Third Five-Year Review Report

for

Joliet Army Ammunition Plant (JOAAP)

Wilmington, Illinois

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Base Realignment and Closure Division

Approved by: **Date:**

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3 Decision Document Summaries

4 Site Inspection Checklists

5 Site Photographs

6 Interview Records

7 ARAR Evaluation

8 Risk Assessment and Toxicology Evaluation

9 Public Notices

10 Midewin National Tallgrass Prairie Management Areas

11 Well Abandonment Information

12 Site-Wide Deed Restriction Implementation Report

13 Responses to USEPA Review Comments

ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
Aerostar	Aerostar Environmental Services, Inc.
AFCEC	Air Force Civil Engineer Center
AFCEE	Air Force Center for Environmental Excellence
ARARs	Applicable or Relevant and Appropriate Requirements
AST	above ground storage tank
bgs	below ground surface
BNA	base neutral acid
BNSF	Burlington Northern Santa Fe
BTF	bioremediation treatment facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CDC	Center for Disease Control
C&D	construction and demolition
CHPPM	Center for Health Promotion and Preventive Medicine
COC	Contaminant(s) of Concern
cm/sec	centimeters per second
CPI LLC	CenterPoint Intermodal, LLC
CV	coefficient of variation
CY	cubic yard(s)
Dames and Moore	Dames and Moore, Inc.
DNAP	dinitroaminophenol
DNB	dinitrobenzene
DNT	dinitrotoluene
DOD	Department of Defense
Donohue	Donohue and Associates, Inc.
ECOP	Environmental Condition of Property
ESD	Explanation of Significant Difference
FFA	Federal Facilities Agreement
FOST	Finding of Suitability to Transfer
FS	Feasibility Study
ft	foot (feet)
ft/day	feet per day
ft/yr	feet per year
GIS	geographic information system
GMZ	groundwater management zone
GOU	Groundwater Operable Unit

GRU	Groundwater Remediation Unit
HMX	High Melting Explosive or cyclotetramethylene-tetranitramine
HRS	Hazard Ranking System
IAC	Illinois Administrative Code
IC	institutional control
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
IOUEL	International Union of Operating Engineers Local
JADA	Joliet Arsenal Development Authority
JOAAP	Joliet Army Ammunition Plant
LAP	Load Assemble Package
lbs	pounds
LTM	long-term monitoring
MEC	Munitions and Explosives of Concern
MFG	Manufacturing
mg/kg	milligrams per kilogram
MKM	MKM Engineers, Inc.
MNA	monitored natural attenuation
MMRP	Military Munitions Response Program
MNTP	Midewin National Tallgrass Prairie
MOA	Memorandum of Agreement
MWH	MWH Americas, Inc.
NA	not applicable
NB	nitrobenzene
NCP	National Contingency Plan
NE	no exceedance
NFA	no further action
NPL	National Priorities List
NT	Nitrotoluene
O&E	ordnance and explosives
O&M	Operation and Maintenance
OHM	OHM Remediation Services Corporation
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCN	polychlorinated naphthalene
PL	Public Law

ppb	parts per billion
ppm	parts per million
PPRTV	Provisional Peer-Reviewed Toxicity Value
PRG	preliminary remedial goal
PVC	Polyvinyl Chloride
R&D	Research and Development
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RAWP	Remedial Action Work Plan
RDF	Recycling Disposal Facility
RDX	Research Department Explosive or cyclotrimethylenetrinitramine
RG	remedial goal
RI	Remedial Investigation
ROD	Record of Decision
SF	square feet
SOU	Soil Operable Unit
SRA	soil restricted area
SRU	Soil Remediation Unit
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TNB	trinitrobenzene
TNT	trinitrotoluene
TOC	total organic carbon
Toltest	Toltest, Inc.
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
UCL95	95th percent upper confidence limit
UE	unrestricted exposure
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USDA/FS	U.S. Department of Agriculture/Forest Service
USAEHA	U.S. Army Environmental Hygiene Agency
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UTL	upper tolerance limit
UU	unlimited use
UXO	unexploded ordnance
VOC	volatile organic compound
WDNR	Wisconsin Department of Natural Resources
yr	year
µg/dL	micrograms per deciliter
µg/L	micrograms per liter

EXECUTIVE SUMMARY

Purpose

This is the third installation-wide five-year review of remedial actions taken at the Joliet Army Ammunition Plant (JOAAP). The purpose of this review is to evaluate information to determine if remedial actions implemented at the sites identified below are and will continue to be protective of human health and the environment.

- Soil Operable Unit (SOU) sites L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L14, L16, L17, L23A, M1, M2, M3, M4, M5, M6, M7, M8, M9, M11, M12, M13, and M16
- Groundwater Operable Unit (GOU) sites L1, L2, L3, L14, M1, M3, M5, M6, M7, M8, and M13

This five-year review is required because hazardous substances remain at the sites thereby preventing unlimited use and unrestricted exposure. The methods, findings, and conclusion of the review are documented in this report. This report also summarizes issues identified during the review and includes recommendations for follow-up actions. The triggering action for this five-year review was the completion of second five-year review for the SOU and GOU in September 2009.

Joliet Army Ammunition Plant

JOAAP is a former U.S. Army munitions facility located on approximately 36 square miles (23,542 acres) of land in Will County, Illinois. The site is located approximately 3 miles north of Wilmington, Illinois. JOAAP was constructed during World War II for manufacturing, loading, assembling, packing, and shipping bombs, projectiles, fuses, and supplementary charges. The plant was used extensively during World War II and again during the Korean War and Vietnam War. Production was stopped in 1977 and the property was declared excess in 1993. The facility is not capable of explosives production and is undergoing transfer of use to other agencies and organizations in accordance with Public Law 104-106 entitled the Illinois Land Conservation Act of 1995. Land transfers have already been made to the U.S. Department of Agriculture (Forest Service), the U.S. Department of Veterans Affairs, the Joliet Arsenal Development Authority, and Will County, Illinois.

Environmental remediation at JOAAP has been addressed under the CERCLA Program as two National Priority List (NPL) sites, a Manufacturing (MFG) area (USEPA ID IL7213820460) and a Load-Assemble-Package (LAP) area (USEPA ID IL0210090049). There are two operable units at JOAAP, a SOU and a GOU. This five-year review is evaluating the protectiveness of the remedies for all SOU and GOU sites identified above and in Tables 1-1 and 1-2.

Soil Operable Unit

The SOU has been divided into six soil remediation units (SRUs) involving CERCLA-based remediation, one SRU involving a non-CERCLA removal action, and a group involving no further action sites for soil. Twenty-six SOU sites were identified for remediation of contaminated soils and debris in the *Record of Decision for Soil and Groundwater Operable*

Units on the Manufacturing and Load-Assemble-Package Areas, National Priority List Sites (U.S. Army 1998). Final remedial goals and selected remedies for 20 of these sites and interim remedies for 14 of these sites were identified in this ROD. Final remedies for 14 interim SOU sites were identified in the *Record of Decision for the Soil Operable Unit Interim Sites* (U.S. Army 2004).

Seven SRUs, listed below, were established to classify the 26 SOU sites according to the type of contaminants:

- SRU1 – Explosives in Soil
- SRU2 – Metals in Soil
- SRU3 – Explosives and Metals in Soil
- SRU4 – PCBs in Soil
- SRU5 – Organics in Soil
- SRU6 – Landfills
- SRU7 – Sulfur

The locations of the SOU sites are shown on Figure 3-2. The remedial actions consisted of the excavation of contaminated soils, which were treated and disposed off site or disposed off site. Landfill caps were installed over waste materials at three sites (L3, M11, and M13). All SOU remedial actions have been completed and final completion reports have been issued. Groundwater monitoring is performed for the landfills at L3, M11, and M13 pursuant to Title 5, Part 724 of the Illinois Administrative Code.

Groundwater Operable Unit

The GOU includes sites where impacted groundwater has been identified. The GOU has been divided into three groundwater remediation units (GRUs) involving CERCLA-based remediation.

- GRU1 is located in the LAP Area and refers to explosives in groundwater at sites L1, L2, L3, and L14.
- GRU2 is located in the MFG Area and refers to explosives and other contaminants in groundwater at sites M1, M5, M6, M7, M8, and M13.
- GRU3 is located in the MFG Area and refers to volatile organic compounds in groundwater at sites M3 and M10.

Final remediation goals for the GRUs were identified in the *Record of Decision for Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas, National Priority List Sites* (U.S. Army 1998). Monitored natural attenuation was identified as the remedy and details are provided in the *Final Groundwater Operable Unit Remedial Design/Remedial Action Work Plan* (MWH 1999a). Groundwater Management Zones (GMZs) were established to define boundaries that encompass impacted groundwater. The locations of the GOU sites are shown on Figure 3-3.

The *Final Long-Term Monitoring Plan [for] Environmental Remediation Services [at] Joliet Army Ammunition Plant* (Toltest 2010) has been the governing document for groundwater monitoring activities at JOAAP during this five-year review.

Site Inspections and Interviews

Five-year review site inspections were performed during April 8 to 17, 2013. Interview questionnaires were issued to the JOAAP Commander's Representative, Midewin Forest Service, Midewin Heritage Association, Will County (Land Use, Energy, and Resource Division), Burlington Northern & Santa Fe Railway Company, and CenterPoint Intermodal, LLC. Arthur Holz, the JOAAP Commander's Representative, was interviewed on site April 15 to 17, 2013. A completed interview questionnaire was received from Dean Olsen, Director of Will County Land Use, Resource, and Energy Division.

Public Notice

A public notice that the five-year review process had begun was published in the Free Press Advocate, a local Wilmington Illinois newspaper, on May 8, 2013. A public notice that the five-year review process was completed was also published in the Free Press Advocate.

Report Format

The five-year review format deviates from the suggested format provided in EPA 540-R-01-007 *Comprehensive Five-Year Review Guidance* and updates. The report provides site or remediation unit-specific information in unique sections to facilitate the review of information for each site/remediation unit. This approach was adopted based on the number of SOU sites (26) and GOU sites (11) at JOAAP.

Issues, Recommendations, and Follow-up Actions

The SRU remedies were executed in accordance with the RODs for all sites. Contaminated soils have been excavated, treated and/or disposed off site. According to the data reviewed, site inspections, and technical assessment, the selected remedies are functioning as intended by the RODs. Issues that affect long-term protectiveness of the remedies and recommendations for follow-up actions are provided below.

- **Site L3;** eroded or displaced rip-rap was observed on the west side of the landfill and should be repaired.
- **Site L5;** closure documentation is not available for metals in soil from a remediated area on the site. The documentation should be located and evaluated to verify that the remediation goals were attained. Closure sampling and analysis should be performed if not already done.
- **Site M6;** the center for Disease Control (CDC) is recommending a lower acceptable level for lead in blood. Additional soil sampling and analysis for lead should be conducted at a detection level less than 1 part per million if the U.S. Environmental Protection Agency accepts the CDC's recommendation.

Issues were also identified that do not affect protectiveness of the remedies. These issues and recommendations for follow-up actions are summarized below.

- Geographic information system (GIS) records have not been retained for institutional controls (ICs) monitoring. The U.S. Army should retain and update the GIS records as part of its monitoring of the implementation of ICs.
- The U.S. Army's compliance with ICs has not been assessed annually and should be done.
- Property owners have not submitted annual reports to the U.S. Army verifying their compliance with ICs. The U.S. Army should make annual requests for Statement of Compliance questionnaires from each property owner.
- The wording on Statement of Compliance questionnaires prepared to assess compliance with ICs has caused confusion for some respondents. The wording should be revised to prevent confusion.
- Statement of Compliance questionnaires prepared to assess compliance with ICs on U.S. Department of Agriculture/Forest Service (USDA/FS) properties had missing or incorrect information. The questionnaires should be revised as follows:
    - Add a statement indicating there is no IC that prohibits camping on USDA/FS properties
    - Incorporate wording changes indicating that the ICs originated from environmental condition of property statements and the two record of decision documents; not as deed restrictions

The GRU remedy was executed in accordance with the 1998 ROD and Remedial Design/Remedial Action Work Plan. Long-term monitoring is ongoing. According to the data reviewed, site inspections, and technical assessment, the selected remedy is functioning as intended by the ROD. An issue that affects protectiveness of the remedy and a recommendation for follow-up action is provided below.

- **GRU2 Site M6;** the toxicity data for 2-nitrotoluene has changed since the 1998 ROD. This compound is now considered a probable human carcinogen. The risk-based remediation goal (RG) for 2-nitrotoluene should be re-evaluated and groundwater monitoring results should be evaluated with respect to the new RG.

Issues were also identified that do not affect protectiveness of the GRU remedy. These issues and recommendations for follow-up actions are summarized below.

- **GRU1 and GRU2;** a residual soil source term has not been evaluated for groundwater. A soil leaching model should be used to determine what the allowable residual soil concentrations would be so that the groundwater RGs can be met. The post-remedial action residual soil concentrations should be compared to these levels to ensure that no new soil source term is contributing to groundwater contamination. The modeling should initially use soil RGs as default concentrations to determine if they would be capable of creating a groundwater exceedance at the site. If so, a site-specific groundwater protection RG should be calculated for comparison to excavation confirmation samples and remedial investigation results associated with soil that was not excavated.

- **GRU1, GRU2, and GRU3;** the Second Five-Year Review Report recommended repair of damaged monitoring well pads. The repairs should consist of placing granular bentonite in the openings at the well surfaces to maintain the surface seals.
- **GRU1 (Site L14)**; 2,4-dinitrotoluene and 2,6-dinitrotoluene exceedances were observed in well H7 (Site L14) during an October 2012 monitoring event. Future long-term monitoring data for well H7 (Site L14) should be evaluated to confirm or refute the results.
- **GRU1 (Site L14);** trend analysis for cyclotrimethylenetrinitramine (RDX) exhibits an increasing trend at well MW512. Future long-term monitoring results should be evaluated to determine whether RDX is increasing in the overburden aquifer.
- **GRU2 Site M8;** sulfate at well MW330 has been detected above the RG. This site was previously recommended for closure. Preparation of a closure report should be postponed due to the detection.
- **GRU2 (sites M5 and M7) and GRU3 (Site M3);** groundwater monitoring is no longer performed at sites M5 and M7. A closure report should be prepared that includes a recommendation for abandoning or maintaining certain wells. Wells to be maintained would be used as control points for groundwater flow monitoring within the MFG Area groundwater management zone. Each site should be designated for "No Further Action".
- **GRU3 (Site M10);** this site has been closed and should be designated for "No Further Action".

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Joliet Army Ammunition Plant (JOAAP)		
EPA IDs: IL7213820460 (Manufacturing Area) IL0210090049 (Load-Assemble-Package Area)		
Region: V	**State:** IL	**City/County:** Wilmington/Will County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Soil Operable Unit (SOU) Groundwater Operable Unit (GOU)	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** U.S. Army		
Author name (Federal or State Project Manager): U.S. Army Corps of Engineers (USACE)		
Author affiliation: U.S. Army Engineer		
Review Period: April 2013 – December 2014		
Date of site inspection: April 8, 2013 to April 16, 2013		
Type of review: Statutory		
Review number: 3		
Triggering action date: September 28, 2009		
Due date *(five years after triggering action date):* September 28, 2014		

Issues/Recommendations				
AOC(s) without Issues/Recommendations Identified in the Five-Year Review:				
SOU sites L1, L2, L4, L6, L7, L8, L9, L10, L11, L14, L16, L17, L23A, M1, M2, M3, M4, M5, M7, M8, M9, M11, M12, M13, and M16 GOU; GRU1 (sites L1, L2, L3, and L14), GRU2 (sites M1, M5, M7, M8, and M13), and GRU3 (site M3)				
Issues and Recommendations Identified in the Five-Year Review:				
AOC(s): SOU site L3	**Issue Category:** Operation and maintenance			
	Issue: Eroded or displaced riprap on the west side of the landfill has not been repaired			
	Recommendation: Repair eroded/displaced rip-rap on the west side of the landfill			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Other	USEPA	October 2015
AOC(s): SOU site L5	**Issue Category:** Remedial action implementation			
	Issue: Closure documentation for lead in soil in the north-central area of a former junk pile is not available			
	Recommendation: Locate closure documentation associated with metals in soil from the north-central portion of a former junk pile area as documented in the Closure Report. Evaluate the data to verify that the remediation goals were attained. Perform closure sampling for metals in soil if not already done.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Other	USEPA	October 2015

AOC(s): SOU site M6	**Issue Category:** New toxicological information			
	Issue: CDC is recommending a lower acceptable lead in blood level			
	Recommendation: Conduct additional soil confirmation sampling/analysis for lead in the remediated area if USEPA accepts CDC's recommended lead in blood level			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Other	USEPA	1 year after acceptance
AOC(s): GRU2 site M6	**Issue Category:** New toxicological information			
	Issue: New toxicology data for 2-NT indicates that the RG should be revised from 5,100 µg/L to 1.3 µg/L			
	Recommendation: Re-evaluate the groundwater monitoring results with respect to the new risk-based concentration for 2-NT			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Other	USEPA	October 2015

Protectiveness Statement(s)

AOC: SOU sites L1, L2, L4, L6, L7, L8, L9, L10, L11, L14, L16, L17, L23A, M1, M2, M3, M4, M5, M7, M8, M9, M11, M12, M13, and M16	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):*
AOC: SOU sites L3, L5, and M6	*Protectiveness Determination:* Short-Term Protective	*Addendum Due Date (if applicable):*
AOC: GRU1, GRU2, and GRU3 sites L1, L2, L3, L14, M1, M3, M5, M7, M8, and M13	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):*

AOC:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
GRU2 site M6	Short-Term Protective	

Protectiveness Statements (SRU Sites):

The remedies at sites L1, L2, L4, L7, L8, L9, L10, L11, L14, L16, L17, L23A, M1, M2, M3, M4, M5, M7, M8, M9, M11, M12, M13, and M16 are protective of human health and the environment because:

- Contaminated soils exceeding the remediation goals (RGs) have been remediated in accordance with the record of decision (ROD) documents.
- Land uses are consistent with the institutional control (IC) objectives identified in the RODs and subsequent land use restrictions.
- The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedies are still valid.
- No other information has come into light that could call into question the protectiveness of the remedies.

The remedies at sites L3, L5, and M6 are currently protective of human health and the environment in the short term because:

- Contaminated soils exceeding the RGs have been remediated in accordance with the RODs.
- Land uses are consistent with the IC objectives identified in the RODs and subsequent land use restrictions.

However, in order for the remedies to be protective in the long-term, the following actions need to be taken to ensure protectiveness:

- Site L3 – repair eroded or displaced riprap on the west side of the landfill.
- Site L5 - obtain site closure documentation for metals in soil from the former Junk Pile Area and confirm that lead concentrations are below the RG.
- Site M6 – perform additional sampling and analysis to evaluate lead in soil concentrations down to 1 mg/kg if the USEPA accepts CDC's recommended lead in blood level (5 µg/dL).

Protectiveness Statements (GRU Sites):

The remedy at GRU1 sites L1, L2, L3, and L14, GRU2 sites M1, M5, M7, M8, and M13, and GRU3 site M3 is protective of human health and the environment because:

- Contaminated soils have been removed (all sites) or contained (sites L3 and M13).
- Long-term monitoring data indicates that contaminant of concern (COC) concentrations have not exceeded the remediation goals at the groundwater management zone boundaries and that natural attenuation processes are occurring.
- Site inspections and assessment of deed restrictions indicate that land uses are consistent with the IC objectives identified in the RODs and restrictions identified in the *Final Remedial Design/Remedial Action Work Plan*

The remedy at GRU2 site M6 is currently protective of human and the environment in the short term based on information and observations noted above. However, in order for the remedy to be protective

in the long-term, the following actions need to be taken to ensure protectiveness:

- A new remediation goal for 2-nitrotoluene should be adopted based on new toxicological information that has come to light since the 1998 ROD.
- Groundwater monitoring data should be evaluated to determine whether 2-nitrotoluene has exceeded the new remediation goal at the groundwater management zone boundaries.

Notes:

COC	contaminant(s) of concern
JOAAP	Joliet Army Ammunition Plant
GOU	Groundwater Operable Unit
IC	institutional control
mg/kg	milligrams per kilogram
RG	remediation goal
ROD	record of decision
SOU	Soil Operable Unit
USACE	U.S. Army Corps of Engineers
µg/dL	microgram(s) per deciliter
µg/L	microgram(s) per liter
2-NT	2-nitrotoluene

1.0 INTRODUCTION

This review was conducted to determine whether previous remedial actions at the former Joliet Army Ammunition Plant (JOAAP) are and will continue to be protective of human health and the environment. The methods, findings, and conclusions of the reviews are documented in this report. Also identified are issues found during the review and recommendations to address them.

The U.S. Army has prepared this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The U.S. Environmental Protection Agency (USEPA) interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

JOAAP has been addressed under the CERCLA program as two National Priorities List (NPL) sites, the Manufacturing (MFG) area (USEPA ID IL7213820460) and the Load-Assemble-Package (LAP) area (USEPA ID IL0210090049). There are two operable units at JOAAP, a Soil Operable Unit (SOU) and a Groundwater Operable Unit (GOU). This five-year review report addresses remedial actions for both NPL sites and both operable units.

The SOU has been divided into six soil remediation units (SRUs) involving CERCLA-based remediation, one SRU involving a non-CERCLA removal action, and a group involving no further action (NFA) sites for soil. Final remedial goals (RGs) and selected remedies for 20 SOU sites were identified in the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas, National Priority List Sites* (U.S. Army 1998). Interim remedies for 14 SOU sites were identified in the 1998 Record of Decision (ROD) and the final remedies for these sites were identified in the *Record of Decision for the Soil Operable Unit Interim Sites* (U.S. Army 2004).

The GOU has been divided into three groundwater remediation units (GRUs) involving CERCLA-based remediation. Final remedial goals for the GRUs were identified in the *Record*

of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas, National Priority List Sites (U.S. Army 1998).

The U.S. Army conducted a review of remedial actions implemented at the JOAAP SOU sites listed in Table 1-1 and GOU Sites listed in Table 1-2 from April to December, 2013. This is the third five-year review for these sites, which was triggered by the completion of the second five-year review in September 2009. Review is required for these sites because the selected remedies do not allow unlimited use (UU) and unrestricted exposure (UE) after the cleanup actions were completed and the cleanup goals were met.

Table 1-1 Summary of SRU Sites

Site	Remediation Unit	COCs	Sub-Sites	Regulatory Program		Record of Decision			Remedial Action				Closure Report Date	Current Land Use	Current Land Owner	Second Five-Year Review (July 2009)			Third Five-Year Review (October 2014)		
				Primary	Secondary	1998 Interim	1998 Final	2004	Type	Implementation Date	OM&M	LUC/ICs				Issues	Recommendation	Current status	Issues	Recommendations	Protectiveness Determination
L1	**SRU1 - Explosives**	1,3,5-TNB & 2,4,6-TNT	Ridge and furrow system; Near Building 61-4 and Building 61-35 sump	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	Oct-05 to Mar-06	groundwater monitoring	Refer to Section 5.2.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
	SRU4 - PCBs	PCB 1260	Soil near transformer pole east of Building 61-4	CERCLA/SARA	TSCA		X		Excavation/Incineration & Disposal	Aug-99 to Oct-99	---		Dec-01								
	SRU5 - Organics	TPH	Soil near above-ground storage tanks (ASTs) at building 61-1 and 61-2	CERCLA/SARA	---	X		X	Excavation & Treatment	Oct-05 to Mar-06	---		Aug-06								
L2	**SRU1 - Explosives**	1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, RDX (includes UXO)	Burning pads and popping furnace area	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	Feb-07 to Oct-07	groundwater monitoring	Refer to Section 5.3.2.3	Oct-09	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
	SRU2 - Metals	As, Cd & Pb (inc. MEC)	Soils near popping furnaces		---	X		X	Excavation & Disposal												
L3	**SRU2 - Metals**	Pb	Soils east of demolition pits; Fire training area	CERCLA/SARA	---	X		X	Excavation & Disposal	Aug-07 to Oct-07	---	Refer to Section 5.4.2.3	Jun-10	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	None	None	Short-term protective
	SRU3 - Explosives & Metals	RDX & Pb	Bermed area		---	X		X	Excavation, Treatment (Bioremediation) & Disposal		groundwater monitoring										
	SRU6 - Landfills	2,6-DNT, Chlordane, Pb, phosphate (possible UXO)	Burning areas (berms) along Prairie Creek		5 IAC Part 724		X		Capping (RCRA Subtitle C cap)		30-yr OM&M per 35 IAC 724.217					No vegetative cover & silt fence at E side of landfill	Install silt fence & hydroseed	Completed	1. Eroded or displaced riprap on the west side of the landfill has not been repaired (may affect long-term protectiveness). 2. The fence gate was unlocked. 3. GIS records have not been retained for ICs monitoring. 4. The US Army's compliance with ICs has not been performed annually.	1. Repair eroded/ displaced riprap on west side of landfill (required for long-term protectiveness). 2. Place a lock on the fence gate. 3. Retain GIS records and update them as part of ICs monitoring. 4. Assess the US Army's compliance with ICs annually.	
L4	**SRU6 - Landfills**	Phosphate	Landfill	CERCLA/SARA	---		X		Excavation & Off-Site Disposal	Dec-05 to Apr-06	---	Refer to Section 5.5.2.3	Aug-07	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually.	Protective
L5	**SRU2 - Metals**	Pb	Open storage area	CERCLA/SARA	---	X		X	Excavation & Disposal	Jun-07 to Sep-07	---	Refer to Section 5.6.2.3	Oct-09	Vacant, not used	USDA/FS and US Army (to be transferred to the USDA)	None	None	---	1. Closure documentation for Pb in soil in north-central area of junk pile is not available (may affect long-term protectiveness). 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. The property owner has not submitted annual reports verifying their compliance with ICs. 5. There is no IC that prohibits camping on the property. 6. The US Army's compliance with ICs has not been assessed annually.	1. Locate closure documentation or perform sampling and analysis (required for long-term protectiveness). 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Makel requests for annual Statement of Compliance questionnaires from the USDA/FS. 5. Revise wording on the Statement of Compliance questionnaire that indicates camping is not prohibited. 6. Assess the US Army's compliance with ICs annually.	Short-term protective
	SRU4 - PCBs	PCB 1254	Junk pile (includes metals)	TSCA	CERCLA/SARA & RCRA		X				---					PCB excavation area shown in Draft Closure Report doesn't match observed conditions. No vegetative cover.	Install silt fence & hydroseed	Completed			
	SRU5 - Organics	TPH	**1998 Interim ROD:** Oil stain area, Drainage ditch, Soil below railroad ties; **2004 ROD:** Oil stain area	CERCLA/SARA	---	X		X			---					None	None	---			
L6	**No Further Action**	TPH, PCBs & BNAs	Storage & service area	CERCLA/SARA	---		X		Excavation & Disposal (prior to 1998 ROD)	1997	---	Refer to Section 5.7.2.3	Mar-98	County Landfill	Will County, IL	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The wording on a Statement of Compliance Questionnaire (for ICs) caused confusion for some respondents. 3. Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs.	1. Retain GIS records and update them as part of ICs monitoring. 2. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 3. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
L7	**SRU1 - Explosives**	2,4,6-TNT & RDX	Around and beneath buildings and sumps	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	July-05 to Feb-06	---	Refer to Section 5.8.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
	SRU4 - PCBs	PCB 1260	Soils around transformer pads	CERCLA/SARA	TSCA		X		Excavation/Incineration & Disposal	Aug-99 to Oct-99	---		Dec-01								
L8	**SRU1 - Explosives**	1,3,5-TNB, 2,4,6-TNT, & RDX	Around and beneath buildings and sumps	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	Sep-05 to Feb-06	---	Refer to Section 5.9.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
	SRU4 - PCBs	PCB 1260	Soils around transformer pads	CERCLA/SARA	TSCA		X		Excavation & Disposal	Aug-99 to Oct-99	---		Dec-01								
L9	**SRU1 - Explosives**	1,3,5-TNB, 2,4,6-TNT, & RDX	Around and beneath buildings and sumps	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	Oct-05 to Jun-06	---	Refer to Section 5.10.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
	SRU4 - PCBs	PCB 1260	Soils around transformer pads	CERCLA/SARA	TSCA		X		Excavation/Incineration & Disposal	Aug-99 to Oct-99	---		Dec-01								

Table 1-1 Summary of SRU Sites

Site	Remediation Unit	COCs	Sub-Sites	Regulatory Program		Record of Decision			Remedial Action				Closure Report Date	Current Land Use	Current Land Owner	Second Five-Year Review (July 2009)			Third Five-Year Review (October 2014)		
				Primary	Secondary	1998 Interim	1998 Final	2004	Type	Implementation Date	OM&M	LUC/ICs				Issues	Recommendation	Current status	Issues	Recommendations	Protectiveness Determination
L10	**SRU1 - Explosives**	2,4,6-TNT, 2,4-DNT, HMX, & RDX	Around and beneath buildings and sumps; sediment in drainage ditch south of Building 3A-10	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	Aug-05 to Sep-05	---	Refer to Section 5.11.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
	SRU4 - PCBs	PCB 1260	Soils around transformer pads	CERCLA/SARA	TSCA		X		Excavation/Incineration & Disposal	Aug-99 to Oct-99	---		Dec-01								
L11	**SRU2 - Metals**	As (inc. MEC)	Soils in target area	CERCLA/SARA	---		X		Excavation & Disposal	Aug-02 & Oct-02	---	Refer to Section 5.12.2.3	Dec-05	Industrial Park	International Union of Operating Engineers Local 150	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs. 5. It is not clear whether deed restrictions were conveyed to the Wilmington Fire Dept.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner. 5. Verify (in the Second Annual Site-Wide Deed Restriction report) whether deed restrictions were conveyed to the Wilmington Fire Department.	Protective
L14	**SRU1 - Explosives**	2,4,6-TNT, HMX & RDX	Soil near sump at Building 4-5	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	July-05 to Aug-05	groundwater monitoring	Refer to Section 5.13.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
L16	**SRU1 - Explosives**	HMX & RDX (inc. MEC)	Soil at sump discharge near Building 6-32	CERCLA/SARA	---		X		Excavation, Treatment (Bioremediation) & Disposal	2001 & Aug-02 to July-03	---	Refer to Section 5.14.2.3	Dec-03	Vacant, not used	Joliet Arsenal Development Authority (JADA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
L17	**SRU4 - PCBs**	PCB 1242	Sediment in drainage ditch	CERCLA/SARA	TSCA		X		Excavation & Disposal	Aug-99 to Oct-99	---	Refer to Section 5.15.2.3	Dec-01	Vacant, not used	Joliet Arsenal Development Authority (JADA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
L23A	**SRU2 - Metals**	Pb	Soils in pit	CERCLA/SARA	---	X		X	Excavation & Disposal	Apr-07 to May-07	---	Refer to Section 5.16.2.3	Oct-09	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. The US Army's compliance with ICs has not been assessed annually.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Assess the US Army's compliance with ICs annually.	Protective
M1	**SRU6 - Landfills**	As & Pb	The southern ash pile	RCRA	CERCLA/SARA		X		Excavation & Off-Site Disposal	Mar-06 to June-08	groundwater monitoring	Refer to Section 5.17.2.3	Dec-09	Vacant, not used	USDA/FS (northern half) US Army (southern half) (to be transferred to the USDA)	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. There is no IC that prohibits camping on the property. 5. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Revise wording on the Statement of Compliance questionnaire that indicates camping is not prohibited. 5. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
M2	**SRU1 - Explosives**	1,3,5-TNB, 2,4,6-TNT, 2,4-DNT & 2,6-DNT	The northern portion of the explosive burning ground and the wetland separating M2 and M11	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	Mar-06 to July-06	---	Refer to Section 5.18.2.3	Aug-06	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually.	Protective

Table 1-1 Summary of SRU Sites

Site	Remediation Unit	COCs	Sub-Sites	Regulatory Program		Record of Decision			Remedial Action				Closure Report Date	Current Land Use	Current Land Owner	Second Five-Year Review (July 2009)			Third Five-Year Review (October 2014)		
				Primary	Secondary	1998 Interim	1998 Final	2004	Type	Implementation Date	OM&M	LUC/ICs				Issues	Recommendation	Current status	Issues	Recommendations	Protectiveness Determination
M3	**SRU1 - Explosives**	1,3,5-TNB, 2,4,6-TNT, & 2,4-DNT	Between primary burning pads and a dumping area/pad	CERCLA/SARA	---	X		X	Excavation, Treatment (Bioremediation) & Disposal	July-06 to Sep-07	groundwater monitoring	Refer to Section 5.19.2.3	Oct-09	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually.	Protective
	SRU2 - Metals	Pb	Lead (and other metals) contaminated soil throughout the site	CERCLA/SARA	---	X		X	Excavation & Disposal												
	SRU3 - Explosives & Metals	1,3,5-TNB, 2,4,6-TNT, & Pb	Flashing area	CERCLA/SARA	---	X		X	Bioremediation & Disposal; Excavation & Disposal												
M4	**SRU2 - Metals**	Pb, K046 (lead wastewater treatment sludges)	Lead contaminated soil around the former leas azide lagoon	CERCLA/SARA	RCRA	X		X	Excavation & Disposal	Dec-06 to Sep-07	---	Refer to Section 5.20.2.3	Oct-09	Vacant, not used	US Army (to be transferred to the USDA)	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually.	Protective
M5	**SRU1 - Explosives**	2,4-DNT, 2,6-DNT, 1,3,5-TNB, 2,4,6-TNT, & tetryl	Around and beneath buildings and ditches throughout the site	CERCLA/SARA	RCRA		X		Excavation, Treatment (Bioremediation) & Disposal	Jul-99 to Nov-99	groundwater monitoring	Refer to Section 5.21.2.3	Dec-00	Industrial Park	BNF-Lease, BNSF, and CenterPoint Intermodal Center at Deer Run property Owners Association (CIC DR POA)	None	None	---	1. Final Closure Report is not available in the project file. 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Place Final Closure Report in the project file. 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
	SRU3 - Explosives & Metals	2,4-DNT, 2,6-DNT, 2,4,6-TNT, & Pb	Throughout the site	CERCLA/SARA	---		X														
M6	**SRU1 - Explosives**	2,4-DNT, 2,6-DNT, 1,3,5-TNB, 2-NT, 2,4,6-TNT, RDX & K111 (DNT production waste waters)	Around and beneath buildings and ditches throughout the site	CERCLA/SARA	RCRA		X		Excavation, Treatment (Bioremediation) & Disposal	Aug-99 to Feb-05	groundwater monitoring	Refer to Section 5.22.2.3	June-06	Vacant, not used	CPI LLC*, BNF-Lease, and BNSF	None	None	---	1. The CDC is recommending a lower acceptable level for Pb in blood (may affect long-term protectiveness). 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Re-evaluate the Pb (soil) RG if USEPA adopts the CDCs recommendation for a lower acceptable Pb in blood level, conduct additional sampling & analysis for Pb in soil at detection limit ≤ 1mg/kg (required for long-term protectiveness). 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Short-term protective
	SRU3 - Explosives & Metals	2,4-DNT, 2,4,6-TNT, As, Be & Pb	Soil in the TNT ditch	CERCLA/SARA	---		X														
M7	**SRU1 - Explosives**	1,3,5-TNB, 2,4-DNT, 2,6-DNT, 2,4,6-TNT, RDX, K047, & K111	Soil in the TNT ditch and red water area	CERCLA/SARA	RCRA		X		Excavation, Treatment (Bioremediation) & Disposal	Jul-01 to Nov-01	groundwater monitoring	Refer to Section 5.23.2.3	Nov-03	Industrial Park	CPI LLC*, and BNSF	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire casued confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring . 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
M8	**SRU7 - Sulfur Sites**	Sulfur	Sulfur present throughout the Oleum Plant	CERCA/SARA	---		X		Excavation & Recycling/Disposal	Unknown	groundwater monitoring	Refer to Section 5.24.2.3	Unknown	Industrial Park	BNF-Lease	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 3. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Retain GIS records and update them as part of ICs monitoring. 2. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 3. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
M9	**SRU6 - Landfills**	2,4-DNT & As	The northern ash pile	CERCA/SARA	---		X		Excavation & Off-Site Disposal	Nov-05 to Apr-06	---	Refer to Section 5.25.2.3	Sep-07	Industrial Park	US Army (landfill) and CPI LLC*	None	None	---	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. Property owners are not submitting annual reports to the US Army verifying their compliance with ICs.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
M11	**SRU6 - Landfills**	As & Pb	Former gravel quarry	CERCLA/SARA	5 IAC Part 724		X		Waste Consolidation & Capping (RCRA Subtitle C cap) Monitored Natural Attenuation (groundwater)	Jul-06 to Aug-08	30 yr O&M per 35 IAC 724.217	Refer to Section 5.26.2.3	Sep-09	Vacant, closed landfill	US Army (to be transferred to the USDA)	Standing water w/ oily/rusty sheen at toe of riprap, W-NW side; excessive vegetative cover, minor surface erosion	Inspect cap/liner on the W-NW side of LF, collect SW & soil samples near oily sheen; mow cap & repair eroded areas	Completed	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually. 3. Implementing 2nd FYR recommendation to replace concrete pads may cause frost heave damage.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually. 3. Plug voids in damaged well pads with bentonite as opposed to concrete.	Protective

Table 1-1 Summary of SRU Sites

Site	Remediation Unit	COCs	Sub-Sites	Regulatory Program		Record of Decision			Remedial Action				Closure Report Date	Current Land Use	Current Land Owner	Second Five-Year Review (July 2009)			Third Five-Year Review (October 2014)		
				Primary	Secondary	1998 Interim	1998 Final	2004	Type	Implementation Date	OM&M	LUC/ICs				Issues	Recommendation	Current status	Issues	Recommendations	Protectiveness Determination
M12	**SRU2 - Metals**	Pb	Metals contaminated soil throughout the site	CERCLA/SARA	---	X		X	Excavation & Disposal	Nov-06 to Sep-07	---	Refer to Section 5.27.2.3	Oct-09	Vacant, not used	USDA/FS	None	None	---	1. Residual COC concentrations in soil at the remediated areas may be suitable for UU/UE. 2. GIS records have not been retained for ICs monitoring. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. There is no IC that prohibits camping on the property. 5. The property owner has not submitted annual reports verifying their compliance with ICs.	1. Evaluate excavation sampling data to determine if UU/UE conditions were attained. 2. Retain GIS records and update them as part of ICs monitoring. 3. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 4. Revise wording on the Statement of Compliance questionnaire that indicates camping is not prohibited. 5. Make requests for annual Statement of Compliance questionnaires from the USDA/FS.	Protective
	SRU7 - Sulfur	Sulfur	Sulfur in the wetland area and drainage ditch immediately south of the lagoon	CERCLA/SARA	---		X		Excavation & Recycling/Disposal												
M13	**SRU6 - Landfills**	Be, Pb & Benzo(a)pyrene	Materials in former disposal area	CERCLA/SARA	5 IAC Part 724		X		Capping (RCRA Subtitle D cap)	Oct-06 to July-08	15 yr maint per 35 IAC 724.217	Refer to Section 5.28.2.3	Sep-09	Industrial Park	CPI LLC*, BNF-Lease, BNSF, and US Army (landfill)	Minor animal burrowing in SE area, excessive vegetation cover, minor erosion, no gate lock	Repair burrows & eroded areas, mow cap, place lock on gate	Completed	1. GIS records have not been retained for ICs monitoring. 2. The US Army's compliance with ICs has not been assessed annually. 3. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 4. The property owner has not submitted annual reports verifying their compliance with ICs.	1. Retain GIS records and update them as part of ICs monitoring. 2. Assess the US Army's compliance with ICs annually. 3. Revise wording on the Statement of Compliance questionnaire that indicates camping is prohibited. 4. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective
M16	**No Further Action Site**	BNAs, pest, metals	Motor pool area	CERCLA/SARA	---		X		None	---	---	Refer to Section 5.29.2.3	---	Industrial Park	BNF-Lease, and BNSF	None	None	---	1. There is no evidence to indicate the presence of COCs at the site. 2. Wording on a Statement of Compliance questionnaire caused confusion for some respondents. 3. The property owner has not submitted annual reports verifying their compliance with ICs.	1. Discontinue future five-year reviews at Site M16. 2. Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion. 3. Make requests for annual Statement of Compliance questionnaires from the property owner.	Protective

Notes:

BNSF = Burlington Northern Santa Fe Railway

* CPI LLC = CenterPoint Intermodal LLC, CenterPoint Properties Trust, and CenterPoint Realty Services Corporation

Table 1-2 Summary of GRU Sites

Site	Remediation Unit	COCs	Sub-Sites	Regulatory Program		Record of Decision			Remedial Action				Closure Date	Current Land Use	Current Land Owner	Second Five-Year Review (July 2009)			Third Five-Year Review (October 2014)		
				Primary	Secondary	1998 Interim	1998 Final	2004	Type	Implementation Date	OM&M	LUC/ICs				Issues	Recommendations	Current Status	Issues	Recommendations	Protectiveness Determination
L1	GRU1; Explosives, LAP Area	1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, RDX	GW related to the ridge and furrow area	CERCLA/SARA			X		MNA & LUC/ICs	Oct-05	Semi-annual monitoring, refer to Section 6.3.2.2	Refer to Section 5.2.2.3	Not closed	Vacant, not used	US Army (to be transferred to the USDA)	Some concrete well pads are damaged	Repair damaged well pads	Weep holes drilled in protective casing	1. Residual soil source term not evaluated for GW. 2. Implementing 2nd FYR recommendation to replace concrete pads may cause frost heave damage. 3. Oct-12 analytical results for 2,4-DNT & 2,6-DNT at well H7 may be anomaly. 4. Trend analysis for RDX at well MW512 exhibits an inc. trend.	1. Use soil leaching model to determine allowable soil concs for attainment of RGs. Evaluate excavation sampling data to ensure no new soil source term is contributing to GW contamination. 2. Plug voids in damaged well pads with bentonite as opposed to concrete. 3. Evaluate future analytical results for well H7 (Site L14) with respect to 2,4-DNT & 2,6-DNT exceedances (Oct-12). 4. Evaluate future analytical results for well MW512 (Site L14) with respect to RDX migration in overburden.	Protective
L2		RDX	GW downgradient of burning pad area	CERCLA/SARA			X					Refer to Section 5.3.2.3									
L3		RDX	GW downgradient of burning cage; GW downgradient of bermed area	CERCLA/SARA	5 IAC Part 724		X					Refer to Section 5.4.2.3									
L14		RDX	GW downgradient of sumps at Bldg. 4-5	CERCLA/SARA			X					Refer to Section 5.13.2.3									
M1	GRU2: Explosives & Other Contaminants, MFG Area	Sulfate & 2,6-DNT	Southern ash pile	CERCLA/SARA			X		MNA & LUC/ICs	Oct-05	Semi-annual monitoring for sulfate, refer to Section 6.4.2.2	Refer to Section 5.17.2.3	Not closed	Vacant, not used	US Army (to be transferred to the USDA)	Some concrete well pads are damaged	Repair damaged well pads	Weep holes drilled in protective casing	1. New toxicity data for 2-NT indicates that the RG should be revised from 5,100 ug/L to 1.3 ug/L (this issue may affect protectiveness). 2. Residual soil source term not evaluated for groundwater. 3. Implementing 2nd FYR recommendation to replace concrete pads may cause frost heave damage. 4. Monitoring is no longer performed at sites M5 & M7. 5. Sulfate at well MW330 (Site M8) has been detected > the RG; this site was previously recommended for closure.	1. Adopt the new RG for 2-NT in groundwater (1.3 ug/L) based on current toxicity data. Re-evaluate results from sites where this compound is monitored (required for long-term protectiveness). 2. Use soil leaching model to determine allowable soil concs for attainment of RGs. Evaluate excavation sampling data to ensure no new soil source term is contributing to groundwater contamination. 3. Plug voids in damaged well pads with bentonite as opposed to concrete. 4. Prepare a closure report for sites M5 & M7; designate each site for "No Further Action". 5. Postpone the closure report for Site M8 until sulfate concentrations are < the RG for a min. of 2 consecutive sampling events.	Protective
M5		2,4,6-TNT, 2,6-DNT & Fe	Tetryl production area	CERCLA/SARA			X				Monitoring is no longer occurring at the site	Refer to Section 5.21.2.3		Industrial Park	BNF-Lease, BNSF, and CenterPoint Intermodal Center at Deer Run property Owners Association (CIC DR POA)						Protective
M6		1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, 2-NT, NB, RDX, Cd & PCE	TNT ditch complex	CERCLA/SARA			X				Semi-annual monitoring for explosives, refer to Section 6.4.2.2	Refer to Section 5.22.2.3		Vacant, not used	CPI LLC, BNF-Lease & BNSF						Short-term protective
M7		2,4,6-TNT, 2,4-DNT, 2,6-DNT, DNT & RDX	Red water area	CERCLA/SARA			X				Monitoring is no longer occurring at the site	Refer to Section 5.23.2.3		Industrial Park	CPI LLC & BNSF						Protective
M8		2,4-DNT, 2,6-DNT, Sb & Fe	Acid Manufacturing Area	CERCLA/SARA			X				Semi-annual monitoring for sulfate, refer to Section 6.4.2.2	Refer to Section 5.24.2.3		Industrial Park	BNF-Lease						Protective
M13		1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, Sb & Cd	Gravel pits	CERCLA/SARA	5 IAC Part 724		X				Semi-annual monitoring for explosives, metals, VOCs, SVOCs, and indicator parameters; refer to Section 6.4.2.2	Refer to Section 5.28.2.3		Industrial Park	CPI LLC, BNF-Lease, BNSF & US Army (landfill)						Protective
M3	GRU3; VOCs, MFG Area	Benzene, Toluene	Flashing Grounds	CERCLA/SARA			X		MNA & LUC/ICs	Oct-05	Monitoring is no longer occurring at this site	Refer to Section 5.19.2.3	Not closed	Vacant, not used	US Army (to be transferred to the USDA)	Some concrete well pads are damaged	Repair damaged well pads	Weep holes drilled in protective casing	1. Implementing 2nd FYR recommendation to replace concrete pads may cause frost heave damage. 2. GW monitoring is no longer performed at Site M3. 3. Site M10 has been closed.	1. Plug voids in damaged well pads with bentonite as opposed to concrete. 2. Prepare closure report for Site M3 & designate for "No Further Action". 3. Designate Site M10 for "No Further Action".	Protective
M10		Benzene, Toluene	Western and Central Toluene Tank Farms	CERCLA/SARA			X				Site closed, monitoring is no longer performed	Refer to Section 5.1.3.8 (Table 5-2)	Oct-05	MNTP	USDA/FS						Removed from the five-year review (see Note 1)

Notes:

1 - GRU3 Site M10 was closed by regulatory acceptance of the *Final Site M10 Closure Report* , it is not included further in this five-year review report

BNSF = Burlington Northern Santa Fe Railway

CPI LLC = CenterPoint Intermodal LLC, CenterPoint Properties Trust, and CenterPoint Realty Services Corporation

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2.0 SITE CHRONOLOGY

The following table lists the dates of important events for the JOAAP SOU and GOU sites subject to this five-year review.

Table 2-1: Chronology of Site Events

Event	Date
Facility-Wide	
The JOAAP was constructed to manufacture, load, assemble, pack, and ship bombs, projectiles, fuses, and supplementary charges	World War II
Production of explosives halted; sulfuric acid and ammonium nitrate plants leased out; other production facilities put in layaway status	1945
Production of explosives reactivated	Korean and Vietnam Wars
Gradual decrease in production of explosives during the Vietnam War and then stopped completely	1977
Installation assessment conducted and environmental impacts evaluated at former JOAAP industrial areas by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA)	1978
Installation Assessment of Joliet Army Ammunition Plant issued by USATHAMA	September 1978
Installation restoration survey conducted by Donohue and Associates, Inc. (Donohue) that included soil, groundwater, surface water, and sediment sampling at the MFG and LAP areas	1981-1982
Installation Restoration Surveys: Joliet Army Ammunition Plant (JOAAP) submitted by Donahue	November 1982
Phase II investigation conducted by Donohue for additional data on previously sampled sites at MFG and LAP areas to assess off-site impacts	1983
Joliet Army Ammunition Plant-Phase II Technical Report submitted by Donahue	August 1983
Environmental Baseline Study, Proposed Burn Ground, Joliet Illinois submitted by Dames and Moore	1986
Midwest Site Confirmatory Survey Assessment Report for Joliet Army Ammunition Plant submitted by Dames and Moore	1986
Environmental Baseline Study, Group 3A and AT4-PVC Area submitted by Dames and Moore, Inc. (Dames and Moore)	1988

Table 2-1: Chronology of Site Events

Event	Date
Federal Facilities Agreement (FFA) between the U.S. Army, USEPA, and Illinois Environmental Protection Agency (IEPA) under CERCLA Section 120 and RCRA Sections 6001, 3008(h), and 3004(u, v)	1989
107 underground storage tanks (USTs) identified, inventoried, and evaluated by USACE; most were removed	1989-1993
Storm Water Outfall Evaluations, Joliet Army Ammunition Plant, Joliet Illinois issued by the U.S. Army Environmental Hygiene Agency (USAEHA)	1990
Ecological risk assessments conducted by the U.S. Army Center for Health Promotion and Preventative Medicine (CHPPM)	1993-1996
Phase 2 Aquatic Ecological Risk Assessment, Joliet Army Ammunition Plant, Joliet, Illinois issued by CHPPM	June 1993
Baseline Risk Assessments conducted by Dames and Moore to quantify the potential human health risks posed by contamination identified at the MFG and LAP areas	1994-1995
Health Risk Assessment for Consumption of Deer Muscle and Liver from Joliet Army Ammunition Plant, Joliet Illinois issued by CHPPM	1994
Baseline Risk Assessment, Final, MFG Area, Joliet Army Ammunition Plant, Joliet Illinois submitted by Dames and Moore	1994
Final Ecological Risk Assessment, Joliet Army Ammunition Plant, Volume 1, Phase 1 issued by CHPPM	November 1994
Phase II Aquatic Ecological Risk Assessment issued by CHPPM	1996
Preliminary Remediation Goals (PRGs) established by OHM based on risk assessment results	1996
Public Law 104-106 of Fiscal Year 1996; Department of Defense (DOD) Authorization Act legislated specific terms for conveyance of JOAAP to various entitles	1996
Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas, National Priority List Sites issued by the U.S. Army (signed in November)	October 1998
Finding of Suitability to Transfer (FOST), Joliet Army Ammunition Plant, Wilmington, Illinois submitted by MWH	June 1999
Multi-Agency Team completes Human Health Work Group and Ecological Work Group technical reports	2000

Table 2-1: Chronology of Site Events

Event	Date
Building decontamination and demolition activities conducted by Plexus Scientific Corporation	January 2000-July 2005
Proposed Plan for the Interim Soil Operable Unit, Joliet Army Ammunition Plant, Will County, Illinois issued by the U.S. Army	2004
Record of Decision for the Soil Operable Unit Interim Sites signed and issued by the U.S. Army	June 2004
Load-Assemble-Package Area	
LAP area proposed for listing on the NPL	1985
Final NPL Listing for LAP area	1989
Phase I and II remedial investigations (RIs) conducted at by Dames and Moore for 35 sites in the LAP area	1991-1994
Phase 1 Remedial Investigation Report (RI), Loading–Assemble–Package (LAP) Area, Joliet Army Ammunition Plant, Joliet Illinois submitted by Dames and Moore	July 1993
Phase 2 Remedial Investigation, Load-Assemble-Package (LAP) Area, Joliet Army Ammunition Plant, Joliet, Illinois submitted by Dames and Moore	December 1994
Field Screening of soil for explosives performed; results were included in feasibility study (FS) reports submitted by Dames and Moore for the LAP area and OHM Remediation Services Corporation (OHM) for the MFG area	1995
Baseline Risk Assessment, Load-Assemble-Package (LAP) Area, Jolliet Army Ammunition Plant, Joliet, Illinois submitted by Dames and Moore	February 1995
Feasibility Study, Soil and Groundwater Operable Units, Load-Assemble-Package (LAP) Area, Joliet Army Ammunition Plant, Joliet Illinois submitted by Dames and Moore	September 1997
Pre-Design Investigation activities conducted by MWH Americas, Inc. (MWH) at the MFG and LAP areas	1998
Manufacturing Area	
MFG area proposed for listing on the NPL	1984
Final NPL Listing for the MFG area	1987
Phase I and II RIs conducted by Dames and Moore for 18 sites in the MFG area	1988-1993
Phase 2 Remedial Investigation, Manufacturing (MFG) Area, Joliet Army	May 1993

Table 2-1: Chronology of Site Events

Event	Date
Ammunition Plant, Joliet Illinois submitted by Dames and Moore	
Baseline Risk Assessment, Manufacturing (MFG) Area, Joliet Army Ammunition Plant, Joliet, Illinois submitted by Dames and Moore	December 1994
Field Screening of soil for explosives performed; results were included in FS reports submitted by Dames and Moore for the LAP area and OHM for the MFG area	1995
Removal action conducted by USACE for polychlorinated biphenyl (PCB) switch boxes from the MFG area	1996-1997
Feasibility Study Report, Soil and Groundwater Operable Units, Manufacturing (MFG) Area, Joliet Army Ammunition Plant, Will County, Illinois submitted by OHM	September 1997
Pre-design investigation activities conducted by MWH at the MFG and LAP areas	1998
Soil Operable Unit	
Proposed Plan for the Soils Operable Unit, Joliet Army Ammunition Plant, Will County, Illinois issued by the U.S. Army	1997
Proposed Plan for SOU presented at a public meeting	January 1998
Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase I submitted by MWH	April 1999
Wetlands Delineation, Wetlands Mitigation, Soils Operable Unit, Remedial Design/Remedial Action – Phase I submitted by MWH	June 1999
Focused Feasibility Study Soil Operable Unit, Load-Assemble-Package Area and Manufacturing Area Joliet Army Ammunition Plant Joliet Illinois issued by USACE	February 2004
Proposed Plan for the Interim Soil Operable Unit, Joliet Army Ammunition Plant, Will County, Illinois issued by the U.S. Army	2004
Final Five-Year Review Report Soils Operable Unit submitted by MWH	April 2004
Record of Decision for the Soil Operable Unit Interim Sites signed and issued by the U.S. Army	June 2004
Final FY2002 Bioremediation Report, Soils Operable Unit submitted by MWH	January 2005
Remedial Design / Remedial Action Workplan – Phase 2, Soils Operable Unit submitted by MWH	October 2005

Table 2-1: Chronology of Site Events

Event	Date
Treatment Completion Report, SRU1 Tetryl Soils, Revision 1 submitted by MWH	May 2006
Operation and Maintenance Plan for SRU6 submitted by MKM	May 2006
Five-Year Review Report, Second Five Year Review Report Soils Operable Unit for Joliet Army Ammunition Plant (JOAAP) Wilmington, Illinois submitted by Aerostar Environmental Services, Inc. (Aerostar)	August 2009
FY2005-07 Bioremediation Report, Bioremediation Treatment Facility submitted by MWH	July 2010
Site L1	
Two transformers removed from an area east of Building 61	August 1990
Remedial action (RA) for SRU4 conducted by MWH	August-October 1999
PCB Sites RA Closure Report Load-Assemble-Package Area (Sites L1, L7, L8, L9, L10 and L17) submitted by MWH	December 2001
RA for SRU1 and SRU5 conducted by MWH	October 2005-March 2006
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site L2	
Removal action for Site L2 wastes conducted by USACE	1996-1997
Engineering Evaluation/Cost Analysis Sites L2, L3, L11, L16, L21, L34, Joliet Army Ammunition Plant, Wilmington, Illinois submitted by U.S. Army Engineering and Support Center	October 1999
Remediation Action Work Plan Military Munitions Response Program (MMRP) Sites L2, L3, and L34 submitted by MKM	October 2006
RA for SRU1 and SRU2 conducted by MWH	February-October 2007
Closure Report Sites L2, L5, L23A, M3, M4, and M12 submitted by MWH	October 2009
Site L3	
Prairie Creek bank stabilization adjacent to Site L3 conducted by USACE	1996-1997
Engineering Evaluation/Cost Analysis Sites L2, L3, L11, L16, L21, L34, Joliet Army Ammunition Plant, Wilmington, Illinois submitted by U.S. Army Engineering and Support Center	October 1999

Table 2-1: Chronology of Site Events

Event	Date
Remediation Action Work Plan Military Munitions Response Program (MMRP) Sites L2, L3, and L34 submitted by MKM	October 2006
RA activities for SRU2, SRU3, and SRU6 conducted by MWH	June 2007-October 2008
Site L3 Landfill Cover Remedial Design Report submitted by MWH	November 2007
L3 Closure Report submitted by MWH	June 2010
Site L4	
L4 Remedial Action Work Plan for Remediation of Soils Operable Unit 6 L4 Landfill submitted by MKM	November 2005
RA for SRU6 conducted by MKM	December 2005-April 2006
Remedial Action Completion Report for Soils Operable Unit Number 6 – L4 Landfill submitted by MKM	August 2007
Site L5	
MEC clearance and RA for SRU2, SRU4, and SRU5 conducted by MWH	June-September 2007
Closure Report Sites L2, L5, L23A, M3, M4, and M12 submitted by MWH	October 2009
Site L6	
RA for PCB contaminated soil (SRU6) conducted by USACE	1997
Final Report, U.S. Department of Defense Removal Action, L6/Group 70 Area, Joliet Army Ammunition Plant, Wilmington, Illinois submitted by International Technology Corporation	March 1998
Site L7	
RA for SRU4 conducted by MWH	August-October 1999
PCB Sites RA Closure Report Load-Assemble-Package Area (Sites L1, L7, L8, L9, L10 and L17) submitted by MWH	December 2001
RA for SRU1 conducted by MWH	July 2005-February 2006
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site L8	

Table 2-1: Chronology of Site Events

Event	Date
RA for SRU4 conducted by MWH	August-October 1999
PCB Sites RA Closure Report Load-Assemble-Package Area (Sites L1, L7, L8, L9, L10 and L17) submitted by MWH	December 2001
RA for SRU1 conducted by MWH	September 2005-March 2006
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site L9	
RA for SRU4 conducted by MWH	August-October 1999
PCB Sites RA Closure Report Load-Assemble-Package Area (Sites L1, L7, L8, L9, L10 and L17) submitted by MWH	December 2001
RA for SRU1 conducted by MWH	October 2005-June 2006
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site L10	
RA for SRU4 conducted by MWH	August-October 1999
PCB Sites RA Closure Report Load-Assemble-Package Area (Sites L1, L7, L8, L9, L10 and L17) submitted by MWH	December 2001
RA for SRU1 conducted by MWH	August-October 2005
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site L11	
Engineering Evaluation/Cost Analysis Sites L2, L3, L11, L16, L21, L34, Joliet Army Ammunition Plant, Wilmington, Illinois submitted by U.S. Army Engineering and Support Center	October 1999
RA for SRU2, including removal of ordnance and explosives (O&E), conducted by MWH	August-October 2002
Closure Report Sites L11/L16 submitted by MWH	December 2003

Table 2-1: Chronology of Site Events

Event	Date
Site L14	
RA for SRU1 conducted by MWH	July-August 2005
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site L16	
Engineering Evaluation/Cost Analysis Sites L2, L3, L11, L16, L21, L34, Joliet Army Ammunition Plant, Wilmington, Illinois submitted by U.S. Army Engineering and Support Center	October 1999
O&E characterization and removal activities performed	2001
RA for SRU1, including O&E removal, conducted by MWH	August 2002-August 2003
Closure Report Sites L11/L16 submitted by MWH	December 2003
Site L17	
RA for SRU4 conducted by MWH	August-October 1999
PCB Sites RA Closure Report Load-Assemble-Package Area (Sites L1, L7, L8, L9, L10 and L17) submitted by MWH	December 2001
Site L23A	
RA for SRU2 conducted by MWH	April-May 2007
Closure Report Sites L2, L5, L23A, M3, M4, and M12 submitted by MWH	October 2009
Site M1	
Interim operation and maintenance (O&M) activities conducted by USACE at the southern ash pile	1997
Interim O&M activities (cap replacement and installation of an impermeable plastic liner) conducted by MWH	April-July 1999
Explanation of Significant Differences, Site M1 – Southern Ash Pile, Joliet Army Ammunition Plant, Wilmington, Illinois issued by USACE to modify groundwater management zone (GMZ) boundaries	February 2003
Remedial Action Work Plan for Remediation of Soils Operable Unit 6 M1 Southern Ash Pile submitted by MKM	April 2006
RA for SRU6 conducted by MKM	March 2006-August

Table 2-1: Chronology of Site Events

Event	Date
	2008
M1 Remedial Action Completion Report Soils Operable Unit M1 Southern Ash Pile submitted by MKM	December 2009
Site M2	
RA for SRU1 conducted by MWH	March-July 2006
Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit submitted by MWH	October 2006
Site M3	
RA for SRU1, SRU2, and SRU3 conducted by MWH	July 2006-September 2007
Closure Report Sites L2, L5, L23A, M3, M4, and M12 submitted by MWH	October 2009
Site M4	
Start of construction by MWH for Site M4 Soil Stockpile Area; SOU and GOU RA trigger (start) date	May 1999
Biological treatment facility operated by MWH at Site M4	1999-2007
Sampling and Analysis Plan, SB-1 Treatment System, Site M4 Bioremediation Treatment Facility submitted by MWH	June 2004
Stormwater Basin (SB-1) Discharge Exceedance Event and Corrective Action Report, Site M4 - Bioremediation Treatment Facility submitted by MWH	September 2004
Stormwater Basin (SB-1) Corrective Action Plan, Site M4 - Bioremediation Treatment Facility submitted by MWH	October 2004
RA for SRU2 conducted by MWH	December 2006-September 2007
Closure Report Sites L2, L5, L23A, M3, M4, and M12 submitted by MWH	October 2009
Site M5	
RA for SRU1 and SRU3 by MWH	July-November 1999
Site M5 Closure Report submitted by MWH	December 2000

Table 2-1: Chronology of Site Events

Event	Date
Site M6	
RA for SRU1 and SRU3 conducted by MWH	August-December 1999
RA for SRU1 conducted by MWH	July-November 2002
RA for SRU1 and SRU3 conducted by MWH	August-November 2003
RA for SRU3 conducted by MWH	January 2004-February 2005
Closure Report, Site M6 Soils Operable Unit submitted by MWH	June 2006
Site M7	
Pre-remediation sampling at the Red Water Lagoon conducted by Donohue	1983
RA conducted by Uniroyal (JOAAP's operating contractor) to remove contaminated surface water and sediments from the Red Water Lagoon	1983-1985
Post-remediation sampling at the Red Water Lagoon conducted by Donohue	1985
RA for SRU1 conducted by MWH	July 2001 -November 2002
Closure Report Site M7 submitted by MWH	November 2003
Site M8	
Oleum Plant Remedial Investigation, Addendum No. 1 to the Phase 2 Remedial Investigation and Baseline Risk Assessment, Manufacturing (MFG) Area, Joliet Army Ammunition Plant, Joliet, Illinois submitted by Dames and Moore	July 1996
Sulfur (SRU7) removed from surface soils prior to transfer of the property to the State of Illinois	Prior to August 10, 2000
Site M9	
Leachate collection and disposal O&M activities by MWH begin at the northern Ash Pile	November 1999
Enhanced temporary cap installed by MWH to promote surface water drainage	July-August 2001
Remedial Action Work Plan for Remediation of Soils Operable Unit 6 M9 Northern Ash Pile submitted by MKM Engineers, Inc. (MKM)	November 2005
RA for SRU6 conducted by MKM	November 2005-April

Table 2-1: Chronology of Site Events

Event	Date
	2006
M9 Remedial Action Completion Report Soil Operable Unit M9 Northern Ash Pile submitted by MKM	September 2007
Site M11	
Remedial Action Work Plan for the Remediation of Soils Operable Unit 6, M11 Landfill submitted by MKM	September 2007
RA for SRU6 conducted by MKM	July 2006-August 2008
M11 Remedy in Place Report submitted by MKM	September 2009
Site M12	
RA for SRU2 and SRU7 conducted by MWH	November 2006-September 2007
Closure Report Sites L2, L5, L23A, M3, M4, and M12 submitted by MWH	October 2009
Site M13	
M13 Remedial Action Work Plan for Remediation of Soils Operable Unit 6 M13 Landfill submitted by MKM	July 2007
RA for SRU6 conducted by MKM	October 2006-July 2008
M13 Remedy in Place Report submitted by MKM	September 2009
Groundwater Operable Unit	
Groundwater and surface water samples collected by Dames and Moore from the MFG and LAP areas	1985 and 1986
Proposed Plan for the Groundwater Operable Unit, Joliet Army Ammunition Plant, Will County, Illinois issued by the U.S. Army	1997
Proposed Plan for GOU presented at a public meeting	January 1998
Groundwater Operable Unit Final Remedial Design/Remedial Action Work Plan, Joliet Army Ammunition Plant, Joliet Illinois submitted by MWH	April 1999
Start of construction of Site M4 Soil Stockpile Area; SOU and GOU RA trigger (start) date	May 1999
Groundwater samples collected from MFG and LAP area wells by MWH	June-November 1999
36 monitoring wells abandoned in the MFG and LAP areas by MWH; abandonment records were provided in the Spring 2000 Semi-Annual	December 1999

Table 2-1: Chronology of Site Events

Event	Date
Groundwater Monitoring Report	(field activities), September 2000 (report)
Groundwater samples collected from MFG and LAP area wells by MWH	May and October 2000
26 MFG area monitoring wells abandoned by MWH; documented in the Spring 2001 Semi-Annual Groundwater Monitoring Report	March-May 2001 (field activities), September 2001 (report)
Groundwater samples collected from MFG and LAP area wells by MWH	May and October 2001
18 monitoring wells installed by MWH to replace previously abandoned wells in the MFG and LAP areas; documented in the Fall 2001 Annual Groundwater Monitoring Report	September-October 2001 (field activities), April 2002 (report)
Groundwater samples collected from MFG and LAP area wells by MWH	May and October 2002
Groundwater samples collected from MFG and LAP area wells by MWH	May and October 2003
Final Five-Year Review Report Groundwater Operable Unit submitted by MWH	April 2004
Groundwater Operable Unit Long-Term Monitoring Long-Term Operation Work Plan submitted by MKM	June 2007
Five-Year Review Report Second Five-Year Review Report Groundwater Operable Unit for Joliet Army Ammunition Plant (JOAAP) Wilmington, Illinois submitted by Aerostar	August 2009
Long-Term Monitoring Plan for Environmental Remediation Services, Joliet Army Ammunition Plant, Wilmington, IL submitted by Toltest, Inc. (Toltest)/MWH	March 2010
43 monitoring wells abandoned from the LAP and MFG areas; documented in a letter report submitted by Toltest/MWH	August-September 2010 (field activities), September 2010 (report)
GRU2 Site M7	
Groundwater sampling conducted by U.S. Army Environmental Hygiene Agency (USAEHA) as part of JOAAP's Resource Conservation Recovery Act (RCRA) groundwater monitoring program at Site M13 and the Red Water Lagoon (Site M7)	1983-1985
GRU2 Site M8	
Oleum Plant Remedial Investigation, Addendum No. 1 to the Phase 2 Remedial Investigation and Baseline Risk Assessment, Manufacturing (MFG) Area, Joliet Army Ammunition Plant, Joliet, Illinois submitted by	July 1996

Table 2-1: Chronology of Site Events

Event	Date
Dames and Moore	
GRU2 Site M13	
Groundwater sampling conducted by USAEHA as part of JOAAP's RCRA groundwater monitoring program at Site M13 and the Red Water Lagoon (Site M7)	1983-1985
Site M13 well abandonment and replacement activities performed by MWH and documented in the Fall 2003 Annual Groundwater Report	January 2004 (field activities), March 2004 (report)
GRU3 Site M10	
Groundwater Operable Unit Site M10 Closure Report submitted by MWH	March 2003

Notes:

There are no site-specific events for SOU site M16, GRU1 sites L1, L2, L3, and L14, GRU2 sites M1, M5, and M6, and GRU3 site M3 that warrant inclusion in Table 2-1.

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3.0 BACKGROUND

3.1 PHYSICAL CHARACTERISTICS

JOAAP is a former U.S. Army munitions facility located on approximately 36 square miles (23,542 acres) of land in Will County, Illinois (Figure 3-1). The site is located approximately three miles north of Wilmington, Illinois, a community of 5,134 residents.

The site is located within the northern part of the Central Lowlands physiographic province, which is characterized by relatively flat topography and low relief. The most prominent feature at JOAAP is an approximately 50 feet (ft) high escarpment that trends north-south through the former installation.

3.2 HYDROLOGY

JOAAP lies within the fork of the confluence of the Des Plaines and Kankakee Rivers. Most of the LAP area drains to the Kankakee River. The Grant Creek and Prairie Creek drainage basins cover approximately 70 percent of the installation, and the Jackson Creek drainage basin covers the remainder. Jackson and Grant creeks are tributaries to the Des Plaines River, whereas Prairie Creek eventually discharges to the Kankakee River. Man-made ditches facilitate drainage to these creeks from the sites.

The hydrology of the area is subdivided into four separate aquifer systems and major confining beds. The aquifer systems are, from uppermost downward:

- Shallow overburden (glacial drift)
- Shallow bedrock (dolomites)
- Cambrian-Ordovician sandstones and dolomites
- Mount Simon sandstone

Groundwater flow in the MFG area is generally westerly but is locally influenced by streams that are incised into the glacial drift. Groundwater flow occurs in several aquifers beneath the site. The shallow overburden aquifer is underlain by a dolomite water-bearing zone. Deeper bedrock aquifers are isolated from the shallow aquifer by low-permeability shale beds. Groundwater in the LAP Area overburden and shallow bedrock appears to discharge to Prairie Creek, a major surface water body draining the area.

Groundwater at JOAAP has been classified as both Class I and Class II in accordance with Illinois Administrative Code (IAC) §620.410 and §620.420. The glacial drift aquifer is Class II because its low yield does not supply usable quantities of groundwater. The shallow dolomite bedrock is considered a Class I groundwater resource and has limited use in the vicinity of JOAAP as a water source despite elevated levels of sulfate and iron.

3.3 LAND AND RESOURCE USE

JOAAP was constructed during World War II for the purpose of manufacturing, loading, assembling, packing, and shipping bombs, projectiles, fuses, and supplementary charges. The production output varied with the demand for munitions. Although the plant was used

extensively during World War II, in 1945 all production of explosives was halted, sulfuric acid and ammonium nitrate plants were leased out, and the remaining production facilities were put in layaway status. The installation was reactivated during the Korean War and again during the Vietnam War. Production at the plant gradually decreased until it was stopped completely in 1977. Since then, various defense contractors under facility-use contracts have utilized some areas of the installation. In April 1993, JOAAP property was declared as excess by the U.S. Army and is now being maintained by a small staff under liquidation status. The facility is not capable of explosives production and is undergoing transfer of use to other agencies and organizations in accordance with Public Law (PL) 104-106, entitled the Illinois Land Conservation Act of 1995, (Div. B, Title 2901-2932, Feb 10, 1996). This law states that the U. S. Army will transfer JOAAP land to various federal, local and state jurisdictions. Land transfers already made by the U.S. Army are listed below:

- U.S. Department of Agriculture - Forest Service (USDA/FS) for establishing the Midewin National Tallgrass Prairie (MNTP); 123 parcels encompassing 20,316.6 acres
- Joliet Arsenal Development Authority (JADA) for subsequent transfer to private entities; 62 parcels encompassing 2,791.1 acres
- Will County, Illinois for development of a landfill; 2 parcels encompassing 465.14 acres
- Department of Veterans Affairs for use as the Abraham Lincoln National Cemetery; 27 parcels encompassing 983.37 acres

During the time when JOAAP was fully operational, it was divided into two main function areas: the LAP area, located to the east of Route 53, and the MFG area, located to the west of Route 53 (Figure 3-2). The LAP area, which covers approximately 22 square miles, is where munitions were loaded, assembled, and packaged for shipping. This area contained munitions, filling and assembly lines, storage areas, and a demilitarized area. The MFG area, which covers approximately 14 square miles, is where the chemical constituents of munitions, propellants, and explosives were manufactured. Production facilities were located in the northern part of the MFG area. Explosives storage facilities were located in the southern part of the MFG area.

3.4 HISTORY OF CONTAMINATION

Past releases and disposal practices at JOAAP have resulted in soil and groundwater contamination with explosives compounds, metals, organic compounds, PCBs, sulfur, and hazardous and non-hazardous debris. Due to the presence of contamination in both groundwater and soil at JOAAP, separate Operable Units (OUs) were established for each medium to address remediation objectives at the sites.

3.4.1 Soil Operable Unit

Twenty-six SOU sites were identified for remediation of contaminated soils and debris in the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas, National Priority List Sites* (U.S. Army 1998). Seven SRUs, listed below, were established to classify the 26 SOU sites according to the type of contaminants:

- SRU1 – Explosives in Soil
- SRU2 – Metals in Soil
- SRU3 – Explosives and Metals in Soil

- SRU4 – PCBs in Soil
- SRU5 – Organics in Soil
- SRU6 – Landfills
- SRU7 – Sulfur

The 1998 ROD selected final remedies for all sites in the SOU containing PCBs (SRU4), landfills (SRU6), sulfur (SRU7), and for the sites contaminated with explosives (SRU1), metals (SRU2), intermixed explosives and metals (SRU3) and organics (SRU5) that were intended for transfer to the State of Illinois for the development of industrial parks. The 1998 ROD also selected interim remedial goals and remedies for SRUs 1, 2, 3, and 5 for lands intended for transfer to the USDA/FS for development of the MNTP. Final RGs and final remedies for the interim sites were presented in the *Record of Decision for the Soil Operable Unit Interim Sites* (U.S. Army 2004). Two sites (L6 and M16) were identified for no further action in the 1998 ROD. These sites are included in this five-year review.

Table 3-1 summarizes the Contaminants of Concern (COCs) for each site based upon SRU designation. Due to the nature of activities conducted at many of the SOU sites, contaminants from more than one SRU were often present at a particular site. Figure 3-2 illustrates the SOU sites.

Table 3-1: Soil Operable Unit COCs

SRU	Description	Final Remedial Action Sites	Contaminants of Concern
1	Explosives	M5, M6, M7, and L16 (1998 ROD) L1, L2, L7, L8, L9, L10, L14, M2, and M3 (2004 ROD)	Dinitrotoluene (DNT), Nitrotoluene (NT), Trinitrobenzene (TNB), Trinitrotoluene (TNT), High Melting Explosive (HMX), Research Department Explosive (RDX), and Tetryl
2	Metals	L11 (1998 ROD) L2, L3, L5, L23A, M4, and M12 (2004 ROD)	Arsenic, Beryllium, Cadmium, Copper, and Lead
3	Explosives and Metals	M5 and M6 (1998 ROD) L3 (2004 ROD)	DNT, TNT, RDX, Arsenic, Beryllium, and Lead
4	PCBs	L1, L5, L7, L8, L9, L10, and L17 (1998 ROD)	PCB1254 and PCB1260
5	Organics	L1 and L5 (2004 ROD)	Total Petroleum Hydrocarbons (TPH) and Polynuclear Aromatic Hydrocarbons (PAHs)
6	Landfills	M1, M9, M11, M13, L3, and L4 (1998 ROD)	Hazardous and Non-hazardous Wastes
7	Sulfur	M8 and M12 (1998 ROD)	Sulfur

Table 3-1: Soil Operable Unit COCs

SRU	Description	Final Remedial Action Sites	Contaminants of Concern
	No Further Action	L6 and M16 (1998 ROD)	L6 - PCBs, petroleum hydrocarbons, and base neutral acids M16 – no COCs identified

Twenty-eight (28) other sites plus two subareas suspected as having contaminated soil were investigated during the Phase 1 and Phase 2 RIs and determined to have no historical evidence suggesting contamination potential, no contamination, or contaminant concentrations that do not pose a threat to human health or the environment. Soils at these sites did not exhibit hazardous waste characteristics. The IEPA and USEPA agreed that, under CERCLA requirements, no further cleanup actions were required and these sites have been designated for NFA. Where present, contaminants remaining at these NFA sites (excluding L6 and M16) occur at levels that allow for UU/UE. Site L6 has contaminant concentrations that meet industrial RGs identified in the 1998 ROD. COCs were not identified at Site M16.

3.4.2 Groundwater Operable Unit

The GOU includes sites where impacted groundwater has been identified. GMZs were established to define boundaries that encompass impacted groundwater. The horizontal boundaries of each GMZ completely contain the contaminant plumes and include a buffer for potential contaminant migration. The GMZs are located in glacial drift and shallow bedrock aquifers and are bounded vertically by the upper surface of the Maquoketa Formation. They were established and defined in the 1998 ROD.

Sites within the GOU were grouped into GRUs according to contaminant type and geographic location. Three GRUs were identified in the ROD: two in the MFG area and one in the LAP area. GMZ boundaries are illustrated in Figure 3-3.

GRU1

GRU1 is located within the LAP area and refers to explosives in groundwater at sites L1, L2, L3 and L14. The primary COCs are explosives; including 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, Nitrotoluenes (2 -NT, 3-NT, and 4-NT), and RDX.

GRU2

GRU2 is located in the MFG area and refers to explosives and other contaminants in groundwater at sites M1, M5, M6, M7, M8, and M13. The primary COCs are sulfate; explosives; including 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, nitrobenzene (NB), 1,3-Dinitrobenzene (DNB), and RDX; volatile organic compounds (VOCs, including tetrachloroethene [PCE]); and metals including iron, antimony, and cadmium.

GRU3

GRU3 is located in the MFG Area and refers to VOCs in groundwater at sites M3 and M10. The primary COCs are benzene and toluene.

Monitored natural attenuation was identified in the ROD as the remedy for all three GRUs. The groundwater remedy also required contaminant source removal that was addressed under the SOU.

3.5 SUMMARY OF INITIAL RESPONSES

In 1978, the U.S. Army Environmental Center (USAEC, formerly USATHAMA) conducted an Installation Assessment of JOAAP (USATHAMA 1978), which consisted of a records search and interviews with employees. This document reported that environmental impacts might be present at former industrial areas and locations where waste disposal activities occurred.

In 1981 and 1982, an Installation Restoration Survey was conducted (Donohue and Associates 1982). This survey included the sampling of soils, groundwater, surface water, and sediment; it identified contamination at nine sites in the MFG area and nine sites in the LAP area. A subsequent Phase II investigation was conducted in 1983 (Donohue and Associates 1983) to gather additional data on previously sampled sites and to evaluate the potential for off-site impacts. This investigation included an assessment of several parcels of land near the edge of the MFG area that were considered excess inventory. Off-site contamination was not identified.

From 1983 through 1985, a response action was conducted by Uniroyal (JOAAP's operating contractor) at the Red Water Lagoon on Site M7 to remove contaminated surface water and sediment. Following the removal of contaminated materials, a clay cap was installed over the lagoon. Pre- and post-remediation sampling documented the conditions before and after the remediation.

Between 1983 and 1985, USAEHA sampled and monitored groundwater monitoring wells as part of JOAAP's RCRA monitoring program around a closed sanitary landfill at Site M13 and the Red Water Lagoon at Site M7.

In November 1984 the MFG area was proposed by the USEPA for listing on the NPL based on the Hazard Ranking System (HRS) score of 32.08. The LAP area was proposed for listing in April 1985 based on the HRS score of 35.23. Final listings on the NPL took place on July 21, 1987 for the MFG area and March 31, 1989 for the LAP area.

In 1985 and 1986, additional groundwater and surface water samples were collected and analyzed from previously sampled locations at the MFG and LAP areas. The analytical data was presented in an Environmental Baseline Study report in which the feasibility and the need for remediation were discussed (Dames & Moore 1986).

In 1989, the U.S. Army, the USEPA, and the IEPA entered into a FFA under CERCLA Section 120 and RCRA Sections 6001, 3008(h), 3004(u), and 3004(v) (USEPA 1989). The purpose of the FFA was to ensure that environmental impacts at the site would be investigated and that remedial actions would be taken to protect public health, welfare, and the environment. Also

during 1989, the USACE conducted an investigation of USTs throughout JOAAP (USACE 1989). One hundred- seven USTs were identified, inventoried, and evaluated for possible leakage in accordance with USEPA regulations for existing USTs. Most of the USTs were emptied and removed by 1993.

From 1988 through 1993, Phase 1 and Phase 2 RIs were conducted at the MFG area (Dames & Moore 1991, 1993a). Eighteen areas were identified for investigation, including nine areas that were previously investigated. The RI reports were amended by the Oleum Plant RI report (Dames & Moore 1996), which was added as a potentially contaminated area.

From 1991 through 1994, Phase 1 and Phase 2 RIs were conducted at the LAP area (Dames & Moore 1993b, 1994a). A total of 35 study areas were investigated, including nine sites that were previously investigated.

The RI reports were supplemented by baseline risk assessments that quantified potential human health risks posed by contamination identified at the MFG and LAP areas (Dames & Moore 1994b, 1995). The assessments included an environmental fate and transport assessment, a toxicity assessment, an exposure assessment, and a risk characterization.

From 1993 through 1996, CHPPM conducted an ecological risk assessment to evaluate the potential for site contamination to impact ecological receptors. Findings indicated limited impacts to terrestrial mammals, aquatic receptors, and birds. The results of these studies were presented in a Phase 1 Ecological Risk Assessment report (CHPPM 1994a) and a Phase 2 Aquatic Ecological Risk Assessment report (CHPPM 1996). Potential risks associated with human consumption of deer tissue were also evaluated and determined to be negligible (CHPPM 1994b). Following the risk assessments, PRGs were established (OHM 1996) for protection of human health and the environment.

In 1996 and 1997, USACE conducted three removal actions to prevent the migration of contaminants from source areas. Waste present in oil pits located at Site L2 was excavated and disposed to prevent the contaminants from migrating into the groundwater. During the same time period, USACE conducted a removal action along Prairie Creek at Site L3. This action involved stabilizing the stream bank to prevent erosion of a landfill that contained buried debris and waste. Also in 1996, USACE removed PCB switch boxes from the MFG area. Soils around the switch boxes were sampled and subsequently removed if contamination was above RGs or if staining was noticeable. In 1997, USACE conducted a RA at Site L6 that involved the excavation and disposal of organics- and PCB-contaminated soil. This action was performed to facilitate transfer of land from the U.S. Army to Will County for establishing a landfill.

Public Law 104-106 of the FY 1996 Department of Defense Authorization Act legislated specific terms relating to the conveyance of JOAAP property to various entities. This law is the governing document for future land use at JOAAP. The majority of JOAAP property is to be transferred to the USDA/FS, with the U.S. Department of Veterans Affairs, Will County, and the State of Illinois receiving the remainder.

In 1997 interim O&M activities were conducted at the southern ash pile (Site M1). These activities involved consolidating waste that had migrated from the pile and covering the pile with a geosynthetic liner to prevent the leaching of waste.

Interim O&M activities were conducted at Site M9 in 1999 to install a leachate control, recirculation, and collection system to prevent leachate seepage to the surrounding environment.

Field screening programs were conducted in 1995 to provide data to more accurately estimate the volume of explosives-contaminated soils on the MFG and LAP areas. These programs were supplemented by testing to characterize the types of wastes present. The results were used in FSs for the MFG and LAP areas. Separate documents were prepared for the GOU and SOU for the LAP (Dames & Moore 1997) and MFG (OHM 1997a) areas. Based on the information gathered and presented in each FS, the U.S. Army recommended, with USEPA and IEPA concurrence, the preferred remedies for contaminated soil and groundwater at JOAAP. The rationale behind the selection of the remedies was released to the general public in the *Proposed Plan for the Soil Operable Unit* and the *Proposed Plan for the Groundwater Operable Unit* (U.S. Army 1997 a, b), which was presented at a public meeting on January 8, 1998.

The initial ROD was signed in November 1998. This document selected final remedies for GOU and SOU sites that contained PCBs (SRU4), Landfills (SRU6), and Sulfur (SRU7). The 1998 ROD also selected final remedies for SOU sites intended for transfer to the state of Illinois for the development of industrial parks that contained explosives (SRU1), metals (SRU2), intermixed explosives and metals (SRU3), and organics (SRU5). The 1998 ROD selected interim remedies for SRUs 1, 2, 3, and 5 for lands intended for transfer to the USDA/FS for the development of the MNTP pending the development of soil cleanup goals that would protect prairie workers and the environment.

A multi-agency management team was formed, comprised of representatives from the U.S. Army, USEPA, IEPA, USDA/FS, U.S. Fish and Wildlife Service (USFWS), and Illinois Department of Natural Resources (IDNR). This team tasked two groups of human health and ecological risk assessment technical experts with developing PRGs that would be protective of the future MNTP lands. The technical work groups completed their assessment of available literature, databases, and site specific data and presented their findings in separate technical reports (Human Health Work Group 2000; Ecological Work Group 2000). The Management Team further refined the COC lists and developed a document that defined the pre-sampling requirements for each site, remediation goals, excavation design values, confirmatory sampling requirements, and sewer line disposal requirements.

Alliant Techsystems, Inc., under a facility-use contract to the U.S. Army, used a portion of the LAP area. Alliant ceased operations in 1999 and demobilized in 2000.

Plexus Scientific Corporation was contracted by the U.S. Army to decontaminate and demolish buildings contaminated by historical activities in the LAP and MFG areas. Decontamination and demolition activities at Site M6 were initiated in January 2000. RA activities at Site M6 were considered complete following the final inspection by the USACE on July 25, 2005.

Using the data from the 1997 FS documents, a Focused Feasibility Study was developed (USACE 2004) to present final cleanup values and evaluate alternatives for the interim ROD sites. A Proposed Plan for the interim ROD sites was provided for public comment from February 20, 2004 to March 20, 2004 and was presented to the public on March 3, 2004.

3.6 GENERAL BASIS FOR TAKING ACTION

The basis for taking action at each site is summarized on forms provided in Attachment 3 and discussed below.

The human health risk assessments identified a total of 79 COCs in soil and sediment, 40 COCs in groundwater, and 45 COCs in surface water. Explosives (primarily TNT, DNT, RDX, HMX, and Tetryl) were the most prevalent COCs in each medium, although other contaminants (metals, pesticides, PCBs, VOCs, semi-volatile organic compounds [SVOCs], petroleum hydrocarbons, and anions) were also identified. COCs in soil at each site are listed in Table 3-2.

According to the 1998 ROD, risk assessments determined that surface waters at JOAAP pose no risk to human health and the environment and were not addressed as a contaminated medium requiring remedial action.

Based on information presented in the human health risk assessments, the principal threat to human health was potential exposure to explosives in soil. DNT is identified by USEPA as a probable human carcinogen and both TNT and RDX are identified by USEPA as possible human carcinogens. Risks and hazards calculated for groundwater were based on the assumption that new wells would be installed into areas of contaminated groundwater and then used. This scenario is unlikely to occur because the majority of the contaminated groundwater resides in the glacial drift aquifer that does not provide usable quantities of groundwater and is not used as a water source at JOAAP.

3.6.1 Soil Operable Unit

The primary objective of the cleanup at JOAAP was to eliminate or reduce the levels of contaminants to concentrations that are protective of human health and the environment such that no adverse health effects or adverse ecological impacts would result from future uses of the land. Human health risk models and other appropriate USEPA and IEPA criteria were used to establish the RGs for the COCs identified in soils. Final RGs for soil were established for industrial land use and recreational land use (tall prairie grass, hiking, etc.) scenarios. Exposure levels for ecological resources that are protective of the environment and compatible with development of the tall grass prairie were determined for the USDA/FS lands and finalized in June 2004 ROD.

Table 3-2 COCs in Soil at SRU Sites

Site	SRU	COCs
L1	1, 4, 5	Explosives (1,3,5-TNB & 2,4,6-TNT), PCB (Aroclor 1260), and Organics (TPH)
L2	1 2	Explosives (2,4-DNT, 1,3,5-TNB, 2,4,6-TNT, & RDX,) and Metals (arsenic, cadmium, and lead)
L3	2, 3, 6	Explosives (2,6-DNT and RDX), Metals (lead), Pesticides (chlordane) and Phosphate
L4	6	Phosphate
L5	2, 4, 5	Metals (lead), PCBs (Aroclor 1254), and Organics (TPH)
L6	NFA	PCBs and Organics (TPH and PAHs)
L7	1, 4	Explosives (2,4,6-TNT and RDX) and PCBs
L8	1, 4	Explosives (1,3,5-TNB, 2,4,6-TNT, and RDX) and PCBs (Aroclor 1260)
L9	1, 4	Explosives (1,3,5-TNB and 2,4,6-TNT) and PCBs (Aroclor 1260)
L10	1, 4	Explosives (2,4-DNT, 2,4,6-TNT, HMX, and RDX) and PCBs (Aroclor 1260)
L11	2	Metals (arsenic)
L14	1	Explosives (2,4,6-TNT, HMX, and RDX)
L16	1	Explosives (HMX and RDX)
L17	4	PCBs (Aroclor 1242)
L23A	2	Metals (lead)
M1	6	None found, contained “red water ash” from incineration of TNT manufacturing wastewater
M2	1	Explosives (1,3,5-TNB, 2, 4-DNT, 2,6-DNT, and 2,4,6-TNT)
M3	1, 2, 3	Explosives (2, 4-DNT, 1,3,5-TNB, & 2,4,6-TNT) and Metals (lead)
M4	2	Metals (lead), includes wastewater treatment sludge (K046 listed waste)
M5	1, 3	Explosives (2, 4-DNT, 2,6-DNT, 1,3,5-TNB, 2,4,6-TNT, and Tetryl) and Metals (lead)

Table 3-2 COCs in Soil at SRU Sites

Site	SRU	COCs
M6	1, 3	Explosives (2-NT, 2, 4-DNT, 2,6-DNT, 1,3,5-TNB, 2,4,6-TNT, and RDX), Metals (arsenic, beryllium, and lead), includes red water (K047 listed waste) and DNT production wastewaters (K111 listed waste)
M7	1	Explosives (2,4-DNT, 2,6-DNT, 1,3,5-TNB, 2,4,6-TNT, and RDX), includes K047 and K111 listed wastes
M8	7	Sulfur
M9	6	Explosives (2,4-DNT) and Metals (arsenic)
M11	6	Metals (arsenic and lead)
M12	2, 7	Metals (lead) and Sulfur
M13	6	Metals (beryllium and lead) and semi-volatile organics (Benzo(a)pyrene)
M16	NFA	Metals, Organics (PAHs), and Pesticides

3.6.2 Groundwater Operable Unit

The primary objective of the cleanup of the GOU at JOAAP is to effectively mitigate contamination, minimize contaminant threats, and provide adequate protection of human health and the environment. The combination of the monitored natural attenuation (MNA) groundwater remedy and source removal of impacted soils for the MFG and LAP areas are expected to meet the remedial action objectives (RAOs).

GRU1

The RGs for contaminants that were historically exceeded in groundwater at GRU1 sites are listed in Table 3-3.

Table 3-3 GRU1 Sites – Maximum Concentrations Exceeding Remedial Goals

Explosives	Remedial Goal (µg/L)	Maximum Concentration Exceeding Remedial Goal (µg/L)			
		Site L1	Site L2	Site L3	Site L14
		Overburden and Shallow Bedrock	Overburden and Shallow Bedrock	Overburden and Shallow Bedrock	Overburden
1,3,5-TNB	5.1	1,300	NE	NE	NE
2,4,6-TNT	9.5	1,900	NE	NE	NE

Explosives	Remedial Goal (µg/L)	Maximum Concentration Exceeding Remedial Goal (µg/L)			
		Site L1	Site L2	Site L3	Site L14
		Overburden and Shallow Bedrock	Overburden and Shallow Bedrock	Overburden and Shallow Bedrock	Overburden
2,4-DNT	0.42	2.01	NE		NE
2,6-DNT	0.42	8.54	NE	NE	NE
RDX	2.6	56.50	640	77.90	840

Notes:

NE No RG exceedance

µg/L microgram per liter

GRU2

The RGs for contaminants that were historically exceeded in groundwater at GRU2 sites are listed in Table 3-4.

Table 3-4 GRU2 Sites - Maximum Concentrations Exceeding Remedial Goals (1)

Midewin Tallgrass Prairie Areas (USDA)		Industrial Park Areas				
Sites	Site M1	Site M5	Site M6	Site M7	Site M8	Site M13
RG (µg/L) (USDA)	Overburden and Shallow Bedrock	Overburden	Overburden and Shallow Bedrock	Overburden and Shallow Bedrock	Overburden	Overburden
Explosives						
1,3,5-TNB 5.1			240			15.5
2,4,6-TNT 9.5		16.7	2,600	9.5		12.9
2,4-DNT 0.42			3,200	200	9	126
2,6-DNT 0.42	0.608	5.53	2,700	70	0.53	39
2-NT 1,000			2,100			
NB 51			81.8			
RDX 2.6			52.7	46		
Metals						
Antimony 24					31	38.7
Cadmium 50			162			56
Iron 5,000		42,000			48,000	
Organics						
PCE 25			150			

Notes:

1 maximum concentration exceeding IEPA Class II Remedial Goals (µg/L)

µg/L = microgram per liter

GRU3

The RGs for contaminants that were historically exceeded in groundwater at GRU3 sites are listed in Table 3-5.

Table 3-5 GRU3 Sites - Maximum Concentrations Exceeding Remedial Goals (1)

Midewin Tallgrass Prairie Areas (USDA)				Industrial Park Areas	
Sites		**M3**	**M10 Central**	**Site**	**M10 West**
RG (µg/L)		**Shallow Bedrock**	**Overburden and Shallow Bedrock**	**RG (µg/L)**	**Overburden and Shallow Bedrock**
Benzene	5	15.8		25	
Toluene	2,500		19,600	2,500	20,000

Notes:

1 maximum concentrations exceeding Class I, Class II, and Risk-Based Park Employee Remedial Goals

µg/L microgram per liter

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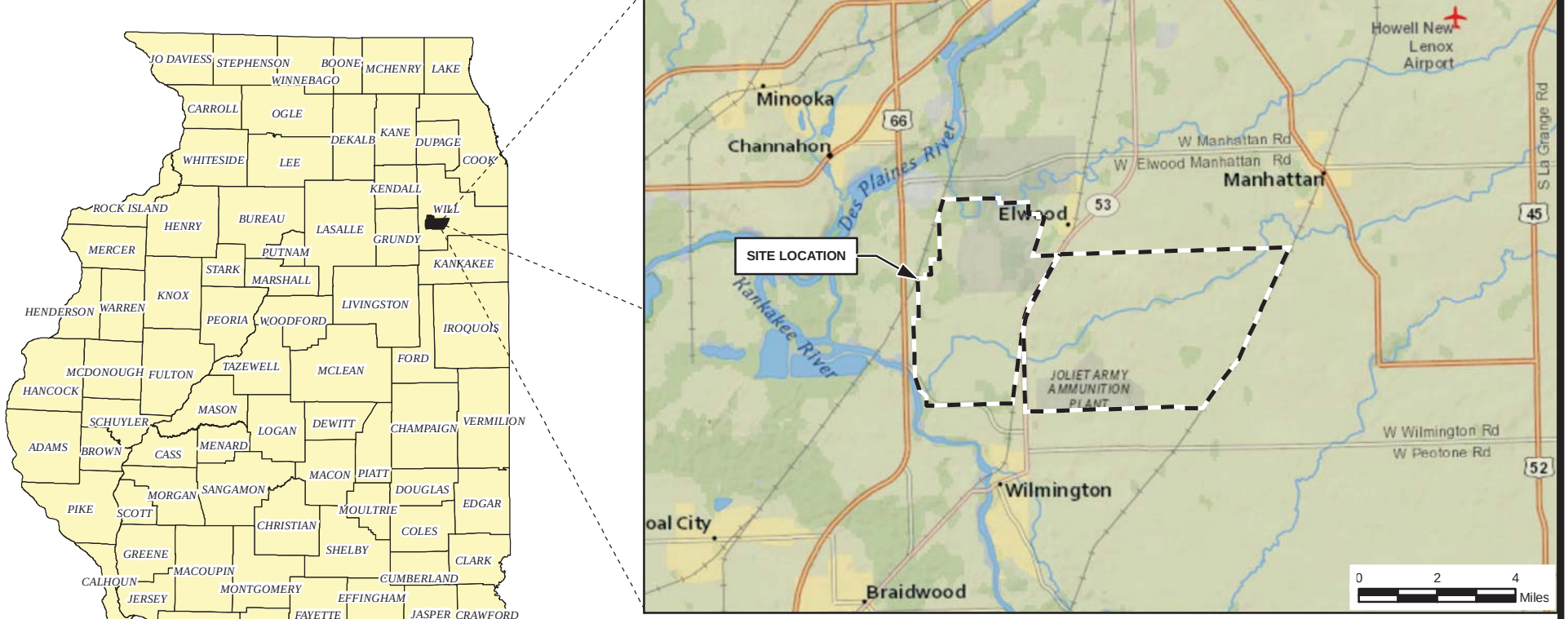

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS BUFFALO, NY	SITE LOCATION MAP	
Document Name: 300713_SiteLocation.mxd Drawn By: H5TDESPM Date Saved: 12 Aug 2013 Time Saved: 2:45:36 PM	JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS	FIGURE 3-1

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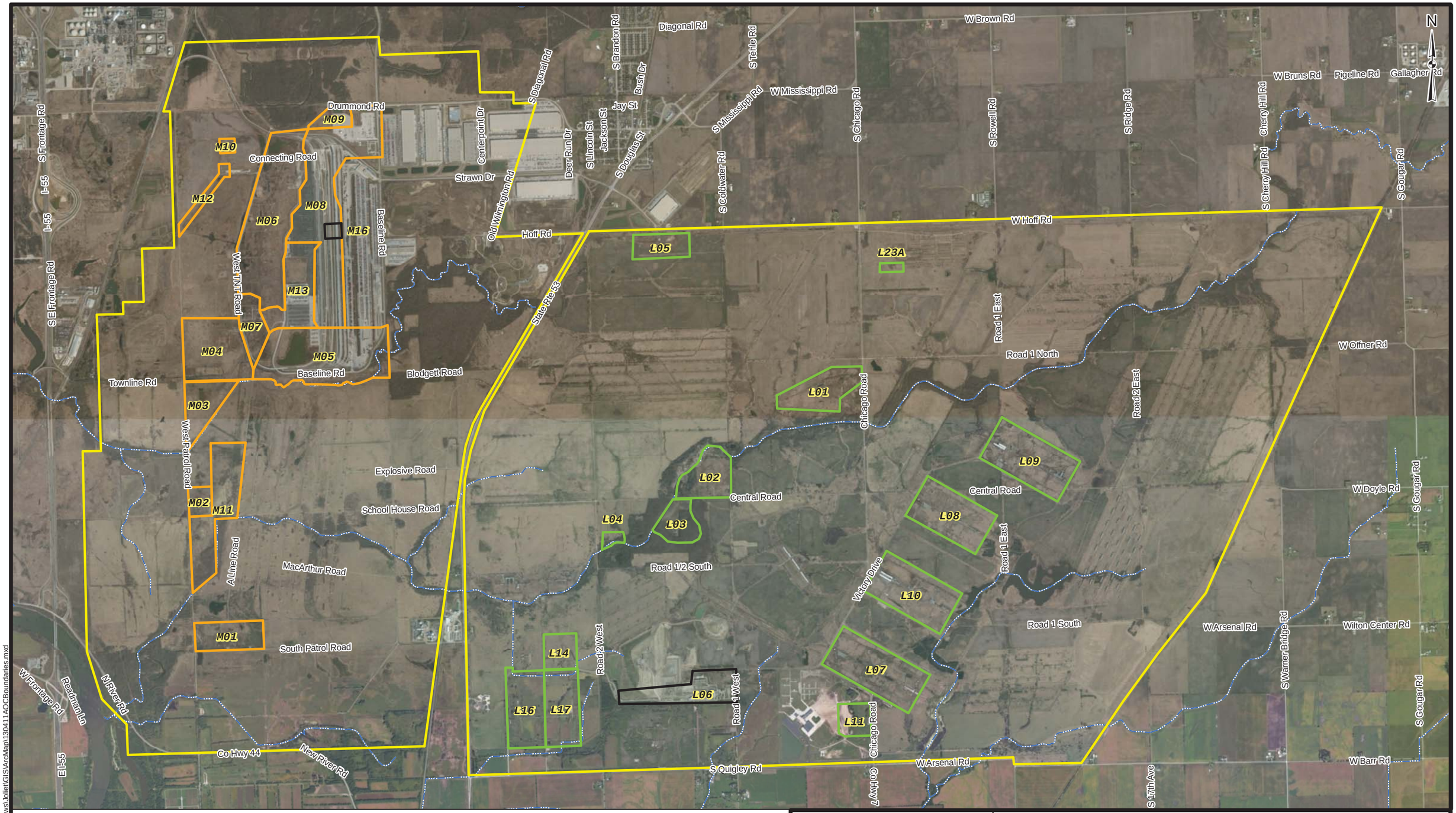

Legend

- Load-Assemble-Package (LAP) Area Sites
- Manufacturing (MFG) Area Sites
- No Further Action Sites
- SiteBoundary
- Streams

0 1,750 3,500 7,000 Feet

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U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

US Army Corps of Engineers
Buffalo District

LOCATION OF SOIL OPERABLE UNIT SITES

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 3-2

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Drawn By & Date: TLP 03/22/13 | Approved By & Date: | Revised By & Date: RJR 04/01/13 | Approved By & Date: | Approved By & Date:

Des Plaines River
North Pumping Station
Smith's Bridge Road
Manufacturing (MFG) Area
Asparagus Lane
McCune Cemetery
Jackson Creek
Drummond Road
Maple Hill Cemetery
W.Acid Rd.
S.Acid Rd.
Connecting Road
Atchison Topeka & Santa Fe Railroad
West TNT Road
Base Line Road
VILLAGE OF ELWOOD
53
M6
M8
Hoff Road
Load-Assemble-Package (LAP) Area
Road 2 North
Snake Road
W.Acid Rd.
E.Acid Rd.
LANDFILL M13
Red Water Lagoon
Tetryl Road
M4
M7
M5
Reed Cemetery
Diagonal Road
Southern Pacific Railroad
Road 1 West
Chicago Road
Road 1 East
Road 2 East
Klinger Cemetery
Bloodgett Road
M3
Road 1 North
L1
Prairie Creek
55
LANDFILL M11
West Patrol Road
A Line Road
School House Road
Explosive Road
Kemery Lake
L2
Central Road
Road 2 West
Newton Cemetery (Singel Grave)
L3/LANDFILL L3
Starr Grove Cemetery
Wabash Railroad
MacArthur Drive
Road 1/2 South
Victory Drive
Prairie Creek
M1
South Patrol Road
JOAAP Administration Office
L14
Road 1 South
Kankakee River
Road 1/2 West
Plant Dr.
Pond
Chicago Road Cemetery
Doyle Lake
New River Road
Quigley Road
Road 2 South
53

north

LEGEND

- APPROXIMATE JOAAP BOUNDARY
- HIGH TENSION TRANSMISSION LINE
- RAILROAD
- M8 STUDY AREA IDENTIFIER
- STUDY AREA BOUNDARY
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- SURFACE WATER

NOTE

BASE MAP DEVELOPED FROM A DRAWING TITLED "SOILS OU – PROPOSED PLAN LAYOUT", PREPARED BY OHM REMEDIATION SERVICES CORP., DATED OCTOBER 1997 AND FIGURE 2 – "GROUNDWATER OPERABLE UNIT SUMMARY OF PROPOSED PLAN", PREPARED BY OHM REMEDIATION SERVICES CORP., DATED DECEMBER 12, 1997.

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 4/1/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 4000'

REV	DATE	BY	DESCRIPTION

GROUNDWATER STUDY AREAS AND LANDFILL SITES

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

Figure 3-3

DRAWING NUMBER
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USAEC U.S. ARMY ENVIRONMENTAL CENTER

JOLIET INC.

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4.0 FIVE-YEAR REVIEW PROCESS

4.1 ADMINISTRATIVE COMPONENTS

The following activities were performed by USACE-Buffalo District and Toltest/MWH:

- Potentially interested parties and the local community were notified of the start of the five-year review
- Documents and site data were reviewed
- Site inspections were performed
- An interview was conducted with Will County Land Use, Resource and Energy Division (Will County Landfill)

4.2 COMMUNITY INVOLVEMENT

A public notice was issued to potentially interested parties on May 8, 2013 that the five-year review process had begun. The notice was published in the Free Press Advocate, a local Wilmington Illinois newspaper. A public notice that the five-year review process was completed was also published in the Free Press Advocate. Copies of the notices are provided in Attachment 9.

The Five-Year Review report will be made available to the public once it has been finalized. Copies of the document will be placed in the designated public repositories identified below.

Joliet Army Ammunition Plant
29401 South Route 53
Wilmington, IL 60481-8879

Joliet Public Library
150 North Ottawa Road
Joliet, IL 60431

4.3 DOCUMENT REVIEW

Relevant, site-related documents were reviewed, including the RODs, previous Five-Year Review reports, remedial action work plans, remedial action completion reports, and recent monitoring/sampling data. A complete list of documents reviewed is provided in Attachment 2. Documents reviewed for the risk assessment and toxicology review are listed in Attachment 8. The documents were obtained from the Administrative Record file and public repositories at JOAAP and the Joliet Public Library.

4.4 DATA REVIEW

Data reviewed for the SOU Sites is documented in Section 5. Data reviewed for the GOU sites is documented in Section 6.

4.5 SITE INSPECTIONS

Site inspections were conducted by USACE on April 15, 16, and 17, 2013 to obtain familiarity with the SRU sites, examine the remediated areas, review records, and assess the protectiveness of the remedies. Site observations are presented within the corresponding section for each site.

Representatives from Toltest and MWH conducted inspections during April 8 to 16, 2013 to assess current conditions, access controls, and use restrictions at each GRU site. The inspections were conducted using the Five-Year Review Site Inspection Checklist (*OSWER No. 9355.7-03B-P*).

Completed site inspection checklist forms are provided in Attachment 4 and site photographs are provided in Attachment 5. Observations for each SOU site are described in Section 5. Observations for each GOU site are described in Section 6.

4.6 INTERVIEWS

Questionnaires were issued to the following parties affiliated with the JOAAP remedial actions and properties.

- Arthur Holz; Commander's Representative, JOAAP
- Dolores Kaitschuck; Midewin Forest Service, Region 9
- Lorin Schab; Midewin Heritage Association
- Michelle Grana and Sharon Purcell; CenterPoint
- Kevin Rainey; Assistant Terminal Supervisor, BNSF Railway
- Dean Olsen; Director, Will County Land Use Resource and Energy Division (Will County Landfill)

Returned interview records are provided in Attachment 6.

5.0 SOIL OPERABLE UNIT SITES

The SOU was divided into six SRUs involving CERCLA-based remediation, one SRU involving a non-CERCLA removal action, and a group involving NFA sites for soil.

- **SRU1** consisted of explosives-contaminated soil
- **SRU2** consisted of metals-contaminated soil
- **SRU3** consisted of soils contaminated with explosives and metals
- **SRU4** consisted of PCB-contaminated soil
- **SRU5** consisted of soil contaminated with organic compounds
- **SRU6** consisted of landfills
- **SRU7** consisted of sulfur-contaminated soil (a non-CERCLA contaminant)

This five-year review report only addresses the NFA sites that contain contaminants and do not allow for UU/UE.

The 1998 ROD selected final remedies for all SRU4, SRU6, and SRU7 sites and for SRU1, SRU2, SRU3, and SRU5 sites that were intended for transfer to the State of Illinois for the development of industrial parks. Interim remedies and RGs were presented for SRU1, SRU2, SRU3, and SRU5 sites on lands intended for transfer to the USDA/FS for development of the MNTP. The 2004 ROD presented final remedies and RGs for the interim portion of the 1998 ROD.

5.1 REMEDIAL ACTION OBJECTIVES AND REMEDIATION GOALS

5.1.1 Remedial Action Objectives

The cleanup objectives identified in the 1998 ROD and 2004 ROD were intended to mitigate and minimize threats to and provide adequate protection of human health and the environment.

The following RAOs were established in both RODs:

- Cleanup contaminants to site-specific and chemical-specific RGs
- Prevent human health and environmental exposure to contamination at concentrations above the RGs
- Eliminate soil contamination as a continuing source of groundwater contamination
- Prevent [the] migration of contaminants
- [Remedial] actions would not leave behind any characteristically hazardous RCRA wastes

5.1.2 Remediation Goals

RGs presented in the 1998 ROD were established to prevent human exposure by dermal contact, inhalation, or incidental ingestion of COCs in soil. A recreational user was considered for sites that would be transferred to the USDA/FS for conversion to the MNTP. An industrial worker was considered for sites that would be converted to industrial park use.

RGs presented in the 2004 ROD were established to prevent exposure by ingestion, inhalation, and dermal contact to SRU1, SRU2, SRU3, and SRU5 COCs in soil. The following receptors were considered for sites that would be converted to the MNTP:

- **Human receptors** - Employed and volunteer workers conducting prairie establishment and maintenance activities and visitors
- **Ecological receptors** – plants, invertebrates in soil, herbivores (mammals and birds), fauna that consume invertebrates (mammals and birds), and fauna that consume other animals

Remediation goals for COCs in soil are listed in Table 5-1.

Table 5-1 Soil Remediation Goals (mg/kg) [1, 2]

Contaminant	1998 ROD		2004 ROD	
	Remediation Goal [3]	Site	Remediation Goal	Site
Explosives				
1,3,5-TNB	100	L3 (SRU6), L16, M5, M6, M7, M9	17	L1, L2, L3, L7, L8, L9, L10, L14, M2, M3
1,3-DNB	200			
2,4,6-TNP	4,100			
2,4,6-TNT	190		200	
2,4-DNT	8.4		20	
2,6-DNT	8.4		20	
2-Nitrotoluene	10,000			
DNAP	4,100			
HMX	10,000		2,860	
Nitrobenzene	1,000			
RDX	52		107	
Tetryl [4]	4,100			
Metals				
Aluminum	1,000,000	L3 (SRU6), L11, M1, M5, M6, M9, M11, M13, M16		L2, L3, L5, L23A, M3, M4, M12
Antimony	820		50	
Arsenic	3.8		21	
Barium	140,000		625	
Beryllium	2			
Cadmium	1,700		63	
Chromium			213	
Chromium (+3)	13,000		240	
Chromium (+6)	1,600		190	
Cobalt	120,000		240	
Copper	82,000		190	
Iron	610,000			
Lead	1,000		500	
Manganese	150,000			

Table 5-1 Soil Remediation Goals (mg/kg) [1, 2]

Contaminant	1998 ROD		2004 ROD	
	Remediation Goal [3]	Site	Remediation Goal	Site
Mercury	610		10	
Nickel	41,000		210	
Selenium	10,000			
Silver	10,000		16	
Thallium	160		2 x UTL	
Vanadium	14,000			
Zinc	610,000		720	
Volatile Organic Compounds				
Acetone	1,000			
Benzene	200			
Ethylbenzene	1,000			
Toluene	1,000			
Xylenes	1,000			
Semivolatile Organic Compounds				
1,2-Dichlorobenzene	10,000	L6, M13, M16		L1, L5
1,3-Dichlorobenzene	10,000			
1,4-Dichlorobenzene	240			
2-Methylnaphthalene	10,000			
1,2,4-Trichlorobenzene	10,000			
Acenaphthene	10,000		98,386	
Acenaphthylene	10,000			
Anthracene	10,000		491,930	
Benzo(a)anthracene	8		17	
Benzo(a)pyrene	1		2	
Benzo(g,h,i)perylene	10,000			
Benzo(b)fluoranthene	8		17	
Benzo(k)fluoranthene	78		171	
Chrysene	780		1,708	
Dibenz(a,h)anthracene	0.78		1.7	
Dibenzofuran	10,000			
Diethyl phthalate	10,000			
Di-n-butyl phthalate	10,000			
Di-n-octyl phthalate	10,000			
Fluoranthene	10,000		65,591	
Fluorene	10,000		65,591	
Hexachlorobenzene	3.6			
Indeno[1,2,3-cd]pyrene	7.8		17	
Naphthalene	10,000		32,793	
Phenanthrene	10,000			
Phenol	10,000			
Pyrene	10,000		49,193	

Table 5-1 Soil Remediation Goals (mg/kg) [1, 2]

Contaminant	1998 ROD		2004 ROD	
	Remediation Goal [3]	Site	Remediation Goal	Site
Pesticides, PCBs [5]				
Chlordane	4.4			
DDD	24			
DDE	17			
DDT	17			
Dieldrin	0.36			
Endrin	610			
Heptachlor	1.3			
Heptachlor epoxide	0.63			
Isodrin	1,000			
PCB 1254	1	L1, L3 (SRU6), L5, L6, L7, L8, L9, L10, L17, M16		
PCB 1260	1			
Anions				
Nitrate/Nitrite	1,000,000			
Phosphate	200,000	L3 (SRU6), L4 (SRU6)		
Phosphorous	200,000			
Sulfate	456	M8, M12		

Notes:

1 RGs for all contaminant (except PCBs) apply to both surface and subsurface soils

2 Average concentration

3 Industrial cleanup goals from *Table 6-2: Soil, Sediment, and Groundwater Remediation Goals (µg/g, µg/L)*

4 The USEPA, IEPA, and the U.S. Army have agreed to base the RG for tetryl on one of its primary breakdown products, dinitroaminophenol (DNAP) because of concern over the reliability of the risk-based value applied to tetryl at the time

5 The remediation goal for PCBs is 1 mg/kg for surface soils (upper 10 inches) and 10 mg/kg for subsurface soils

DNAP Dinitroaminophenol

DNB Dinitrobenzene

DNT Dinitrotoluene

HMX High Melting Explosive or Cyclotetramethylene-tetranitramine

mg/kg milligrams per kilogram

RDX Research Department Explosive or Cyclotrimethylenetrinitramine

TNB Trinitrobenzene
UTL upper tolerance limit

5.1.3 Remedy Selection

5.1.3.1 SRU1 Soils

SRU1 consisted of sites where the explosives TNT, DNT, and tetryl were manufactured. The selected remedy included removal and treatment of contaminated soil from sites L1, L7, L8, L9, L10, L14, L16, M2, M3, M5, M6, and M7 using the following activities:

- Building demolition (where appropriate) followed by salvage or disposal
- Excavation of contaminated soil, transportation to a central treatment area, and confirmatory sampling within each excavation
- Soil preparation at the central treatment area by screening, sorting to remove large objects, unexploded ordnance (UXO), and raw TNT, and blending to homogenize the soil
- Treatment of the contaminated soil using a bioremediation process
- Backfilling, regrading, and revegetating the excavated areas
- Disposal of the treated soil at a RCRA Subtitle C facility or Subtitle D facility, use as subgrade fill in capped landfills at JOAAP, or use as backfill in the remedial excavations
- Decommissioning of the treatment area
- ICs consisting of deed restrictions on the land and soil

5.1.3.2 SRU2 Soils

SRU2 consisted of sites where production, testing, and disposal activities resulted in metals contamination. The selected remedy included removal and disposal of contaminated soil and debris from sites L2, L3, L5, L11, L23A, M3, M4, and M12 using the following activities:

- Excavation of contaminated soil, transportation to a central treatment area and confirmatory sampling within each excavation
- Soil preparation at the central treatment area by screening, sorting to remove large objects, and blending to homogenize the soil
- Backfilling, regrading, and revegetating the excavated areas
- Disposal of contaminated soil at a RCRA Subtitle C facility or Subtitle D facility, or use as subgrade fill in capped landfills at JOAAP
- ICs consisting of deed restrictions on the land and soil

5.1.3.3 SRU3 Soils

SRU3 consisted of sites contaminated by explosives and metals from previous production and disposal activities. The selected remedy included removal, treatment, and disposal of contaminated soil and debris from sites L2, L3, M5, and M6 using the following activities:

- Excavation of contaminated soil, transportation to a central treatment area, and confirmatory sampling within each excavation
- Soil preparation at the central treatment area by screening, sorting to remove large objects, UXO, and raw TNT, and blending to homogenize the soil

- Determining whether the contaminated soils should be treated prior to disposal based on metals concentrations and explosives characteristics and concentrations
- Treatment of the contaminated soil using a bioremediation process
- Backfilling, regrading, and revegetating the excavated areas
- Disposal of contaminated soil at a RCRA Subtitle C facility or Subtitle D facility, or use as subgrade fill in capped landfills at JOAAP
- Decommissioning of the treatment area
- ICs consisting of deed restrictions on the land and soil

5.1.3.4 SRU4 Soils

SRU4 consisted of PCB-contaminated soils and debris. The selected remedy included excavation and disposal of contaminated soil and debris from sites L1, L5, L7, L8, L9, L10, and L17 using the following activities:

- Building demolition (where appropriate) followed by salvage or disposal
- Excavation of contaminated soil, transportation to an off-site disposal facility, and confirmatory sampling within each excavation
- Backfilling, regrading, and revegetating the excavated areas
- Soil incineration or disposal based on the following criteria:
    - Soil and debris having PCB concentrations less than 50 parts per million (ppm) would be disposed at an offsite RCRA Subtitle D permitted facility
    - Soil and debris having PCB concentrations between 50 ppm and 500 ppm would be disposed at an off-site Toxic Substances Control Act (TSCA) permitted facility
    - Soil and debris having PCB concentrations greater than 500 ppm would be disposed off-site in accordance with TSCA (e.g. treated in a permitted incinerator)
- ICs consisting of deed restrictions on the land and soil

5.1.3.5 SRU5 Soils

SRU5 consisted of two sites, L1 and L5, where petroleum products were spilled. The selected remedy included excavation and disposal of contaminated soil using the following activities:

- Building demolition (where appropriate) followed by salvage or disposal
- Excavation of contaminated soil, transportation to a disposal facility, and confirmatory sampling within each excavation
- Backfilling, regrading, and revegetating the excavated areas
- Disposal of contaminated soil at a RCRA Subtitle C facility or Subtitle D facility, or use as subgrade fill in capped landfills at JOAAP
- ICs consisting of deed restrictions on the land and soil

5.1.3.6 SRU6 Landfills

SRU6 consisted of six sites that were used for waste disposal (landfills) during production and operation activities. The selected remedies included capping or excavation and disposal of landfills.

The landfills at sites L3, M11 and M13 were capped using the following activities:

- Surface regrading
- Installation of a RCRA Subtitle C cap at L3 and M11; installation of a RCRA Subtitle D cap at M13
- Establishment of a maintenance and monitoring program
- ICs consisting of deed restrictions on the land and soil

The landfills at sites L4, M1 and M9 were excavated and disposed using the following activities:

- Excavation of landfilled materials, transportation, and confirmatory sampling within each excavation
- Disposal of excavated material at an off-site RCRA Subtitle C facility, Subtitle D facility, or reuse
- Regrading and revegetating of the excavated areas
- ICs consisting of deed restrictions on the land and soil

5.1.3.7 SRU7 Sulfur

SRU7 consisted of areas where raw sulfur was present on the ground. Raw sulfur was used to produce sulfuric acid and other chemicals used in the production of explosives.

Remedial actions consisted of the removal and disposal of sulfur from sites M8 and M12 using the following activities:

- Excavation, transportation, and confirmatory sampling within each excavation
- Backfilling, regrading and revegetating the excavated areas
- Disposal of excavated sulfur
- ICs consisting of deed restrictions on the land and soil

The removal of sulfur is not regulated under CERCLA; it was required by the 1998 ROD.

5.1.3.8 Institutional Controls

IC objectives identified in the 1998 and 1999 RODs include:

- Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels
- Prevent the development and use of [the] property for industrial or residential uses for properties designated for the USDA/FA; and for residential uses for properties designated for industrial development
- Maintain the integrity of landfill caps
- Prevent exposure to/use of contaminated groundwater

ICs were implemented for all land areas that were not suitable for UU/UE at the time of the property transfer. The ICs vary depending on the impacted media and intended land use, but are all intended to limit exposure of human and ecological receptors to contaminated soil or groundwater to avoid unacceptable risk.

JOAAP property transfers have taken one of the following three forms:

1. Federal agency (U.S. Army) to Federal agency (USDSA/FS or U.S. Department of Veterans Affairs) for the MNTP and Abraham Lincoln National Cemetery
2. Federal agency (U.S. Army) to the State of Illinois via JADA for subsequent transfer to private entities
3. Federal agency (U.S. Army) to Will County, Illinois, for development of a landfill

ICs for Land Transferred to the USDA Forest Service

Due to the procedure for transfer of land from one Federal agency to another, formal deeds were not recorded for property that was transferred from the U.S. Army to the USDA/FS. However, U.S. Army conveyance documents including an Environmental Condition of Property (ECOP) and Letters of Assignment included applicable land use restrictions. These restrictions were incorporated into the USDA/FS official land management plan for the MNTP (The Prairie Plan). An amendment to the Prairie Plan (Amendment 1) prepared June 28, 2008 established a separate management area (MA3) to provide direction for monitoring and reporting on land uses for remediated lands transferred from the U.S. Army. MA3 lands have two designations that carry separate restrictions: soil restricted areas (SRAs) and GMZs.

According to the amended Prairie Plan, SRAs contain COCs that have been remediated to the standards identified in the 2004 ROD or are areas where bioremediated soils have been used as backfill. In either case, sites in SRAs do not meet residential standards and require land use constraints and tracking. GMZs have contaminated groundwater that is expected to attenuate naturally over time. Restrictions on groundwater use in the GMZs will be in place until monitoring indicates that water quality meets the standards identified in the 1998 ROD. MA3 land may not be suitable for future land conveyances without consultation with the U.S. Army, IEPA and USEPA and additional cleanup. MA3 land that is conveyed outside a governmental agency must be remediated to a residential standard or conveyed with a deed restriction.

Approximately 1,028 acres of land were allotted to MA3 with the amendment and have one or both of the SRA and GMZ designations. The Prairie Plan (as amended) includes requirements for the USDA/FS to report to the U.S. Army, IEPA and USEPA annually on the status of land use and groundwater restrictions as well as any land use proposals that would be, or were, affected by them. The location and extent of MA3 land is depicted in Attachment 10. The IC objectives, standards, and restrictions are fully described and clearly stated in the Prairie Plan. In addition to general restrictions preventing unrestricted exposure to soils with residual contamination and preventing the development and use of the property for residential, schools, childcare or playgrounds, or industrial uses, the following additional restrictions for MA3 land are required by the Prairie Plan:

- SRA – Movement of soil from SRAs can only occur within the same parcel, to another SRA, or removed to a landfill permitted to accept the soils. Incidental soil movement, including but not limited to soil on equipment, plant salvage, and soil sampling is not subject to this restriction.

- GMZ – It is prohibited to install groundwater production wells or to perform any other activity that could cause migration of contaminated groundwater within the GMZ boundaries defined by the U.S. Army.
- GMZ – If groundwater management zones are reduced or eliminated as a result of U.S. Army monitoring, the cleared parcel will revert to MA1 – Prairie Ecosystem Restoration without need of an amendment.
- In areas that are comprised of more than one component of MA3 (i.e. a SRA and GMZ in the same area), applicable standards and guidelines will be followed for all component areas.
- Report on the condition of MA3 lands annually in a Monitoring and Evaluation Report that is sent to the USEPA – Region 5, IEPA, and the U.S. Army.

Table 5-2 summarizes the ICs for land transferred to the USDA/FS. Site-specific ICs, the status of current compliance, and site-specific details regarding long-term stewardship are documented in Attachment 12 and discussed in subsequent sections of this report that describe five-year review details for each site.

Table 5-2 - IC Summary For Land Transferred to USDA/FS

Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions.	**IC Objective**	**Title of IC Instrument Implemented** **(note if planned)**
Soil The area of restricted land use is identified in Attachment 10	• Restrict exposure to soils with residual contamination • Prevent development for residential, schools, childcare, playgrounds, or industrial uses • No camping • Restrict soil movement	Land and Resource Management Plan (Prairie Plan) Amendment #1 – Establishment of Management Area 3 and Designation of Utility Corridors into MA2 USDA/FS Midewin National Tallgrass Prairie Wilmington, Will County, Illinois, June 26 2008
Groundwater The GMZs are identified in Attachment 10	• Prohibit installation of groundwater production wells or any other activities that could cause migration of contaminated groundwater within the GMZ boundaries defined by the U.S. Army	

Table 5-2 - IC Summary For Land Transferred to USDA/FS

Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions.	IC Objective	Title of IC Instrument Implemented (note if planned)
Remedy Components	• Maintain the integrity of groundwater or monitoring wells • Fulfill the annual tracking and reporting requirements to the U.S. Army, USEPA, and IEPA	

ICs for Land Transferred to JADA

The ICs required for property conveyed from the U.S. Army to the State of Illinois (JADA) have been implemented as Land Use Restrictions and Covenants, and Groundwater Restrictions and Covenants. These were recorded on the deeds of the properties. Detailed descriptions of the environmental condition of the property were also provided on the deeds.

Two quit claim deeds have been conveyed from the U.S. Army to JADA. A Memorandum of Agreement (MOA) included with the deeds, or included by reference, details requirements for compliance, enforcement, and annual reporting associated with the ICs. Legal descriptions and parcel and tract maps annotated with special groundwater restriction areas are also included as exhibits to the individual deeds.

The Land Use Restrictions and Covenants and Groundwater Restrictions and Covenants recorded on all of the deeds granted to JADA are generally the same. With limited exceptions as detailed in the deeds, the deeds generally state that the land shall be used for commercial and industrial parks and shall not be used for residential, educational, child or adult care, landfill, quarry, incineration, or concrete or asphalt batching purposes. Additionally, existing or future groundwater monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed. The IC objectives, standards, and restrictions are fully described and clearly stated in the deeds and MOA.

The deeds generally state that restrictions are necessary to ensure the protection of human health and the environment and that the covenants and restrictions therein shall run with the land and shall be binding upon the Grantee, its successors and assigns, future owners, heirs, and executors. The deeds also require that the land use restrictions and covenants be included in all subsequent lease, transfer, or conveyance documents for all or any part of the deeded tracts. Further, the deed states that failure to include the land use restrictions and covenants in all subsequent lease, transfer, or conveyance documents shall not abrogate the status of these restrictions and covenants as binding upon Grantee, its successors and assigns, future owners, heirs, and executors.

The deeds generally state that the Grantee (JADA) shall not knowingly or negligently undertake or allow any activity on or use of the deeded property that would violate the land use restrictions and covenants, and that the land use restrictions and covenants are enforceable by the U.S. Army.

Groundwater restrictions for land within the GMZs generally state that JADA and future owners shall not use the groundwater above the Maquoketa confining bed for potable purposes and shall not cause any increase the volume or area of the contaminated groundwater, damage the confining layers, or create pathways of exposure to human or ecological receptors from the contaminated groundwater. All laws and regulations that are applicable to the safe and proper management, discharge, disposal, or treatment of any shallow groundwater encountered shall also be complied with.

Additional restrictions applicable to specific parcels of land included in the deeds generally state that JADA or future owners shall not use the contaminated groundwater and shall not drill, construct, pump, or use groundwater supply wells. Table 5-3 summarizes ICs for land transferred to JADA. Site-specific ICs, the status of current compliance, and site-specific details regarding long-term stewardship are documented in Attachment 12 and discussed in subsequent sections of this report that describe five-year review details for each site.

Table 5-3 - IC Summary for Land Transferred to JADA

Media, Engineered Controls, and Areas that Do Not Support UU/UE Based on Current Conditions.	IC Objective	Title of IC Instrument Implemented (note if planned)
Soil Areas restricted to commercial/industrial cleanup (refer to the 1998 ROD)	• Prohibit residential, educational, child or adult care use	Restrictive Covenant recorded in the following documents at the Will County Recorder's Office: • Document Number 20000086264 8/9/2000 • Document Number 200402130025145 3/15/2002 • Document Number 200504190064066 3/25/2005
Groundwater Areas designated as GMZs and Groundwater Restriction Areas (Figure 3-3)	• Prohibit potable use of contaminated water • Prohibit activities that could influence flow or damage confining layers • Require proper management or disposal of contaminated water • Prohibit ground water supply wells and any use of contaminated groundwater in the Groundwater Restricted Areas	

Table 5-3 - IC Summary for Land Transferred to JADA

Media, Engineered Controls, and Areas that Do Not Support UU/UE Based on Current Conditions.	IC Objective	Title of IC Instrument Implemented (note if planned)
Remedy Components	• Prohibit Interference with Remedy Components- do not damage monitor wells • Permit unrestricted Army access for remediation, monitoring, operation and maintenance • No landfills, quarries, concrete or asphalt batching, or incineration	

A robust set of ICs have been designed and implemented for all transferred properties that are no longer under the direct control of the U.S. Army. These ICs are protective of human health and the environment and protect the integrity of the remedy. Adherence to the ICs for land transferred to non-Federal entities are documented in Attachment 12.

ICs for Land Transferred to Will County

The ICs required for property conveyed from the U.S. Army to Will County have been implemented as land use restrictions and covenants and groundwater restrictions and covenants recorded on the deeds. This information is in addition to detailed descriptions of the environmental condition of the property.

One quit claim deed was conveyed from the U.S. Army to Will County. Legal descriptions and parcel and tract maps annotated with special groundwater restriction areas are also included as exhibits to the deed.

The land use restrictions and covenants and groundwater restrictions and covenants recorded on the deed granted to Will County generally state that the property may only be developed and utilized for landfill purposes and prohibits the development of the property for residential purposes and prohibits the use of groundwater within the glacial drift and Silurian dolomite aquifer and above the Maquoketa confining bed for human consumption. The deed restrictions generally state that Will County and future owners shall not undertake or allow any activity on or use of the property that would violate the land use and groundwater use restrictions. The IC objectives, standards, and restrictions are fully described and clearly stated in the deed. The deed requires that the restrictions shall be binding on Will County, its representatives, agents, contractors, successors and assigns, future owners, heirs and executors, and shall be included in all subsequent deeds, leases, transfer or conveyance documents and shall run with the land.

Table 5-4 summarizes the ICs for land transferred to Will County. Site-specific ICs, the status of current compliance, and site-specific details regarding long-term stewardship are documented in Attachment 12 and discussed in subsequent sections of this report that describe five-year review details for each site.

Table 5-4 - IC Summary for Land Transferred to Will County

Media, Engineered Controls, and Areas that Do Not Support UU/UE Based on Current Conditions.	IC Objective	Title of IC Instrument Implemented (note if planned)
Soil The area of land restricted to commercial industrial cleanup use is identified in the 1998 ROD	• Prohibit residential, educational, child or adult care use	Restrictive Covenant recorded in the following document at the Will County Recorder's Office: Document Number 200204120063838 (4/12/2002)
Groundwater The areas designated as GMZs and Groundwater Restriction Areas are identified in Figure 3-3	• Prohibit potable use of contaminated water • Prohibit activities that could influence flow or damage confining layers • Require proper management or disposal of contaminated water • Prohibit ground water supply wells and any use of contaminated groundwater in the Groundwater Restriction Areas	
Remedy Components	• Prohibit Interference with remedy components- do not damage monitor wells • Permit unrestricted U.S. Army access for remediation, monitoring, operation and maintenance • The property may only be developed for landfill purposes	

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5.2 SITE L1 – BUILDING GROUP 61

5.2.1 Background Information

Site L1 is an 80-acre site centrally located in the northern portion of the LAP Area. The site was originally used for crystallizing ammonium nitrates and was extensively modified to function as a shell renovation and 1,3,5-TNB recovery plant until 1945. In April 1946 the facility was reactivated to reclaim TNT. Washout operations involving larger munitions were performed outside of Building 61-35. The solids that settled in a sump were sent to Site L2 (Explosive Burning Grounds), while the overflow from the sump (pink water) was discharged to an adjacent 4.3-acre ridge-and-furrow system (or evaporating bed). Explosive compounds in soil were present in a ridge and furrow impoundment, the western most of two newer ponds, an area south of the washout building, and in soil around the sump.

The site is owned by the U.S. Army and is not being used. It is located within a GMZ for GRU1.

Site L1 contained the following SRUs (refer to Figure 5-1):

- SRU1 – explosives in soil
- SRU4 – PCBs in soil
- SRU5 – organics in soil

SRU1 Soil

The majority of SRU1 soil was present in the ridge and furrow system, a western lagoon south of the evaporation beds, an area south of a former washout building, and around a building sump. COCs included 1,3,5-TNB and 2,4,6-TNT.

SRU4 Soil

Two transformers were removed in August 1990 from an area east of Building 61-4 that were suspected to have leaked oil-containing PCBs onto site soil. PCB 1260 was the COC for SRU4 soil.

SRU5 Soil

Stained soils containing petroleum hydrocarbons were identified in the vicinity of above ground storage tanks (ASTs) located west of Building 61-1 and north of Building 61-2. Total petroleum hydrocarbons were the COC for SRU5 soil.

5.2.2 Remedial Actions

5.2.2.1 Implementation

SRU1 and SRU 5 Soils

RA activities were conducted from October 2005 to March 2006. A total of 11,634 cubic yards (CY) of unscreened SRU1 soil and 1,895 CY of unscreened SRU5 soil were excavated and

treated at the Site M4 bioremediation treatment facility (BTF). A total of 321 CY of concrete debris was excavated and disposed of at the Prairie View Recycling and Disposal Facility (RDF).

Soil for backfill was obtained from on-site locations. The excavations were backfilled and re-graded to promote proper drainage. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all SRU1 and SRU5 RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site L1 for SRU1 and SRU5 soils is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

SRU4 Soil

RA activities were conducted between August and October 1999. A total of 155 CY of non-TSCA regulated soil was excavated and disposed of at the Laraway RDF in Elwood, Illinois. The excavations were backfilled using clean soil from the site. Backfill was placed and graded to drain consistent with adjacent terrain. Seed and mulch was used to establish vegetation in the re-graded areas consistent with surrounding grasses.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all SRU4 RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of Site L1 for SRU4 soils is documented in *Joliet Army Ammunition Plant Wilmington, Illinois Final PCB Sites RA Closure Report Load-Assemble-Package Area* (MWH 2001b).

Table 5-5 Volume of Contaminated Soils and Concrete Removed from Site L1

Media	Volume (CY)	Notes
SRU1 Soil	11,634	Treated at the BTF
SRU4 Soil	155	Disposed at the Laraway RDF
SRU5 Soil	1,895	Treated at the BTF
Concrete	321	Disposed at the Prairie View RDF

Other Remedial Actions

Three ASTs were removed, two from an area north of Building 61-2 and one from an area west of Building 61-1. These areas correspond to the SRU5 remediation areas illustrated on Figure 5-1.

Potential asbestos-containing material (ACM), consisting of roof tar material on the ground and transite panels at buildings 61-2, 61-4, and 61-35, were removed and disposed at the Prairie View RDF.

5.2.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RAs take place at the site. Groundwater monitoring is being performed pursuant to the GRU1 remedy (refer to Section 6.3.2.2 for monitoring details).

5.2.2.3 Land Use/Institutional Controls

Site L1 will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater (within a GMZ) may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater
    - Damaging of confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
    - Shall not be used for potable water supply
    - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.2.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and the photographs.

The site is not used and contains vacant structures from previous LAP operations. Open areas of the site contain grassland and scrub-brush. A chain link and barbed-wire fence surrounds the site. The entrance gate was locked and a large opening in the fence was observed adjacent to the gate. Land uses incompatible with the restrictions identified in Section 5.2.2.3 were not observed. The entire LAP Area is surrounded by a perimeter fence.

5.2.4 Progress Since Last Five-Year Review

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred at the site since this time.

5.2.5 Technical Assessment

5.2.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L1 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance of the SOU are not anticipated. Opportunities for optimization were not identified.

5.2.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. A review of the applicable or relevant and appropriate requirements (ARARs) used to develop RGs established in the 1998 and 2004 RODs was performed (Attachment 7). The only ARAR-based RG listed in the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.2.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD and 2004 ROD.

5.2.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- Geographic information system (GIS) records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.2.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.2.8 Protectiveness Statement

The SOU remedy at Site L1 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site or treated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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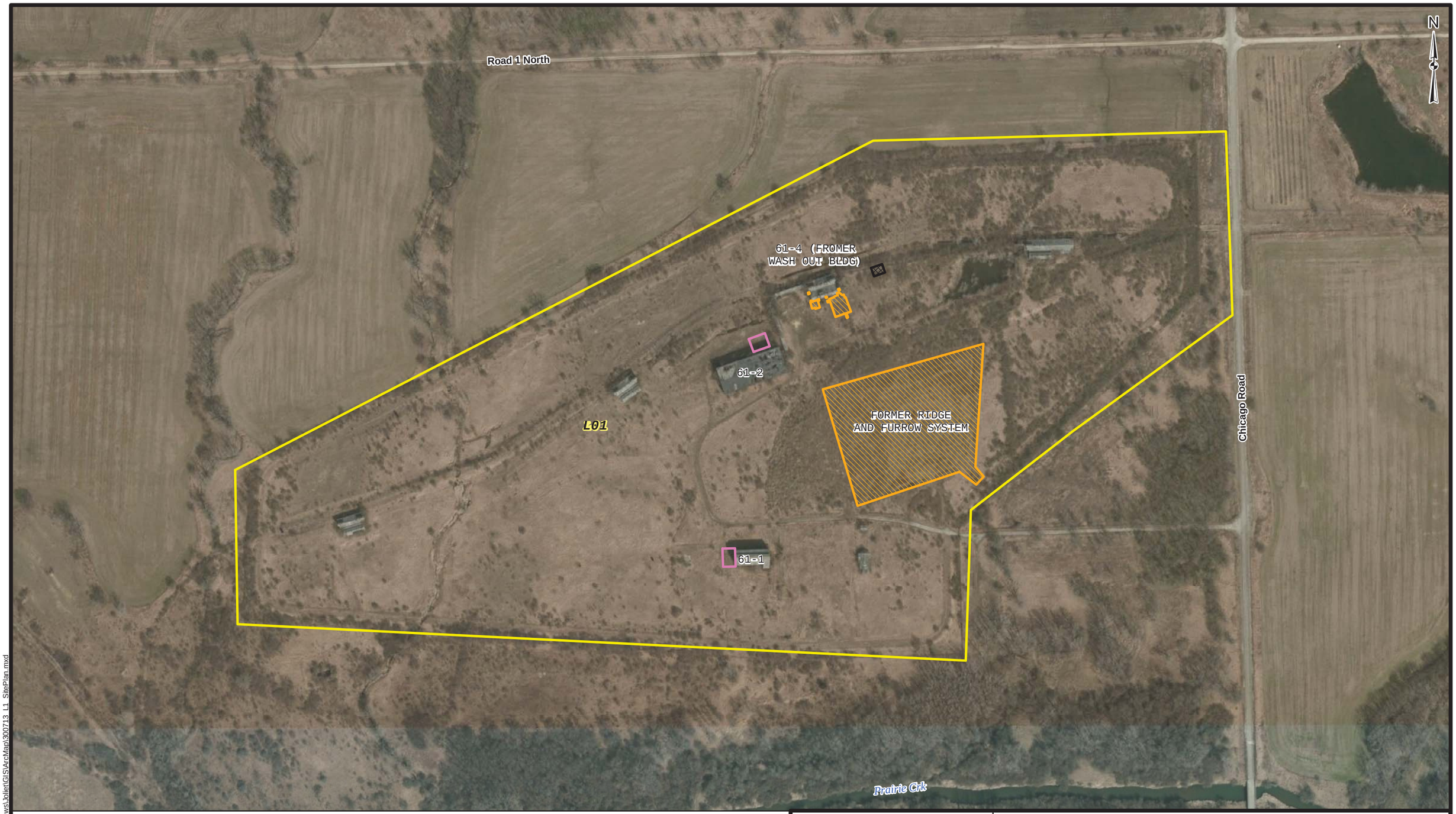

Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 4 - PCB Remediation Area
- SRU 5 - Organics Remediation Area

Reference:
Montgomery Watson Harza, 2001. "Joliet Army Ammunition Plant Final PCB Sites RA Closure Report Load-Assembly-Package Area". December.
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August

0 300 600 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L1 REMEDIAL ACTION

Name: 300713_L1_SitePlan.mxd
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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-1

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5.3 SITE L2 – EXPLOSIVE BURNING GROUNDS

5.3.1 Background Information

Site L2 is located in the west-central portion of the LAP Area, adjacent to Prairie Creek and Kemery Lake. The operational area covered approximately 5 acres and contained six east-west burning pads, each approximately 650 ft long by 50 ft wide, where explosives and associated wastes from other LAP sites were burned. Three north-south burning pads were located east of this area, which were subsequently reconfigured into one pad. Oil and pits were constructed on the southern portion of the pads. Burning pads were constructed with gravel and fitted with electric igniters for remote operation.

Three popping furnaces, where small ammunition was detonated, were located at the southwest portion of the site. During operations, metal waste from the furnaces was removed and sent to a salvage yard at Site L5. The Explosive Burning Grounds also contained three solvent and oil disposal pits (each less than 0.25 acre) located adjacent to the burning pads that were occasionally used to burn waste oil. These pits were remediated in 1996 as part of a removal action conducted by the U.S. Army. Munitions and Explosives of Concern (MEC), including fuses and other items, were identified on the burning pads and buried in an area north of the burning pads. The MEC was disposed during the removal action and a complete MEC sweep was performed. An April 30, 2007 letter confirming the MEC removal action was included in the RA closure report.

Drainage features include two ditches that flow from the northern portion of the burning pads to Kemery Lake and a gully at the southwestern corner of the site that receives runoff from the popping furnace area and southern portions of the site.

The site is owned by the U.S. Army and not being used. It is located within a GMZ for GRU1.

Site L2 contained the following SRUs (refer to Figure 5-2):

- SRU1 – explosives in soil
- SRU2 – metals in soil

SRU1 Soil

The COCs for SRU1 soil included 2,4-DNT, 1,3,5-TNB, 2,6-DNT, and RDX.

SRU2 Soil

Soils surrounding the popping furnaces were contaminated with arsenic, cadmium, and lead. An area in the southwest corner of the burning pads contained lead concentrations above the RG identified in the 2004 ROD.

5.3.2 Remedial Actions

5.3.2.1 Implementation

RA activities and MEC clearance were conducted between February 12 and October 31, 2007. Approximately 946 CY of unscreened SRU1 soil was excavated and transported to the BTF for stockpiling, screening, and treatment. Approximately 7,092 CY of unscreened SRU2 soil and 280 CY of concrete debris were excavated and disposed at the Prairie View RDF.

Table 5-6 Volume of Contaminated Soils and Concrete Removed from Site L2

Media	Volume (CY)	Notes
SRU 1 Soil	946	Treated at the BTF
SRU 2 Soil	7,092	Disposed at the Prairie View RDF
Concrete	280	Disposed at the Prairie View RDF

The following additional activities were performed during the RA:

- Munitions debris (13,690 pounds - lbs) and range residue (4,949 lbs) were recovered and disposed of at the Belson Steel Center Scrap facility in Bourbonnais, Illinois
- Transite panels from the popping furnace roofs were removed and disposed off site
- The popping furnaces were cut up and disposed at the Prairie View RDF
- 100 gallons of diesel fuel from a 2,000-gallon AST was mixed with the excavated soils that were disposed of at the Prairie View RDF

Backfill was obtained from an earthen berm located at Site L7. The backfill was placed, compacted, and re-graded to drain consist with the adjacent terrain. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). The selected remedy removed SRU1 and SRU2 soils above RGs and the soil RA is complete. Closure of Site L2 is documented in the *Final Closure Report, Sites L2, L5, L23A, M3, M4, and M12* (MWH 2009).

5.3.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring is being performed pursuant to the GRU1 remedy (refer to Section 6.3.2.2 for monitoring details).

5.3.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan*

(MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater (within a GMZ) may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater
    - Damaging of confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
    - Shall not be used for potable water supply
    - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.3.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and the photographs.

The site is not used and consists of open grassland and scrub-brush. A sign on Chicago Road indicates the area is closed. Land uses incompatible with the restrictions identified in Section 5.3.2.3 were not observed. The entire LAP area is surrounded by a perimeter fence.

5.3.4 Progress Since Last Five-Year Review

Site L2 achieved closure status for the SOU and a final closure report has been issued (MWH 2009) since the second five-year review.

5.3.5 Technical Assessment

5.3.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L2 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.3.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used as the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that would call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.3.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 2004 ROD.

5.3.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring

- The U.S. Army's compliance with ICs has not been assessed annually

5.3.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.3.8 Protectiveness Statement

The SOU remedy at Site L2 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site or treated and disposed off site
- Land use is consistent with the IC objectives identified in the 2004 ROD
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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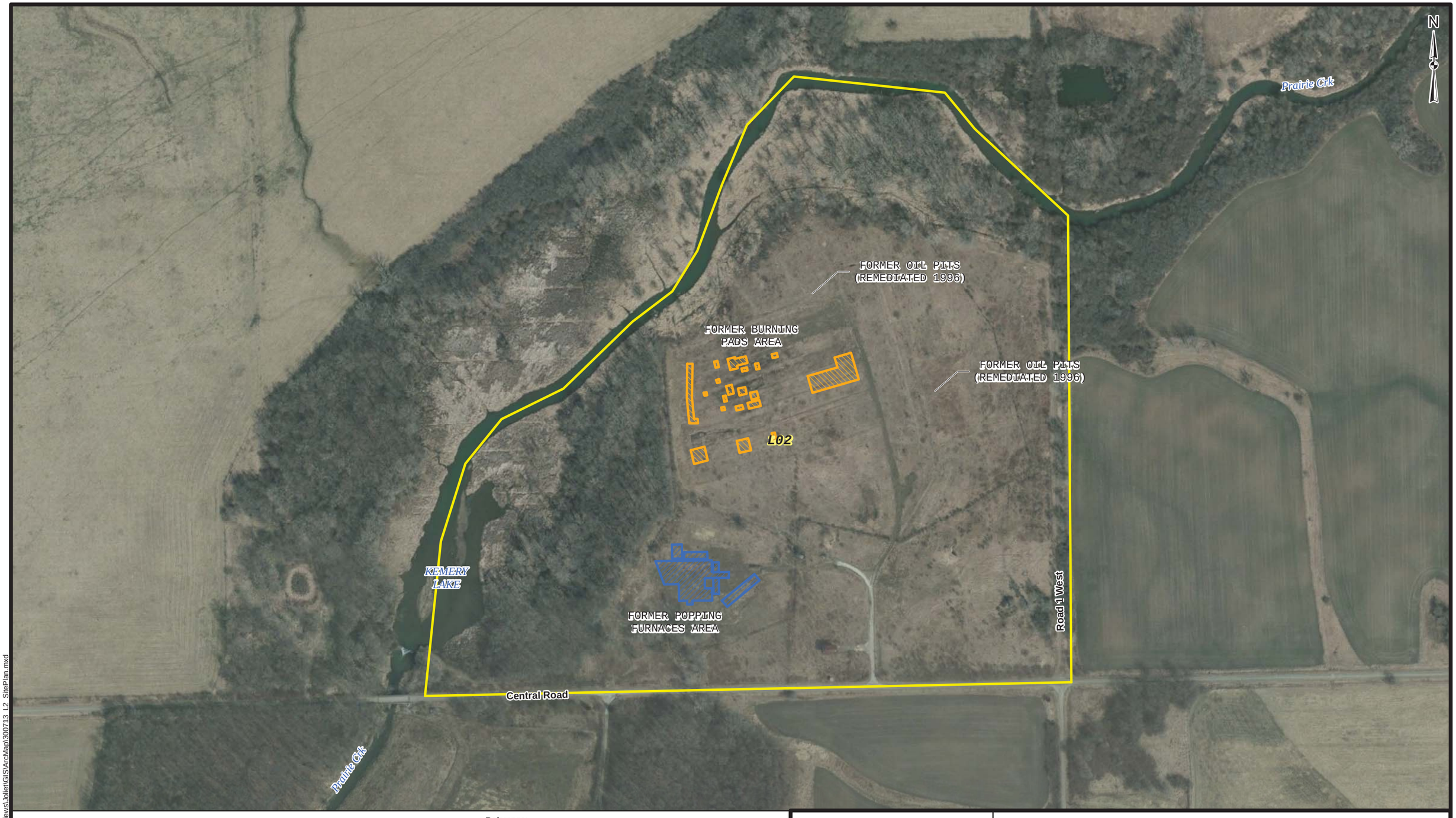

Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 2 - Metals Remediation Area

Reference:
MWH 2009. "Final Closure Report Sites L2, L5, L23A, M3, M4 and M12 Joliet Army Ammunitions Plant." October.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L2 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-2

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5.4 SITE L3 – DEMOLITION AREA

5.4.1 Background Information

Site L3 encompasses approximately 50 acres southwest of the Explosive Burning Grounds (Site L2). It is bounded to the west by Prairie Creek, to the south by an unnamed tributary to Prairie Creek, and to the east by Star Grove Cemetery. The principal operation conducted at the site was open burning of combustible refuse and munitions crates. Uncontaminated solid waste and some potentially low-level explosives-contaminated solid waste were also burned in this area. A 1 acre fire training area was located at the site.

The burning area consisted of U- and L-shaped bermed features and a burning cage. The berms were situated adjacent to Prairie Creek and measured approximately 800 ft by 300 ft. During the Phase 1 RI, geophysical techniques identified buried metallic debris in and around the berms. The entire area between Prairie Creek and the easternmost access road was presumed to be filled with metallic debris and other wastes including MEC. The extent of contamination along Prairie Creek appeared to be related to the presence of fill material.

The fire training area consisted of a small depression enclosed by an earthen berm, which contained burning and fire training areas.

The site is owned by the U.S. Army and is located within a GMZ for GRU1.

Site L3 contained the following SRUs (refer to Figure 5-3):

- SRU2 – metals in soil
- SRU3 – explosives and metals in soil
- SRU6 - landfill

SRU2 Soil

Soil at the fire training pit and east of the demolition pits was contaminated with lead.

SRU3 Soil

Soil contaminated with RDX and lead was present in the western portion of the bermed area.

SRU6

The former burning area along Prairie Creek was contaminated with lead, chlordane, 2,6-DNT and phosphate above the RGs. MEC was also identified in this area, which was classified as RCRA characteristic waste based on reactivity (RCRA waste code D003).

5.4.2 Remedial Actions

5.4.2.1 Implementation

RA activities were conducted between August 2 and October 9, 2008 and consisted of excavation/off-site disposal of contaminated soil and on-site consolidation and capping of waste material/contaminated soil.

Excavation/Off-site Disposal of Contaminated Soil

Approximately 3,330 CY of SRU2 and SRU3 soils and 5,000 CY of concrete and debris were excavated and disposed at the Prairie View RDF. Approximately 15,727 lbs of munitions debris and 45,120 lbs of range residue were recovered. Approximately 31,000 lbs of the range residue/munitions debris was drummed and disposed at the Belson Steel Scrap Center. Rebar and other metallic debris were recycled.

Table 5-7 Quantities of Contaminated Soils and Debris Removed from Site L3

Media	Volume/Weight	Notes
SRU 2 and 3 Soils	3,300 CY	Disposed at the Prairie View RDF
Concrete and debris	5,000 CY	Disposed at the Prairie View RDF
Munitions debris	31,000 lbs	Disposed at the Belson Steel Scrap Center

The following additional RA activities were performed:

- Transite panels from a framed structure and buried panels adjacent to Prairie Creek were removed and disposed at the Prairie View RDF
- A concrete retaining wall from the north-central portion of the site was removed and sent to the International Union of Operating Engineers Local (IOUEL) 150 training center for recycling
- A storm sewer located near the burning cage was capped with a concrete plug
- Approximately 726 CY of a chalky white solid and deteriorated drums were removed and disposed a the Prairie View RDF

The excavations were backfilled using clean soil from Site L3 and earthen berms from Site L7.

On-site Waste Consolidation/Landfill Capping

Debris from Site L3 containing MEC and contaminated soil from Site L2 were consolidated on Site L3 and covered with a RCRA Subtitle C cap. The capped area (Landfill L3) occupies 3.3 acres adjacent to Prairie Creek (refer to Figure 5-3). The cap included the following components:

- Liner consisting of a geocomposite material or native clay
- Drainage layer consisting of linear low density polyethylene geomembrane and geonet composite

- Perimeter drainage system on three sides of the landfill
- 24-inch rooting zone soil layer
- 12-inch topsoil cover
- Riprap at the landfill toe of slope along Prairie Creek

RA activities at Site L3 are complete and closure of the site is documented in the *Final Site L3 Closure Report* (MWH 2010).

5.4.2.2 Operation, Maintenance and Monitoring

Maintenance and monitoring of the landfill is performed pursuant to IAC Title 5, Subtitle G, Chapter 1, subchapter c, Part 724, Subpart G and the *Final Long-Term Monitoring Plan* (Toltest 2010). The objectives of the maintenance and monitoring program are:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened
- Ensure that the cap is maintained in a manner that will not increase future infiltration or otherwise allow waste to be exposed
- Keep survey points protected and visible to facilitate future identification

The following activities are performed:

- Quarterly landfill inspections to assess site conditions and land uses
- Semi-annual groundwater monitoring
- Semi-annual surface water monitoring

The landfill maintenance and monitoring program started in October 2008 and will be conducted for 30 years. Landfill inspections are documented in the following reports and documents:

- *Final 2009 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011a)
- *Final 2009 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011b)
- *Response to United States Environmental Protection Agency Comments Draft Final 2010 Semi-Annual Groundwater Monitoring Report Former Joliet Army Ammunition Plant Wilmington, Illinois*. (Toltest 2011c)
- *Final 2010 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011d)
- *Final 2010 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012a)
- *Final 2011 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012b)
- *Final 2011Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013a)
- *Final 2012 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013b)

- *Final 2012 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2014a)

The documents provide landfill inspection reports for October 2008, February 2009, May 2009, July 2009, October 2009, January 2010, April 2010, July 2010, November 2010, January 2011, April 2011, July 2011, October 2011, January 2012, April 2012, July 2012, and October 2012. The following were noted:

- The October 2008 report indicates that upgradient well MW2 was heavily damaged and unusable. Subsequent reports indicate the well was destroyed. Well abandonment documentation was not found.
- The October 2008 report indicates that an erosion gulley was present in the northwestern portion of the landfill and filter fabric had not been extended to this area. Subsequent reports indicate that these conditions were repaired.
- The October 2008 report indicates that no filter fabric and insufficient rip rap was applied to a drainage ditch north and east of the landfill. Subsequent reports indicate that this condition was repaired.
- A photograph provided in the February 2009 report shows a damaged drain line near former well MW2. Subsequent reports do not identify this condition.
- Beginning with the January 2010 report, rip rap on the west side of landfill was noted as being displaced and the underlying filter fabric was exposed. This was attributed to high water events in Prairie Creek.
- All reports indicate that a gate lock was not present.

Details of the groundwater and surface water monitoring programs are provided in Section 6.3.2.2.

5.4.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater (within a GMZ) may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater

  - Damaging of confining layers that underlie the contaminated groundwater
  - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
  - Shall not be used for potable water supply
  - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.4.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photographs.

A chain-link and barbed-wire fence with postings is present between the north side of the landfill and Central Road. The fence does not extend to the west side and the landfill can be accessed from the east bank of Prairie Creek. A lock was not present on the fence gate. The landfill vegetative cover consisted of grass that did not exhibit signs of stress and woody vegetation. Irregular features such as bulges, unstable slopes, or eroded channels were not observed. Riprap was present at the toe of slope adjacent to Prairie Creek and areas identified in the inspection reports as requiring repair were present; however, they were not significant enough to impact current protectiveness. Groundwater monitoring wells are situated within and surrounding the landfill. The wells were locked and appeared to be in good condition. Land uses incompatible with the restrictions identified in Section 5.4.2.3 were not observed. The entire LAP area is surrounded by a perimeter fence.

5.4.4 Progress Since Last Five-Year Review

Site L3 achieved closure status and a final closure report has been issued (MWH 2010) since the second five-year review.

The second five-year review site inspection identified the following issue and provided a recommendation (Aerostar 2009b):

> Issue: The area east of the landfill had no vegetative cover and a silt fence was not in place to control erosion.
> Recommendation: Install silt fencing around the area without established vegetation to the east of the landfill and hydroseed.

Adequate vegetative cover east of the landfill was observed during the recent five year review inspection.

5.4.5 Technical Assessment

5.4.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is currently functioning as intended by the decision documents. The SOU remedy for Site L3 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and landfill maintenance and monitoring reports identified areas of eroded and displaced riprap on the west side of the landfill, adjacent to Prairie Creek. If these areas are not repaired the remedy may eventually be no longer protective. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.4.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.4.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD and 2004 ROD.

5.4.6 Issues

Eroded and displaced riprap on the west side of the landfill has been observed since January 2010. This condition has been attributed to high water events in Prairie Creek. The five year review site inspection determined that the affected areas are not significant enough to impact current protectiveness. However, the condition will be exacerbated if maintenance is not performed. Continued erosion and displacement of the riprap will affect landfill performance and future protectiveness of the remedy.

This five-year review has also identified the following issues that do not affect protectiveness of the remedy:

- The landfill fence gate was unlocked
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.4.7 Recommendations for Follow-up Actions

A recommendation for follow-up action to address an issue that may affect the long-term protectiveness of the remedy is provided below.

- Eroded and displaced riprap on the west side of the landfill should be repaired by the U.S. Army in accordance with recommendations provided in the landfill inspection reports. The repair should be conducted prior to October 2015.

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Place a lock on the fence gate
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.4.8 Protectiveness Statement

The SOU remedy at Site L3 currently protects human health and the environment because contaminated soils exceeding the RGs have been excavated and disposed off site and contaminated soil containing possible MEC has been consolidated and capped on site. A perimeter fence that surrounds the LAP area restricts access to the site. Land use is consistent with the IC objectives identified in the RODs. However, eroded or displaced riprap on the west side of the landfill needs to be repaired to ensure protectiveness.

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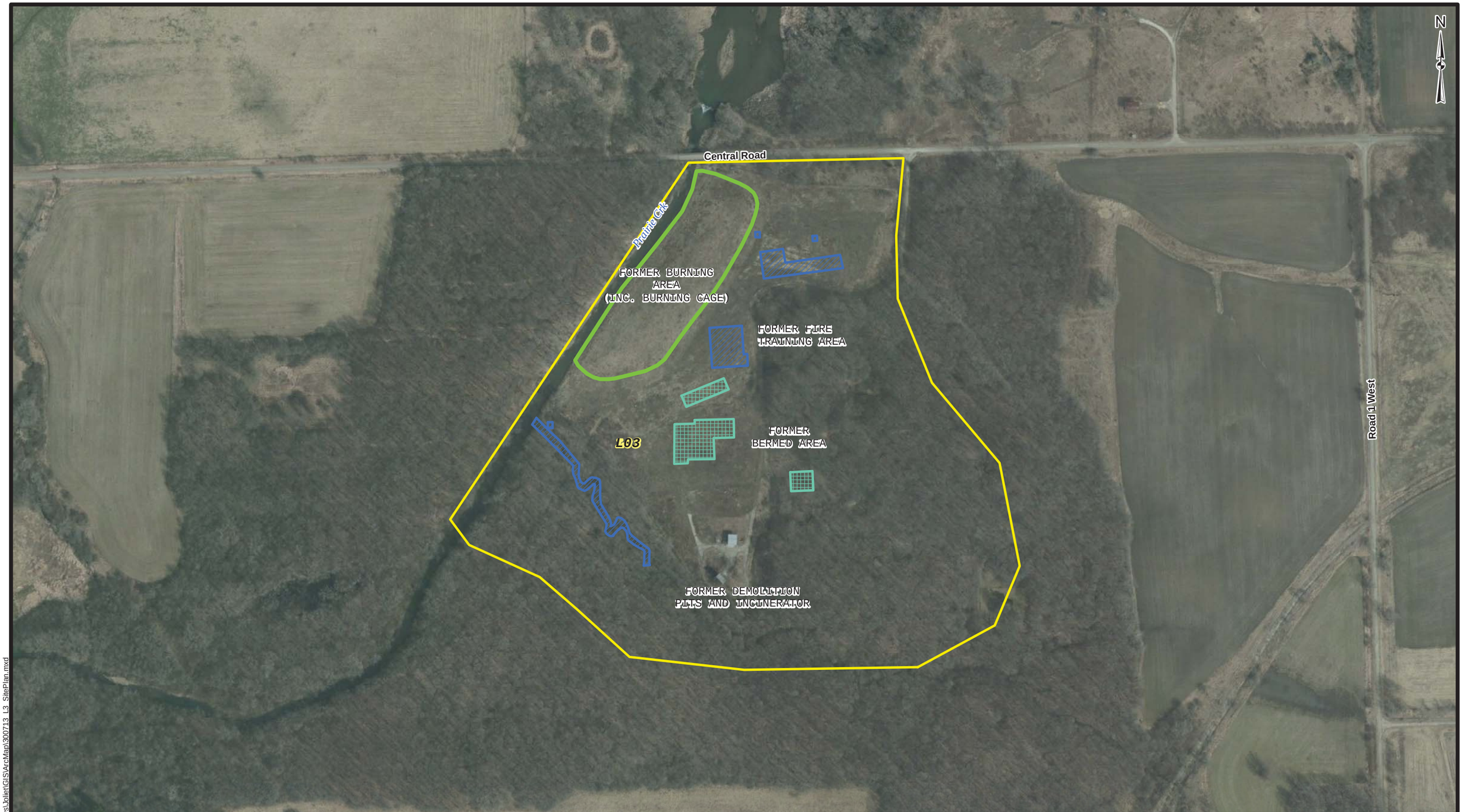

Legend

- Approximate Site Boundary
- SRU 2 - Metals Remediation Area
- SRU 3 - Explosives and Metals Remediation Area
- SRU 6 - Landfill, Capped In-Place

Reference:
MWH 2010. "Joliet Army Ammunition Plant Final Site L3 Closure Report". June

0 300 600 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L3 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-3

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5.5 SITE L4 – LANDFILL AREA

5.5.1 Background Information

Site L4 is located southwest of the Demolition Area (Site L3) on the northern side of Prairie Creek. Two former extraction pits excavated to bedrock are located in this area. The western pit was partially filled with construction waste and sanitary sewage and the eastern pit has been flooded by Prairie Creek. The western pit was used as a landfill from the early 1940s until the late 1960s and reportedly accepted various types of construction debris and 5 gallon pails containing unknown substances. A final cover was installed in the 1970s.

Investigations revealed that the waste consisted of construction and demolition (C&D) debris to a maximum thickness of 12 ft. The landfill was estimated to contain 37,000 CY of waste materials. Fill was not identified in the southwestern portion of the site and exposed bedrock defined the southern boundary of the landfill.

The site is owned by the U.S. Army and is not being used.

Site L4 contained the following SRU (refer to Figure 5-4):

- SRU6 – Landfill

Characterization activities performed during the Phase 1 and 2 RIs (Dames and Moore 1990 and 1993a) and a subsequent investigation performed in 1999 (MWH 1999b) did not identify COCs above the RGs (MKM 2007a). RCRA hazardous wastes were not identified at the site.

5.5.2 Remedial Action

5.5.2.1 Implementation

RA activities were conducted from December 8, 2005 to April 27, 2006. The landfill was excavated and 18,405 CY of C&D debris was disposed of at the Prairie View RDF. Fourteen (14) truckloads of transite panels from the southern portion of the landfill were also disposed of at the Prairie View RDF.

Table 5-8 Amount of Fill Removed from Site L4

Media	Quantity	Notes
C&D debris	18,405 CY	Disposed at the Prairie View RDF
Transite panels	14 truck loads	Disposed at the Prairie View RDF

Test trenches excavated on January 4 and 5, 2006 and field observations conducted by USACE, USEPA, IEPA, and the contractor verified that the landfilled material had been completely removed. Approximately 18,465 CY of treated soil from the BTF was used as backfill. The restored area was hydroseeded using a USDA/FS-approved grass mixture.

Closure of the SOU for Site L4 is documented in the *Final Remedial Action Completion Report for Soils Operable Unit Number 6 – L4 Landfill* (MKM 2007a).

5.5.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place at the site.

5.5.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.5.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes. A five-year review inspection checklist is provided in Attachment 4.

Changed conditions since the second five-year review report were not observed; the site is vacant and contains open grass land and wetlands. Trees and scrub-brush are present in the riparian areas of Prairie Creek and a tributary to the creek. Land uses incompatible with the restrictions identified above were not observed. The entire LAP area is surrounded by a perimeter fence.

5.5.4 Progress Since Last Five-Year Review

Monitoring wells MW413, MW414, and MW415 were abandoned since the second five-year review. There are no monitoring wells remaining on the site.

5.5.5 Technical Assessment

5.5.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L4 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the 1998 ROD. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.5.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Site L4 is one of the SRU6 sites that will become part of the MNTP. The RA objectives and risk-based RGs for SRU6 sites were finalized in the 1998 ROD. However, some of the COCs that were identified for SRU6 soils were revised for other SRUs as part of the 2004 ROD (as discussed in Attachment 8). Since the 2004 ROD risk-based RGs were based generally on protection of the environment and were more stringent than the RGs developed for protection of human health, meeting the 1998 ROD RGs may not be protective of the environment at SRU6 site L4.

The Remedial Action Completion Report for this site (MKM 2007a) was reviewed. After excavation of the landfill area the bioremediated soil identified for backfill was evaluated to determine whether or not it was suitable for use for that purpose. Table 4-1 of the Remedial Action Completion Report (MKM 2007a) compares the 2004 ROD ecological RGs against residual soil concentrations of COCs in the bioremediated backfill soil. All of the COCs were remediated to levels that were below the ecological RGs. In addition, there were several soil samples obtained in the limits of the excavation (sidewalls, bottoms). Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs protective of human health in Table 4-2 of the Remedial Action Completion Report (MKM 2007a), most of the organic COCs were not detected, and all of the metals would also be below ecological RGs from the 2004 ROD.

5.5.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No information has come to light that would call into question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

5.5.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring

- The U.S. Army's compliance with ICs has not been assessed annually

5.5.7 Recommendations for Follow-up Actions

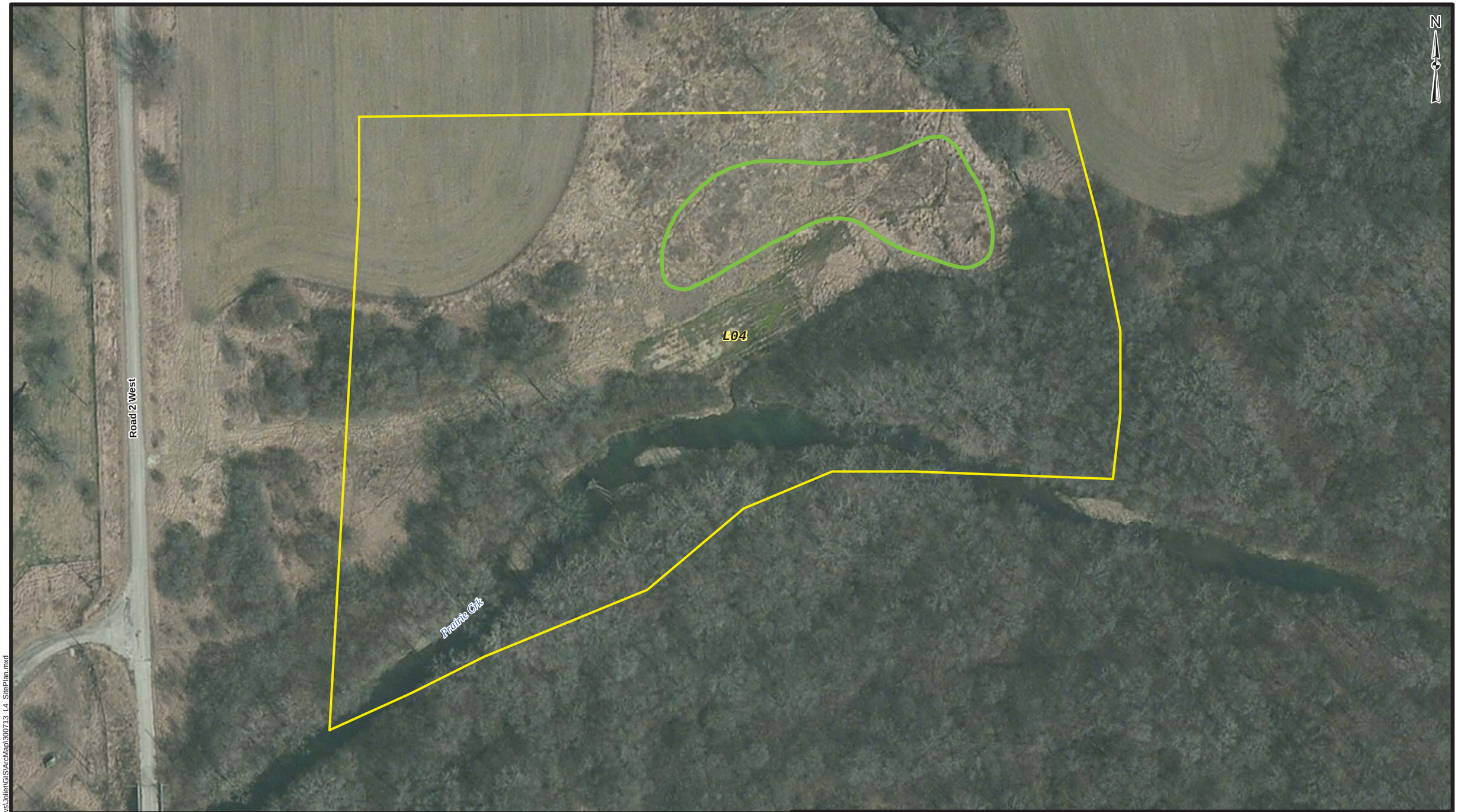
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.5.8 Protectiveness Statement

The SOU remedy at Site L4 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site
- Land use is consistent with the IC objectives identified in the 1998 ROD
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 6 - Former L4 Landfill, Excavated and Disposed

Reference:
MKM Engineers, Inc. 2007. "Final Remedial Action Completion Report for Soils Operable Unit Number 6 - L4 Landfill". August.

0 100 200 Feet

US Army Corps of Engineers Buffalo District

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FIGURE 5-4

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5.6 SITE L5 – SALVAGE YARD

5.6.1 Background Information

Site L5 was used for salvage and open storage of miscellaneous materials from the installation. It is located in the northwestern corner of the LAP Area along Hoff Road. Metal waste from the popping furnaces at the Explosive Burning Grounds (Site L2) was reportedly sent to the salvage yard during facility operations. Contaminated areas at the site included a 1,000 square feet (SF) oil spill near Building 26-3, a 500-ft long shallow ditch located south of the spill that was used to store barrels of unknown substances, several large piles of railroad ties (approximately 1 acre), and a large junk pile (less than 1 acre).

Part of the site is owned by the U.S. Army and part is owned by the USDA/FS. The site is not being used.

Site L5 contained the following SRUs (refer to Figure 5-5):

- SRU2 – metals in soil
- SRU4 – PCB in soil
- SRU5 – organics in soil

SRU2 Soil

SRU2 soil was contaminated with lead primarily at the surface. In the former junk pile, lead contamination occurred in surface soil with some deeper hot spots present. The 500 ft long ditch also contained elevated levels of beryllium, lead and arsenic.

SRU4 Soil

Soil around the junk pile contained PCB-1254 above the RG, which was attributed to a former transformer. Polychlorinated naphthalenes (PCNs) were also detected during characterization sampling and identified as a COC.

SRU5 Soil

A former oil spill located adjacent to Building 26-3 contained surface soil with TPH above the RG of 2,500 mg/kg.

5.6.2 Remedial Actions

5.6.2.1 Implementation

RA activities and MEC clearance were conducted between June 6 and September 18, 2007. Unscreened SRU2 and SRU4 soils were excavated and transported to the Prairie View RDF for disposal. Unscreened SRU5 soil was treated at the BTF. Remediation volumes are listed in Table 5-9.

Table 5-9 Volume of Contaminated Soil Removed from Site L5

Media	Volume (CY)	Notes
SRU2 Soil	1,383	Disposed at the Prairie View RDF
SRU4 Soil [a]	27,603	Disposed at the Prairie View RDF
SRU5 Soil	344	Treated at the BTF

Note:

a - SRU4 soils included PCBs and PCNs

Munitions debris (scrap metal with no explosive potential) was encountered in a small localized area at the eastern end of the ditch. Recovered items were drummed and approximately 9,600 lbs was disposed at the Belson Steel Center Scrap facility in Bourbonnais, Illinois.

Backfill was obtained from an earthen berm at Site L7. The backfill was placed, compacted, and regraded consistent with the adjacent terrain. The remediated areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). The *Final Closure Report, Sites L2, L5, L23A, M3, M4, and M12* (MWH 2009) indicates that metals confirmation sampling at the north-central portion of the Junk Pile Area did not overlap with the remedial design plan. Additional confirmation sampling for metals was planned in the north-central portion of the former Junk Pile Area to 1 ft for the spring of 2008. Closure documentation for this area was to be submitted under a separate cover.

5.6.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place on the site.

5.6.2.3 Land Use/Institutional Controls

A portion of Site L5 has been transferred to the USDA/FS. The remaining portion is owned by the U.S. Army and will be transferred to the USDA/FS for inclusion in the MNTP.

USDA/FS Property

The following LUC/ICs and restrictions apply for the portion of the site that has been transferred to the USDA/FS:

- **Soil Exposure** – Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels identified in the 2004 ROD; prevent the migration of contaminants in accordance with the 1998 ROD.
- **Land Use** – The land shall be used as a tall grass prairie and may not be used for residential housing, elementary and secondary schools, childcare facilities, playgrounds, industrial operations, and camping. The U.S. Army will notify the USDA/FS, USEPA,

and IEPA of any apparent violations of land or groundwater use restrictions and the USDA/FS will take actions to correct incompatible uses.

- **Notifications of Violations** – The USDA/FS will notify the U.S. Army and regulators of any land use restriction violations within 30 days and address the obligation to comply with CERCLA Section 120 on future land transfers.
- **Access to Property** – The U.S. Army will retain an easement, running with the land, that grants a right of access for the U.S. Army, the USEPA, and the IEPA for the purpose of conducting any activity related to the ROD and FFA, including, but not limited to the following activities:
    - Monitoring the work
    - Verifying any data or information submitted to the United States or the State of Illinois
    - Conducting investigations relating to contamination at or near the site
    - Obtaining samples
    - Assessing the need for, planning, or implementing additional response actions at or near the site
    - Implementing the work pursuant to the conditions set forth in the FFA and ROD
    - Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by the U.S. Army or their agents, consistent with the FFA's section on access
    - Assessing the U.S. Army's compliance with the FFA and the RODs
    - Determining whether the site or other property subject to the RODs is being used in a manner that is prohibited or restricted or that may need to be prohibited or restricted by, or pursuant to, the FFA and the RODs
- **Annual Reporting** – The USDA/FS will submit an Annual Certification letter certifying that the land and groundwater uses remain the same and that the integrity of the land and groundwater restrictions has not been compromised.

U.S. Army Property

The following requirements and restrictions apply to the portion of the site that is owned by the U.S. Army and will be transferred to the USDA/FS for inclusion in the MNTP.

Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. Land use restrictions include:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the properties. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.6.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photographs.

The remediated areas were open and contained sparse vegetation. Former JOAAP structures on the site were vacant. A site gate was locked and the perimeter fence was intact. Land uses incompatible with the restrictions identified above were not observed. The entire LAP area is surrounded by a perimeter fence, which serves as a deterrent to unauthorized entry to the site.

5.6.4 Progress Since Last Five-Year Review

Site L5 achieved closure status and a final closure report has been issued (MWH 2009) since the second five-year review.

The second five-year review site inspection identified the following issues and provided a recommendation (Aerostar 2009b):

Issue: The PCB excavation area shown on Figure 3-7 of the Draft Closure Report was not evident as depicted.

Issue: Significant vegetative cover was not established in the excavation area east of the on-site buildings and a silt fence was not in place.

Recommendation: Install a silt fence around the area without established vegetation to the east of the on-site buildings and hydroseed.

A response was provided in *Responses to United States Environmental Protection Agency Comments Draft Final 2010 Semi-Annual Groundwater Monitoring Report Former Joliet Army Ammunition Plant Wilmington, Illinois* (Toltest 2011c). The document indicates that the area identified has since become vegetated. This was verified by the recent five year review inspection.

5.6.5 Technical Assessment

5.6.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy for Site L5 was implemented and is currently functioning as intended by the decision documents. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs

(U.S. Army property) and consistent with the LUCs/ICs and restrictions incorporated into the Prairie Plan (USDA/FS property). Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.6.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid for both USDA/FS and U.S. Army portions of the property. A review of the ARARs used to develop RGs established in the 1998 and 2004 RODs was performed (Attachment 7). The only ARAR-based RG listed the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy at JOAAP were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy for both USDA/FS and U.S. Army portions of the property. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8); it applies to both USDA/FS and U.S. Army portions of the property. These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors, with the exception of DNTs and PAHs. The 2004 ROD does indicate that the RGs for these organic compounds, although designed for protection of human health, area also protective of ecological receptors. Section 7.1 of the 2004 ROD states, "The RGs (Tables 6-1 and 6-2) developed by the JOAAP Management Team provide an acceptable level of risk for human health (i.e. less than $1x10^{-6}$ for carcinogens and Hazard Index less than 1 for noncarcinogens) and do not pose a risk to populations of plants or animals or individual endangered or threatened species." The ecological RGs were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.6.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Closure documentation for the north-central portion of the former Junk Pile Area was not available for the five-year review.

5.6.6 Issues

The following issue was identified that may affect long-term protectiveness of the remedy:

- Closure documentation for the north-central portion of the former Junk Pile was not found

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) that do not affect protectiveness are summarized below.

- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Annual IC reporting by the USDA/FS has not been received since 2009. The USDA/FS has committed to adding an appendix to the Annual Prairie Management Plan to specifically address the issues associated with the transferred land that has restrictions
- The USDA/FS noted that there is no IC that prohibits camping on its property and the ICs originated from the Environmental Condition of Property statements and record of decision documents, not as deed restrictions
- The U.S. Army's compliance with ICs has not been assessed annually

5.6.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions that may affect long-term protectiveness are provided below.

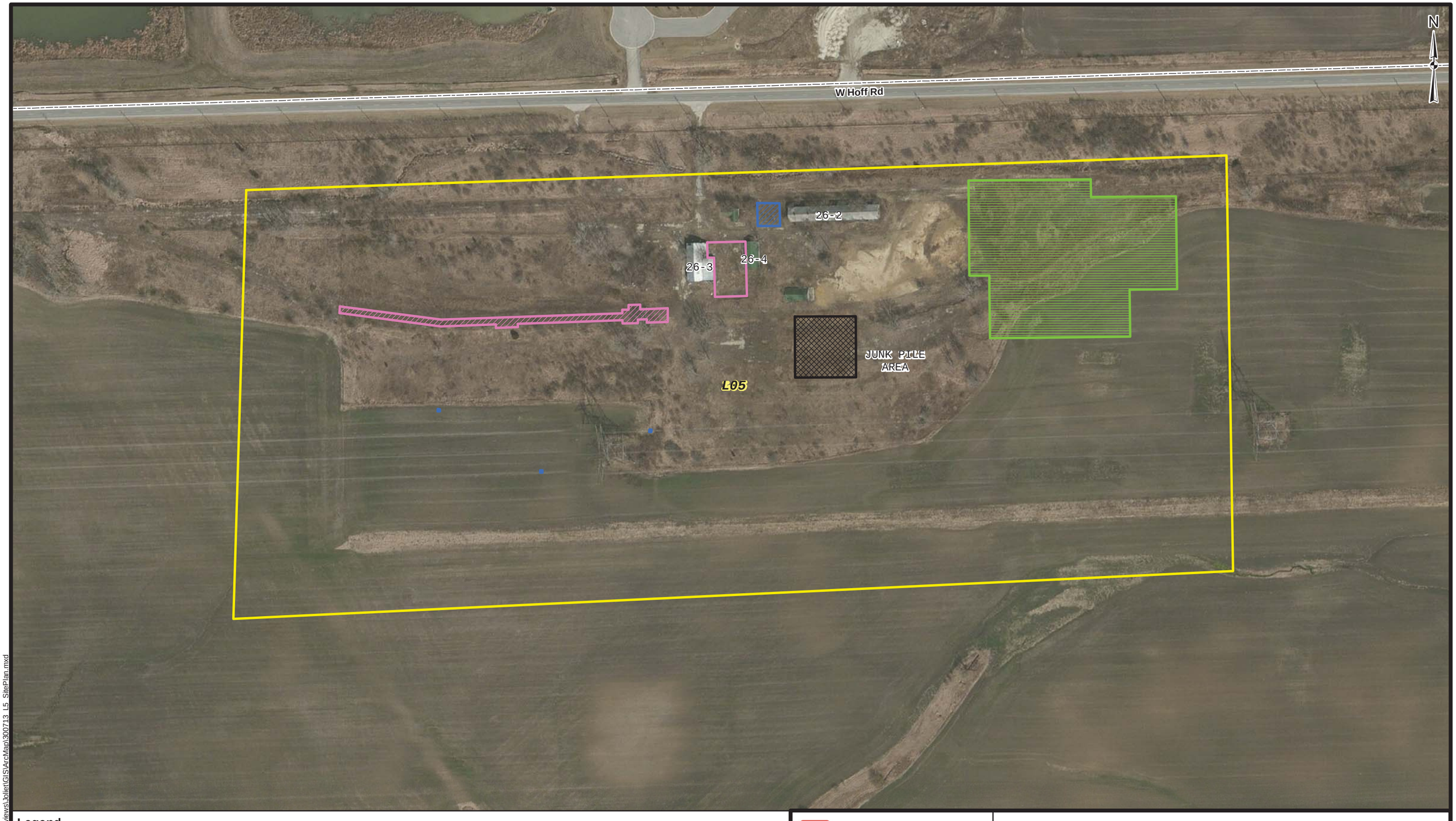
- Locate closure documentation associated with metals in soil from the north-central portion of the former Junk Pile Area as documented in the Closure Report (MWH 2009b)
- Perform closure sampling for metals in soil from the north central portion of the former Junk Pile Area if not already done

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the USDA/FS
- Revise wording on the Questionnaire and Statement of Compliance form to indicate that there is no IC that prohibits camping on USDA/FS property and the ICs originated from Environmental Condition of Property statements and record of decision documents, not as deed restrictions
- Assess the U.S. Army's compliance with ICs annually

5.6.8 Protectiveness Statement

The SOU remedy at Site L5 currently protects human health and the environment because the site is not being used and clean fill was placed in the Junk Pile Area excavation. However, closure documentation should be obtained for metals in soil to assure future protectiveness.



Legend

- Approximate Site Boundary
- SRU 2 - Metals Remediation Area
- SRU 2/4 - Metals and PCB Remediation Area
- SRU 2/5 - Metals and Organic Remediation Area
- SRU 2/4/5 - Metals, PCB and Organic Remediation Area
- SRU 5 - Organics Remediation Area

Reference:
MWH 2009. "Final Closure Report Sites L2, L5, L23A, M3, M4 and M12 Joliet Army Ammunitions Plant." October.

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US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
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BUFFALO, NY

SITE L5 REMEDIAL ACTION

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WILL COUNTY, ILLINOIS

FIGURE 5-5

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5.7 SITE L6 – GROUP 70

5.7.1 Background Information

Site L6 was a storage and service area located in the southwestern portion of the LAP Area. It contained an electric shop, a locomotive service building, a carpenter shop, an AST, and various equipment storage buildings. The locomotive service shop contained three repair pits and a 15 ton crane. An oil skimmer recovery system was located adjacent to the shop. Spent oil was reportedly spread over local roads to minimize windblown dust. Historical aerial photos indicate that debris covered approximately 8 acres in the southwestern portion of the site in 1944.

A low lying area between the locomotive service building and electric shop that contained ponded water and stressed vegetation was identified in 1987. An area where transformer oil had been dumped, between a receiving shop and the electrical shop, was discovered in 1988. Several other potential areas of concern were identified in 1990.

Based on Phase 1 RI results, USACE performed a RA in 1997 to remove organic and PCB contaminated soils. PCB contaminated soils were removed to levels below 1 mg/kg. Remaining COCs were removed to the industrial RGs set in the 1998 ROD. The RA is documented in the *Final Report, Removal Action Site L6/Group 70 Area, Joliet Army Ammunition Plant, Wilmington, Illinois* (IT 1998). Based on results of the removal actions, Site L6 was identified as a NFA site in the 1998 ROD. Impacted soils remain that do not allow for UU/UE and ICs have been implemented.

The site is owned by Will County and occupies a portion of the Will County Landfill.

5.7.2 Remedial Action

5.7.2.1 Implementation

The site was remediated in 1997, prior to the 1998 ROD.

5.7.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place at the site.

5.7.2.3 Land Use/Institutional Controls

ICs for property conveyed from the U.S. Army to Will County have been implemented as land use restrictions and covenants and groundwater restrictions and covenants recorded on the deeds. The following LUCs/ICs apply to the property:

- **Land Use Restrictions**
  - The property may only be developed and is being used for landfill purposes
  - The property shall not be used for residential purposes
- **CERCLA Remediation**
  - Activities shall not be undertaken on the property that would interfere with or impede the completion of the CERCLA cleanup at the former JOAAP

  - ICs established or put in place by the U.S. Army shall be complied with
- **Monitoring Well Restrictions**
  - The U.S. Army has rights to continue with the operation of any monitoring wells, treatment facilities, or other responses actions
- **Groundwater Use Restrictions**
  - Groundwater within the glacial drift and Silurian dolomite aquifer and above the Maquoketa confining bed shall not be used for human consumption unless the requirements of the Safe Drinking Water Act and applicable State law are met

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.7.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to assess site conditions and land use.

Changed conditions since the second five-year review report were not observed. Several JOAAP structures (buildings 70-40, 70-44, 70-45, and the garage) remain. Buildings 70-40, 70-44, and 70-45 appear to be vacant and not used. The garage is occupied and appears to have been renovated. The eastern portion of the site, adjacent to Phillips Road, is used for temporary staging of roll-off boxes and truck trailers. The northwest corner of the site has been modified and construction equipment (scrapers and dump trucks) are staged in this area. An elevated water tank is also present in this area. A storm water detention pond is situated in the southern portion the site. The Will County Landfill occupies the western portion of the site and adjacent areas to the west and northwest. Land uses incompatible with the restrictions identified in Section 5.7.2.3 were not observed.

5.7.4 Progress Since Last Five-Year Review

No additional SOU RA activities have occurred at the site since the second five-year review.

5.7.5 Technical Assessment

5.7.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L6 was implemented prior to the 1998 ROD and the RA is complete. Documentation provided in the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b) indicates that COCs remain at the site at concentrations that do not allow for UU/UE. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the restrictions identified above. Costs or issues associated with monitoring and

performance of the remedy are not anticipated. Opportunities for optimization were not identified.

5.7.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. This is the first review of toxicity and risk assessment methodology changes since the 1998 ROD. Since that time, there have been multiple human health toxicity criteria changes and updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for the Superfund program (discussed in Attachment 8). However, for most of the constituents at most of the sites, the cleanup goals established in the 1998 ROD remain protective of human health. Only five sites had COCs for which the cleanup goal would now represent an unacceptable risk. One of these sites is L6.

For Site L6 a no further action designation was made because a removal action occurred prior to finalization of the ROD. The early soil removal action involved the excavation and disposal of organics and PCB contaminated soil to eliminate the risks from exposure to these contaminants (Dames and Moore 1995). This was also done to facilitate transfer of the property to the Will County Landfill in accordance with Public Law 104-106 (U.S. Congress 1996). The 1998 ROD indicated that the removal action eliminated health hazards for the identified future industrial use of the site and the Second Five Year Review indicated that the remaining COCs at Site L6 that posed potential human health and environmental hazards were removed to levels that met the industrial RGs set in the 1998 ROD (Aerostar 2009b). The removal action at Site L6 was documented in the *Final Report, Removal Action Site L6/Group 70 Area, Joliet Army Ammunition Plant, Wilmington, Illinois* (IT 1998). Table 2-2 of that report (summary of confirmation samples collected from removal action areas) was reviewed and residual concentrations of PAHs (e.g. naphthalene as the COC with greatest change in USEPA RSL) were compared to the new USEPA RSLs, which would be protective of exposure to industrial workers to the soil. The majority of samples did not have any PAHs above laboratory reporting limits, less than 1 mg/kg, which is generally considered to represent background concentrations of PAHs in soil. The maximum concentration of naphthalene was 7 mg/kg, which is below the new USEPA RSL, indicating that the cleanup achieved concentrations that are protective of human health. In addition, the site is currently part of the Will County Landfill and actual exposure to potentially contaminated soil would be much less than what was assumed in developing RGs and USEPA Industrial RSLs (exposure to open soil areas for 8 hours a day, 250 days a year, for 25 years). For both of these reasons (low residual concentrations of PAHs and limited human exposure), the previous removal action would still be considered protective of human health at Site L6.

5.7.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

5.7.6 Issues

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- GIS records have not been retained for ICs monitoring.
- The wording on a Statement of Compliance questionnaire caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.7.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.7.8 Protectiveness Statement

The SOU remedy at Site L6 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils have been removed
- Land use is consistent with the restrictions and covenants recorded on the property deeds
- No information has come into light that could call into question the protectiveness of the remedy

5.8 SITE L7 – GROUP 1

5.8.1 Background Information

Site L7 is located in the southern portion of the LAP Area where explosives were melted and loaded into projectiles. The loaded projectiles were then transferred to another building for final assembly. Process water containing explosives residue was discharged to sumps. Solids that collected in the sumps were reportedly sent to the Explosive Burning Grounds (Site L2) for disposal. Liquids from the sump were discharged to a storm sewer that ultimately discharged to Doyle Lake.

The site is owned by the U.S. Army and is not being used.

Site L7 contained the following SRUs (refer to Figure 5-6):

- SRU1 – explosives in soil
- SRU4 – PCBs in soil

SRU1 Soil

2,4,6-TNT and RDX were identified in the 1998 ROD as COCs in soil from red-stained areas adjacent to buildings throughout the site.

SRU4 Soil

Contamination by PCB 1260 resulted from leaks and spills associated with formerly used transformers. Surface soil around six transformers exceeded the RG.

5.8.2 Remedial Actions

5.8.2.1 Implementation

SRU1 Soil

RA activities were conducted between July 13, 2005 and February 14, 2006. A total of 3,860 CY of unscreened SRU1 soil was excavated and transported to the BTF for screening and treatment. A total of 445 CY of concrete debris was disposed of at the Prairie View RDF.

The following additional activities were performed during the RA:

- The foundations of buildings 1-40A and 1-40C were removed to facilitate access to impacted soil
- Sumps near buildings 1-4, 1-6, 1-10, and 1-16/1-40 were removed
- Manways 1.38 and 1.39 near Building 1-10 were removed
- 150 ft of clay tile storm water pipe designated as “ditch” and a manway were removed
- Transite paneling was removed from conveyors near buildings 1-4/1-40A, 1-6, and 1-16/1-40

- Potential asbestos-containing material (pipe insulation) was removed from beneath Building 1-6
- Steel conveyor structures/frames near Building 1-6 were removed

Backfill was obtained from the soil covering concrete bunkers or from clean areas surrounding the excavations. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site L7 for SRU1 soil is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

SRU4 Soil

RA activities were conducted between August and October 1999. A total of 1,245 CY of PCB-contaminated soil and concrete were excavated disposed off site. TSCA regulated waste (1,110 CY) was disposed at the Wayne Disposal facility in Belleville, Michigan and non-TSCA regulated waste (135 CY) was disposed at the Laraway RDF in Elwood, Illinois. The excavations were backfilled using clean soil from the site. Backfill was placed and graded to drain consistent with adjacent terrain. Seed and mulch was used to establish vegetation in the re-graded areas consistent with surrounding grasses.

Table 5-10 Volume of Contaminated Soils and Concrete Removed from Site L7

Media	Volume (CY)	Notes
SRU 1 Soil and Concrete		
Soil	3,860	Treated at the BTF
Concrete	445	Disposed at the Prairie View RDF
SRU4 Soil and Concrete		
TSCA regulated	1,110	Disposed at Wayne Disposal
Non-TSCA regulated (<50 ppm)	135	Disposed at the Laraway RDF

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of the site for SRU4 soils is documented in the *Final PCB Sites RA Closure Report* (MWH 2001b).

5.8.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place on the site.

5.8.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.8.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

Changed conditions since the second five-year review report were not observed. The site is not being used; it is predominantly vacant and contains remnant LAP structures. Land uses incompatible with the restrictions identified in Section 5.8.2.3 were not observed. Areas surrounding the structures are overgrown and consist of grassland and scrub-brush. A fence surrounds the site. The entire LAP area is also surrounded by a perimeter fence.

5.8.4 Progress Since Last Five-Year Review

Monitoring wells MW426, MW427, MW428, MW429, and MW430 have been abandoned since the second five-year review. There are no other wells on the site.

5.8.5 Technical Assessment

5.8.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected remedies for Site L7 were implemented and the RA is complete. Closure report documentation and site observations indicate that the remedies were properly executed and satisfied the RAOs. The site

inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.8.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. A review of the ARARs used to develop RGs established in the 1998 and 2004 RODs was performed (Attachment 7). The only ARAR-based RG listed in the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy at JOAAP were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that would call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.8.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the RODs.

5.8.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.8.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.8.8 Protectiveness Statement

The SOU remedy at Site L7 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site or excavated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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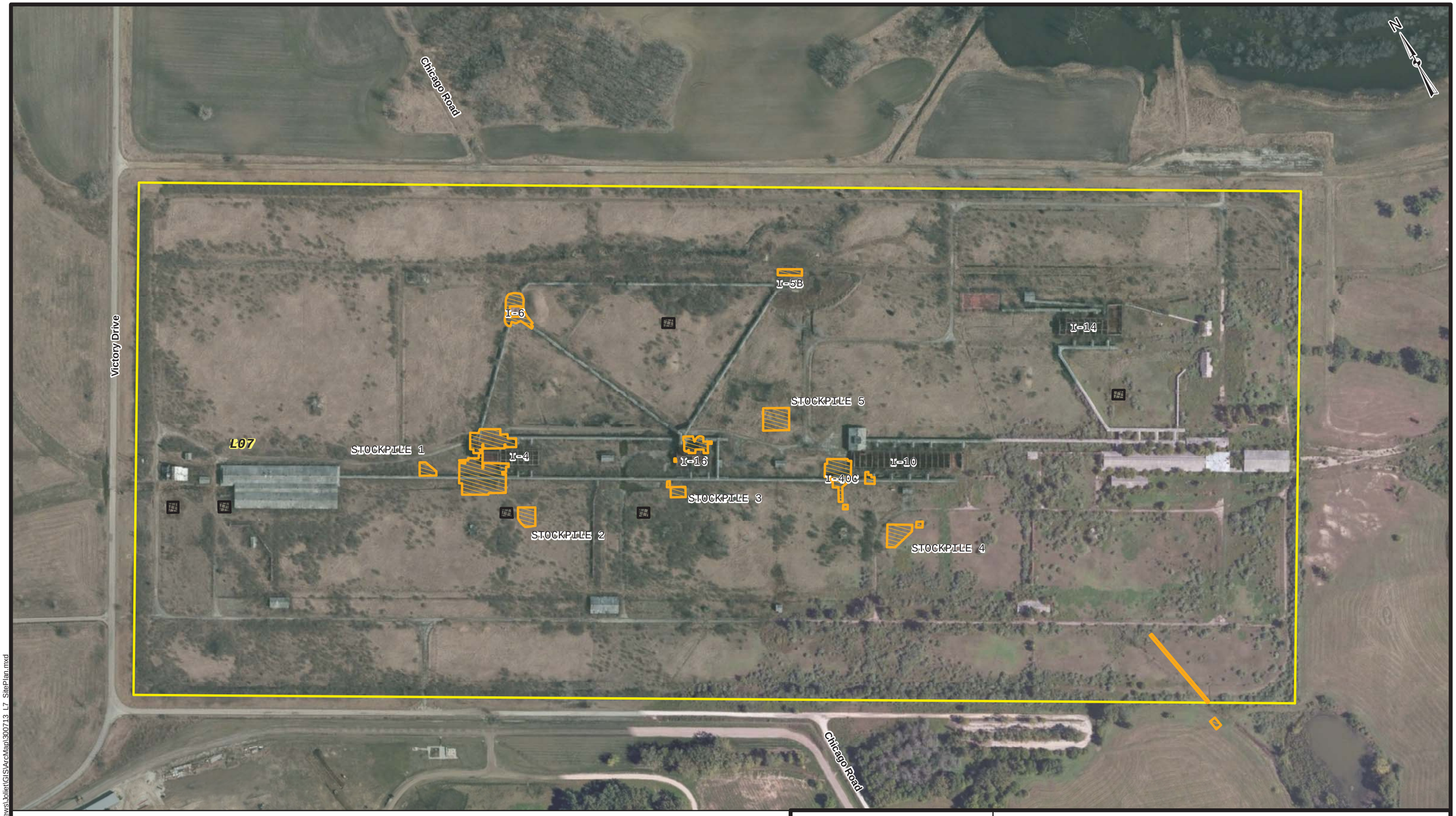

Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 4 - PCB Remediation Area

Reference:
Montgomery Watson Harza, 2001. "Joliet Army Ammunition Plant Final PCB Sites RA Closure Report Load-Assembly-Package Area". December.
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August

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US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L7 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-6

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5.9 SITE L8 – GROUP 2

5.9.1 Background Information

Site L8 is centrally located in the LAP Area, east of the intersection of Chicago and Central Roads. The site was used for melting and loading of Composition B into projectiles. Subsequent cleaning and wash down operations produced pink water that was discharged to external sumps and surface areas.

The site is owned by the U.S. Army and is not being used.

Site L8 contained the following SRUs (refer to Figure 5-7):

- SRU1 – explosives in soil
- SRU4 – PCBs in soil

SRU1 Soil

1,3,5-TNB, 2,4,6-TNT, and RDX were identified in the 1998 ROD as COCs in soil. TNB and TNT contamination was present in soil from red stained areas adjacent to buildings throughout the site and beneath washout Building 2-40B. RDX contamination occurred in a few locations beyond the stained areas.

SRU4 Soil

Soil contamination by PCB 1260 resulted from leaks and spills associated with formerly used transformers. Surface soil around six transformers exceeded the RG.

5.9.2 Remedial Actions

5.9.2.1 Implementation

SRU1 Soil

RA activities were conducted between September 28, 2005 and February 27, 2006. A total of 1,869 CY of unscreened SRU1 soil was excavated and transported to the BTF for screening and treatment. A total of 384 CY of concrete debris was disposed of at the Prairie View RDF.

The following additional activities were performed during the RA:

- The Foundation of Building 2-40B was removed to access impacted soil
- A sump near Building 2-6 was removed
- A manway south of building 2-12 was removed
- Three septic fields were removed; Septic-N (west of Building 2-6), Septic-S (west of Building 2-6, and Septic 2-1 (south of Building 2-37)
- Potential asbestos-containing material (pipe insulation) was removed from beneath Building 2-4
- Transite paneling was removed from conveyors near buildings 2-4/2-40B and 2-6

- Steel conveyor structures/frames near Building 2-6 were removed

Backfill was obtained from soil covering concrete bunkers or from clean areas surrounding the excavations. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site L8 for SRU1 soil is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

SRU4 Soil

RA activities were conducted between August and October 1999. A total of 631 CY of SRU4 soil was excavated and disposed off site. TSCA regulated material (54 CY) was disposed of at the Wayne Disposal facility in Belleville, Michigan. Non-TSCA regulated material (577 CY) was disposed of at the Laraway RDF in Elwood, Illinois. The excavations were backfilled using clean soil from the site. Backfill was placed and graded to drain consistent with adjacent terrain. Seed and mulch was used to establish vegetation in the re-graded areas consistent with surrounding grasses.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of the site L8 for SRU4 soil is documented in the *Final PCB Sites RA Closure Report* (MWH 2001b).

Table 5-11 Volume of Contaminated Soils and Concrete Removed from Site L8

Media	Volume (CY)	Notes
SRU 1 Soil and Concrete		
Soil	1,869	Treated at the BTF
Concrete	384	Disposed at the Prairie View RDF
SRU4 Soil and Concrete		
TSCA regulated	54	Disposed at Wayne Disposal
Non-TSCA regulated	577	Disposed at the Laraway RDF

5.9.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place on the site.

5.9.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan*

(MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.9.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

Changed conditions since the second five-year review report were not observed. The site is not being used; it is predominantly vacant and contains remnant LAP structures. Land uses incompatible with the restrictions identified in Section 5.9.2.3 were not observed. Areas surrounding the structures are overgrown and consist of grassland and scrub-brush. A fence surrounds the site. The entire LAP area is surrounded by a perimeter fence.

5.9.4 Progress Since Last Five-Year Review

Monitoring wells MW432, MW433, MW434, MW435, MW436, and MW504 have been abandoned since the second five-year review. There are no other wells on the site.

5.9.5 Technical Assessment

5.9.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L8 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.9.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. A review of the ARARs used to develop RGs established in the 1998 and 2004 RODs was performed (Attachment 7). The only ARAR-based RG listed the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that would call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.9.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the RODs.

5.9.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.9.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.9.8 Protectiveness Statement

The SOU remedy at Site L8 is protective of human and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site or excavated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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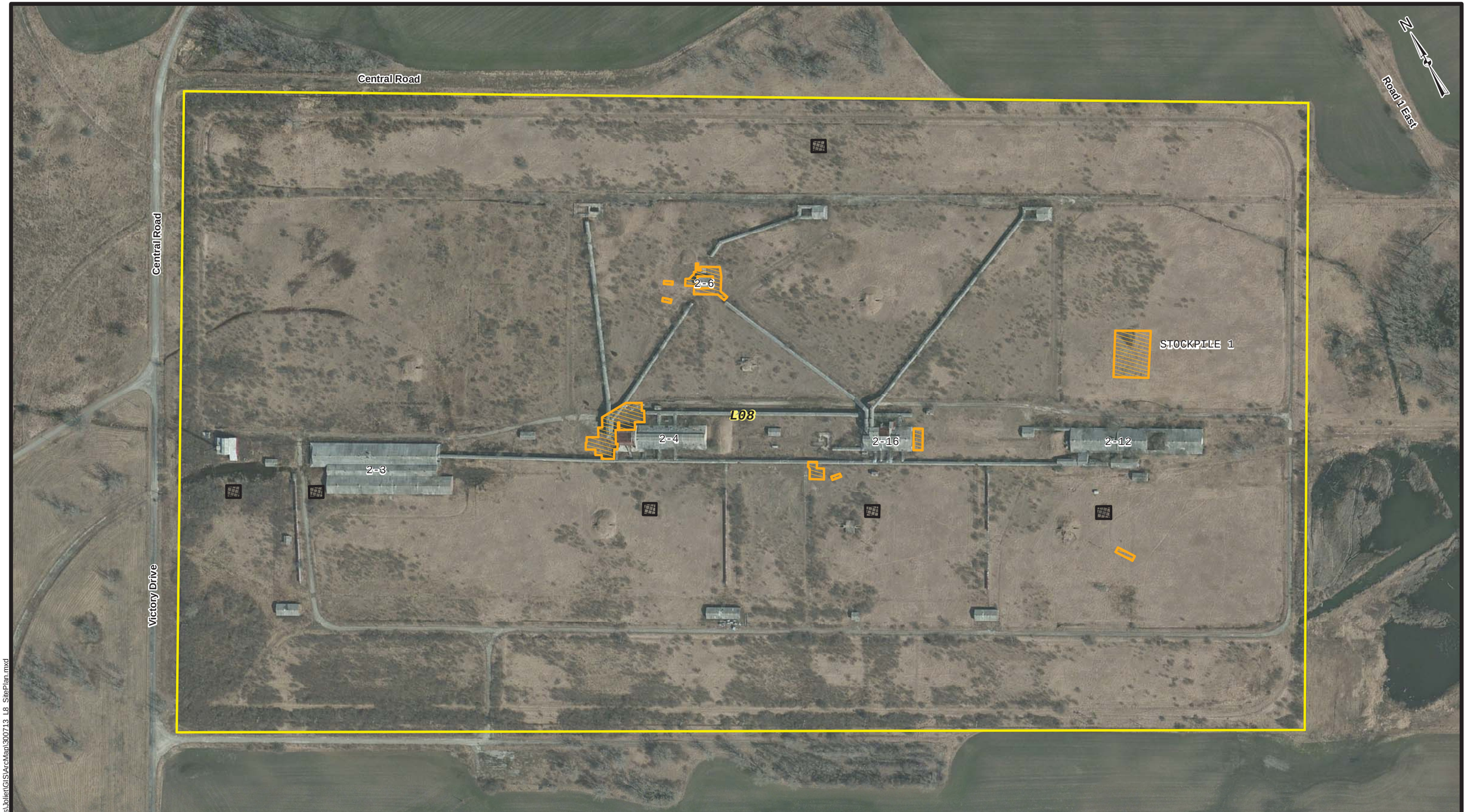

Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 4 - PCB Remediation Area

Reference:
Montgomery Watson Harza, 2001. "Joliet Army Ammunition Plant Final PCB Sites RA Closure Report Load-Assembly-Package Area". December.
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August

0 250 500 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L8 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-7

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5.10 SITE L9 – GROUP 3

5.10.1 Background Information

Site L9 is located in the central part of the LAP Area, 1 mile east of the intersection of Chicago and Central Roads. Operations were similar to those described for sites L7 and L8.

The site is owned by the U.S. Army and is not being used.

Site L9 contained the following SRUs (refer to Figure 5-8):

- SRU1 – explosives in soil
- SRU4 – PCBs in soil

SRU1 Soil

SRU1 COCs included 1,3,5-TNB, 2,4,6-TNT, and RDX. High levels of explosives, up to 4 percent, were identified in soil from red stained areas adjacent to buildings throughout the site. RDX contamination occurred in a few locations beyond the stained areas.

SRU4 Soil

Contamination by PCB 1260 resulted from leaks and spills associated with formerly used transformers. Surface soil around five transformers exceeded the RG.

5.10.2 Remedial Actions

5.10.2.1 Implementation

SRU1 Soil

RA activities were conducted between October 5, 2005 and June 12, 2006. A total of 4,210 CY of unscreened SRU1 soil was excavated and transported to the BTF for screening and treatment. A total of 550 CY of concrete debris was disposed of at the Prairie View RDF.

The following additional activities were performed during the RA:

- Sumps near buildings 3-5A and 3-37 were removed
- One septic field (Septic-1) located northeast of Building 3-4 was removed
- Transite paneling was removed from conveyors near buildings 3-4 and 3-6
- Steel conveyor structures/frames near buildings 3-4 and 3-6 were removed

Backfill was obtained from soil covering concrete bunkers or from clean areas surrounding the excavations. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site L9 for

SRU1 soil is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

SRU4 Soil

RA activities were conducted between August and October 1999. A total of 694 CY of SRU4 soil was excavated and disposed offsite. TSCA regulated material (162 CY) was disposed of at the Wayne Disposal facility in Belleville, Michigan. Non-TSCA regulated material (532 CY) was disposed of at the Laraway RDF in Elwood, Illinois. The excavations were backfilled using clean soil from the site. Backfill was placed and graded to drain consistent with adjacent terrain. Seed and mulch was used to establish vegetation in the regraded areas consistent with surrounding grasses.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of the site L9 for SRU4 soil is documented in the *Final PCB Sites RA Closure Report* (MWH 2001b).

Table 5-12 Volume of Contaminated Soils and Concrete Removed from Site L9

Media	Volume (CY)	Notes
SRU 1 Soil and Concrete		
Soil	4,210	Treated at the BTF
Concrete	550	Disposed at the Prairie View RDF
SRU4 Soil and Concrete		
TSCA regulated	162	Disposed at Wayne Disposal
Non-TSCA regulated	532	Disposed at the Laraway RDF

Other Remedial Actions

Potential ACM, consisting of transite panels from conveyor structures at buildings 3-4 and 3-6, were removed and disposed at the Prairie View RDF.

5.10.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place on the site.

5.10.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.10.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. A photograph is included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photograph.

The site is not being used. It is predominantly vacant and contains remnant LAP structures. Areas surrounding the structures are overgrown and consist of grass land and scrub-brush. Land uses incompatible with the restrictions identified in Section 5.10.2.3 were not observed. A fence surrounds the site. The entire LAP area is also surrounded by a perimeter fence.

5.10.4 Progress Since Last Five-Year Review

Monitoring wells MW301, MW302, MW303, and MW306 have been abandoned since the second five-year review. There are no other wells on the site.

5.10.5 Technical Assessment

5.10.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The selected remedies for Site L9 were implemented and the RA is complete. Closure report documentation and site observations indicate that the remedies were properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.10.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. A review of the ARARs used to develop RGs established in the 1998 and

2004 RODs was performed (Attachment 7). The only ARAR-based RG listed the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy at JOAAP were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that would call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.10.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the remedy for the intended use of the property as described in the RODs.

5.10.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.10.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.10.8 Protectiveness Statement

The SOU remedy at Site L9 is protective of human and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site or excavated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 4 - PCB Remediation Area

Reference:
Montgomery Watson Harza, 2001. "Joliet Army Ammunition Plant Final PCB Sites RA Closure Report Load-Assembly-Package Area". December.
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August

0 300 600 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L9 REMEDIAL ACTION

Name: 300713_L9_SitePlan.mxd
Drawn By: H5TDESPM
Date Saved: 09 Aug 2013
Time Saved: 11:31:37 AM

JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-8

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5.11 SITE L10 – GROUP 3A

5.11.1 Background Information

Site L10 is located in the central part of the LAP Area, between Sites L7 and L8. Load-assemble-package operations performed at Site L10 were similar to those described for Site L7.

The site is owned by the U.S. Army and is not being used.

Site L10 contained the following SRUs (refer to Figure 5-9):

- SRU1 – explosives in soil
- SRU4 – PCBs in soil

SRU1 Soil

2,4,-DNT, 2,4,6-TNT, HMX, and RDX were identified in the 1998 ROD as COCs in soil from visually stained areas adjacent to buildings and sumps throughout the site. High levels of explosives, up to 13.8 percent, were present in surface soil. High concentrations of RDX occurred in locations where staining and stressed vegetation was observed. Explosives were detected in heavily contaminated surface areas, beneath the foundation of one sump, near buildings 3A-4, -5, -13, -41, -43, -44, -45, and -47, and next to a manhole near Building 3A-12.

SRU4 Soil

Contamination by PCB 1260 resulted from leaks and spills associated with formerly used transformers. Surface soil around six transformers exceeded the RG.

5.11.2 Remedial Actions

5.11.2.1 Implementation

SRU1 Soil

RA activities were conducted between August 17 and September 27, 2005. A total of 2,952 CY of unscreened SRU1 soil was excavated and transported to the BTF for screening and treatment. A total of 449 CY of concrete debris was disposed of at the Prairie View RDF.

The following additional activities were performed during the RA:

- Sumps near buildings 3A-4, 3A-41, 3A-43, 3A-44, 3A-45, and 3A-47 were removed
- Manways 3A.7 (near Building 3A-16B) and 3A.13 (near Building 3A-4) were removed
- Two septic fields were removed; Septic-W and Septic-E (both southeast of Building 3A-16A)
- A metal bridge crossing a ditch line was decommissioned and disposed

Backfill was obtained from soil covering concrete bunkers or from clean areas surrounding the excavations. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site L10 for SRU1 soil is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

SRU4 Soil

RA activities were conducted between August and October 1999. A total of 1,147 CY of SRU4 soil was excavated and disposed off site. TSCA regulated material (760 CY) was disposed of at the Wayne Disposal facility in Belleville, Michigan. Non-TSCA regulated material (387 CY) was disposed of at the Laraway RDF in Elwood, Illinois. The excavations were backfilled using clean soil from the site. Backfill was placed and graded to drain consistent with adjacent terrain. Seed and mulch was used to establish vegetation in the re-graded areas consistent with surrounding grasses.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of the site L10 for SRU4 soils is documented in the *Final PCB Sites RA Closure Report* (MWH 2001b).

Table 5-13 Volume of Contaminated Soils and Concrete Removed from Site L10

Media	Volume (CY)	Notes
SRU 1 Soil and Concrete		
Soil	2,952	Treated at the BTF
Concrete	449	Disposed at the Prairie View RDF
SRU4 Soil and Concrete		
TSCA regulated	760	Disposed at Wayne Disposal
Non-TSCA regulated	387	Disposed at the Laraway RDF

5.11.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place on the site.

5.11.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.11.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

The site is not being used; it is predominantly vacant and contains remnant LAP structures. Areas surrounding the structures are overgrown and consist of grassland and scrub-brush. A fence surrounds the site. Land uses incompatible with the restrictions identified in Section 5.11.2.3 were not observed. The entire LAP area is also surrounded by a perimeter fence.

5.11.4 Progress Since Last Five-Year Review

Monitoring wells MW3A1, MW3A2, MW3A3, MW442, MW443, MW444, MW445, MW446, and MW505 have been abandoned since the second five-year review. There are no other wells on the site.

5.11.5 Technical Assessment

5.11.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected remedies for Site L10 were implemented and the RA is complete. Closure report documentation and site observations indicate that the remedies were properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.11.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. A review of the ARARs used to develop RGs established in the 1998 and 2004 RODs was performed (Attachment 7). The only ARAR-based RG listed the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy at JOAAP were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that would call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.11.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the remedies for the intended use of the property as described in the RODs.

5.11.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.11.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.11.8 Protectiveness Statement

The SOU remedy at Site L10 is protective of human and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site or excavated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 4 - PCB Remediation Area

Reference:
Montgomery Watson Harza, 2001. "Joliet Army Ammunition Plant Final PCB Sites RA Closure Report Load-Assembly-Package Area". December.
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August

0 300 600 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L10 REMEDIAL ACTION

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FIGURE 5-9

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5.12 SITE L11 – TEST SITE

5.12.1 Background Information

Site L11 covers approximately 33 acres and is located directly south of Site L7. The site was used to test the firing velocities and impact effectiveness of various munitions within a secured perimeter fence. Munitions were fired into a downrange target area consisting of a coarse gravel detonation pad constructed over native soil. UXO clearance activities were performed during the Phase I RI and were not detected, although numerous fragments were found. Arsenic was detected at levels above the RG in all soil samples from the target area. No RCRA hazardous wastes were identified at the site.

The site is owned by the IUOEL 150 and the Wilmington Fire Department.

Site L11 contained the following SRU (refer to Figure 5-10):

- SRU2 – metals in soil

Arsenic was detected above the RG in all soil samples from the down range target area, which had dimensions of approximately 80 ft by 300 ft.

5.12.2 Remedial Actions

5.12.2.1 Implementation

UXO/O&E characterization and removal activities were performed in 2001. A total of five O&E items, 10 lbs of O&E scrap, and 1 lb of non-O&E scrap were removed from an area of approximately 4 acres.

RA activities were conducted in two separate phases in 2002. Approximately 152 lbs of MEC waste was removed between August 12 and 23, 2002. Approximately 15 CY of arsenic contaminated soil was excavated on October 2, 2002. The contaminated soil was disposed at the Laraway RDF in Elwood, Illinois.

LAP buildings, ASTs, surface pipelines, and debris were removed prior to the 2001 and 2002 removal actions (MWH 2003d).

Table 5-14 Amount of MEC and Contaminated Soil Removed from Site L11

Media	Quantity/Weight/Volume	Notes
MEC	5 items and 10 lbs 152 lbs	2001 removal action 2002 removal action
SRU2 Soil	15 CY	Disposed at the Laraway RDF

Backfilling and revegetation of the remediated area was not conducted because the site was transferred for commercial development.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of Site L11 for SRU 2 soil is documented in the *Final Closure Report, Sites L11/L16* (MWH 2003d).

5.12.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place on the site.

5.12.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site L11:

- **Land use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations (note; there are no monitoring wells on the site)
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA (note: there are no monitoring wells on the site)
- **Groundwater Restrictions** – Use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, and pumping from water supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.12.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. A photograph is included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement the site inspection notes and photograph.

The site is used by IUOEL Local 150 as a heavy equipment operator training school. It includes an outdoor training area for heavy construction equipment such as bulldozers, excavators, scrapers, and cranes. A 342,000 square ft indoor training area is located on IUOEL Local 150 property adjacent to the site. Land uses incompatible with the restrictions identified in Section 5.12.2.3 were not observed. The entire IUOEL training facility is enclosed by a fence that restricts public access.

5.12.4 Progress Since Last Five-Year Review

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred at the site since this time.

5.12.5 Technical Assessment

5.12.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected remedy for Site L11 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the ICs identified in Section 5.1.3.8. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.12.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8 of this report. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. However, for the COCs at this site, the RGs established in the 1998 ROD remain protective of human health.

5.12.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the 1998 ROD.

5.12.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed.
- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs
- It is not clear whether the deed restrictions were conveyed to the Wilmington Fire Department when part of the property was transferred

5.12.7 Recommendations for Follow-up Actions

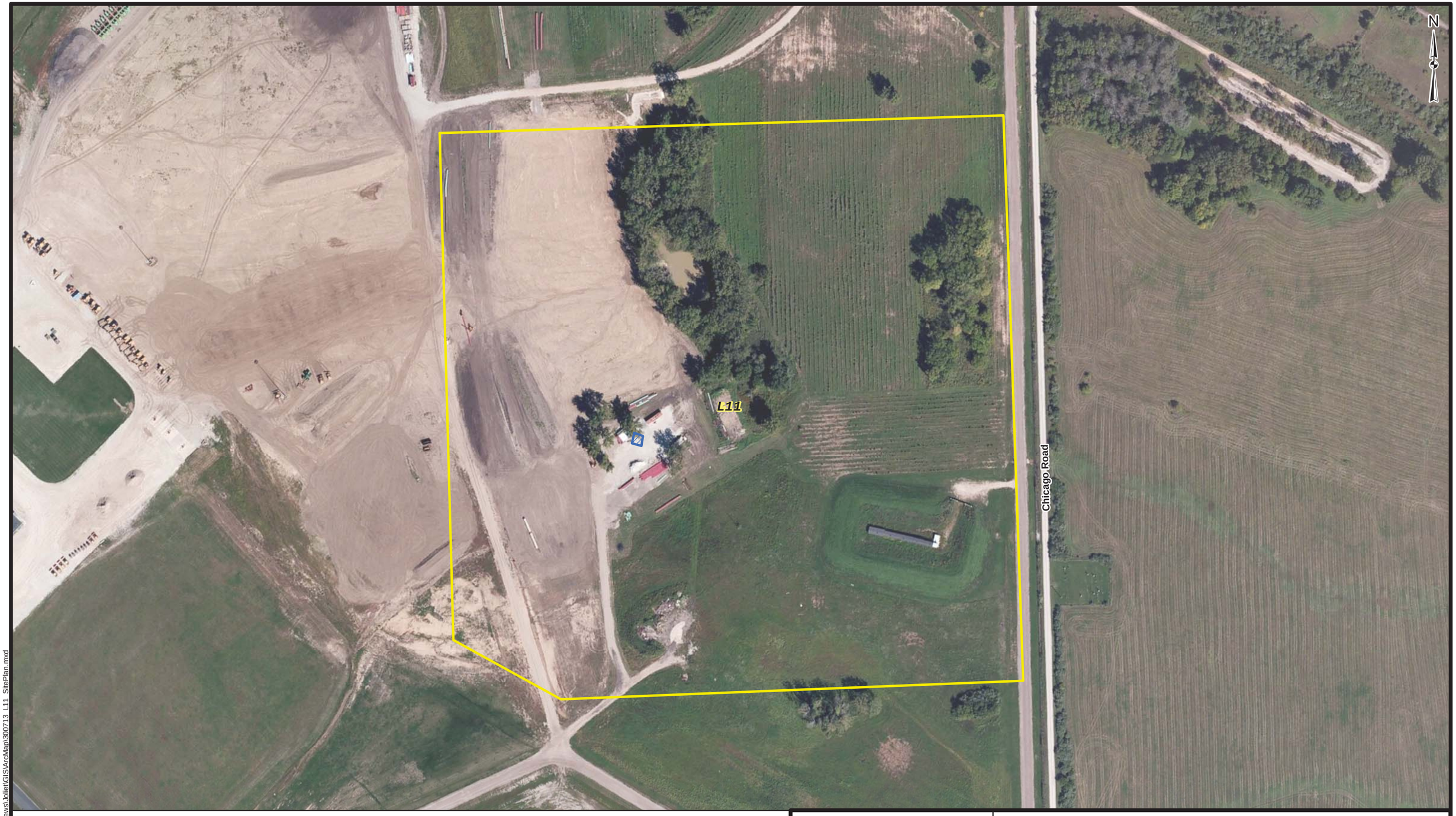
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner
- Verify (in the Second Annual Site-Wide Deed Restriction report) whether deed restrictions were conveyed to the Wilmington Fire Department

5.12.8 Protectiveness Statement

The SOU remedy at Site L11 is protective of human and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site
- Land use is consistent with the restrictions and covenants included in the deed
- The cleanup levels and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 2 - Metals Remediation Area

Reference:
MWH Americas, Inc. 2003. "Joliet Army Ammunition Plant Final Closure Report Sites L11/L16." December.

0 200 400 Feet

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

US Army Corps of Engineers
Buffalo District

SITE L11 REMEDIAL ACTION

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FIGURE 5-10

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5.13 SITE L14 – GROUP 4

5.13.1 Background Information

Site L14 occupies 33 acres in the southwestern corner of the LAP Area. The site was developed to produce various types of fuses. Mercury fulminate, reportedly stored at the site, was loaded into the fuses in Building 4-14. After 1945, Building 4-14 was used for repackaging smokeless powder. According to JOAAP personnel, a sump north of Building 4-5 periodically overflowed, which caused soil contamination in this area.

The site is owned by the U.S. Army and is not being used. It is located in the GMZ for GRU 1.

Site L1 contained the following SRU (refer to Figure 5-11):

- SRU1 – explosives in soil

Explosives COCs included 2,4,6-TNT, HMX, and RDX. The highest concentrations of explosives (up to 55,000 mg/kg) were detected in surface soil near the sump north of Building 4-5. SRU1 soils above RGs were also detected in three soil piles. Explosive concentrations decreased with depth but were detected in samples collected at 5 ft below ground surface (bgs).

5.13.2 Remedial Actions

5.13.2.1 Implementation

RA activities were conducted between July 8 and August 8, 2005. A total of 780 CY of unscreened SRU1 soil was excavated and transported to the BTF for screening and treatment. Excavated SRU1 soil was taken from an area near Building 4-5 and from three soils piles (designated 2, 3, and 4), which are illustrated on Figure 5-11.

Table 5-15 Volume of Contaminated Soil Removed from Site L14

Media	Volume (CY)	Notes
SRU1 Soil	780	Treated at the BTF

Backfill was obtained from an earthen berm at the site. The excavation was backfilled and re-graded to promote proper drainage. The backfilled area was allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site L14 for SRU1 soil is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

5.13.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring is being performed pursuant to the GRU1 remedy (refer to Section 6.3.2.2 for monitoring details).

5.13.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater (within a GMZ) may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater
    - Damaging of confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
    - Shall not be used for potable water supply
    - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.13.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

Changed conditions since the second five-year review report were not observed. The site is not being used; it is predominately vacant and contains remnant LAP structures. Areas surrounding the structures are overgrown and consist of grassland and scrub-brush. Land uses incompatible with the restrictions identified in Section 5.13.2.3 were not observed. The entire LAP area is surrounded by a perimeter fence.

5.13.4 Progress Since Last Five-Year Review Report

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred that the site since this time.

5.13.5 Technical Assessment

5.13.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L14 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the 2004 ROD. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.13.5.2 Question B: Are the exposure assumptions, toxicity data, exposure assumptions, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.13.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 2004 ROD.

5.13.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.13.7 Recommendations for Follow-up Actions

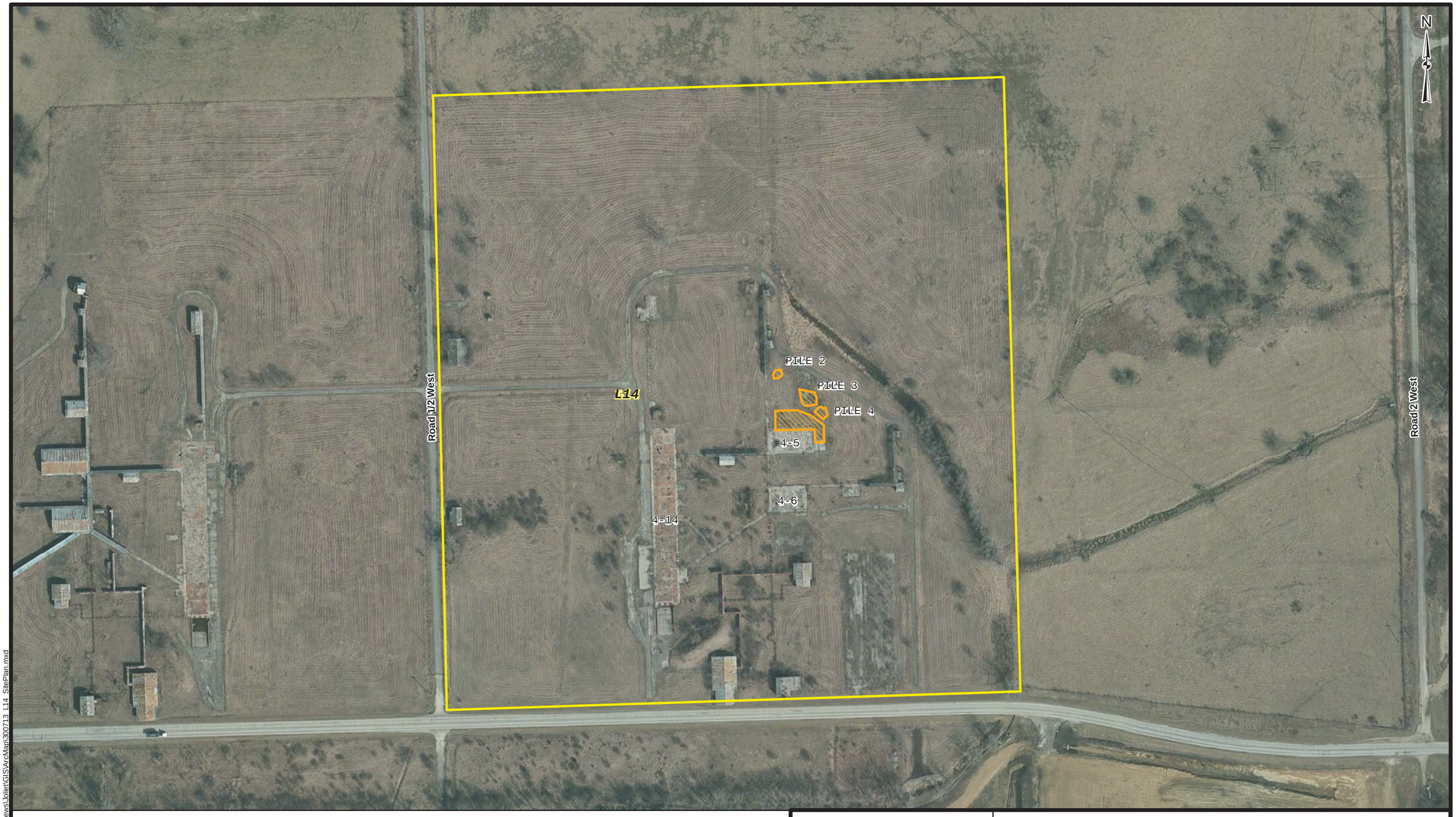
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.13.8 Protectiveness Statement

The SOU remedy at Site L14 is protective of human and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site
- Land use is consistent with the IC objectives identified in the 2004 ROD
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area

Reference:
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August.

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US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L14 REMEDIAL ACTION

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FIGURE 5-11

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5.14 SITE L16 – GROUP 6

5.14.1 Background Information

Site L16 covers approximately 90 acres and is located in the southwestern corner of the LAP Area. The site was used as a production facility for boosters and fuses and a testing area was present in the southeast corner. Contaminated areas were limited to sumps and flume outfalls located near former production buildings. These sumps received wastewater during production activities at buildings 6-2, 6-4, and 6-32, which then discharged into drainage ditches.

The site is owned by JADA.

Site L16 contained the following SRU (refer to Figure 5-12):

- SRU1 – explosives in soil

Explosive COCs in soil included HMX and RDX in a drainage ditch north of Building 6-32, around the sump at Building 6-32, at entrances/exits to Building 6-2, and along a tile flume that extended west from a sump at Building 6-4.

5.14.2 Remedial Action

5.14.2.1 Implementation

O&E characterization and removal activities were conducted in 2001. A total of 107 nose fuzes and fuze boosters were located around a railroad tie structure. Approximately 292 lbs of O&E waste and 89 lbs of non-O&E waste were removed. Approximately 90 percent of the site was cleared during this activity.

The remaining 10 percent of the site was cleared in August 2002. 828 UXO/O&E scrap items were identified; five of the items were classified as live and were taken to Site L11 for detonation. Sump and soil removal activities were conducted in 2002 and 2003. Three sumps and one concrete outflow were removed on August 28, 2002. SRU1 soils were excavated on October 10, 2002 (approximately 5 CY) and July 30, 2003 (approximately 8 CY). The excavated soils were treated at the BTF.

Table 5-16 Amount of MEC and Contaminated Soil Removed from Site L16

Media	Quantity/Weight/Volume	Notes
MEC	292 lbs (O&E) and 89 lbs (non-O&E)	2001 removal action
	828 items	2002 removal action
SRU1 Soil	13 CY	Treated at the BTF

LAP buildings, ASTs, surface pipelines, and debris were removed prior to the 2001 and 2002 removal actions (MWH 2003d).

Re-grading and backfilling was performed at the sump removal locations. Backfilling and regrading at the other RA areas was not conducted because the excavations were shallow and the site was to be transferred for commercial development.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of Site L11 for SRU 2 soil is documented in the *Final Closure Report, Sites L11/L16* (MWH 2003d).

5.14.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RA take place on the site.

5.14.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site L16:

- **Land use -** The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation -** Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations (note; there are no monitoring wells on the site)
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA (note; there are no monitoring wells on the site)
- **Groundwater Restrictions** – Groundwater above the Maquoketa confining bed shall not be used for potable purposes, drilling, constructing, pumping or for groundwater supply wells

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.14.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

The site has not been developed and consists of open grassland areas containing scrub-brush. Former LAP structures are present in the west central portion of the site. Land uses incompatible with the restrictions identified in Section 5.14.2.2 were not observed. The entire LAP area is surrounded by a perimeter fence.

5.14.4 Progress Since Last Five-Year Review

Monitoring well MW454 has been abandoned since the second five-year review. There are no monitoring wells remaining on the site.

5.14.5 Technical Assessment

5.14.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L16 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the ICs identified in Section 5.1.3.8. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.14.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8 of this report. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. However, for the COCs at this site, the RGs established in the 1998 ROD remain protective of human health.

5.14.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD.

5.14.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.14.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.14.8 Protectiveness Statement

The SOU remedy at Site L16 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site or excavated and disposed off site
- Land use is consistent with the restrictions and covenants included in the deed
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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Legend

- Approximate Site Boundary
- Unknown - To be Addressed
- SRU 1 - Explosives Remediation Area

Reference:
MWH Americas, Inc. 2003. "Joliet Army Ammunition Plant Final Closure Report Sites L11/L16." December.

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US Army Corps of Engineers
Buffalo District

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CORPS OF ENGINEERS
BUFFALO, NY

SITE L16 REMEDIAL ACTION

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FIGURE 5-12

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5.15 SITE L17 – GROUP 7

5.15.1 Background Information

Site L17 encompasses 90 acres in the southwestern corner of the LAP Area. It was initially developed for the production munitions boosters. After 1945 the site was used for repacking of lead azide. A drainage ditch southwest of Building 7-6 contained PCB-contaminated soil and sediments.

The site is owned by JADA.

Site L17 contained the following SRU (refer to Figure 5-13):

- SRU4 – PCBs in soil

The only COC identified during RA characterization and sampling was PCB 1242 (MWH 2001b).

5.15.2 Remedial Actions

5.15.2.1 Implementation

RA activities were conducted between August and October 1999. Seventy-eight (78) CY of PCB-contaminated soil (TSCA regulated) was excavated and disposed at the Wayne Disposal facility in Belleville, Michigan. The excavated area was backfilled and graded to drain consistent with the adjacent terrain. Seed and mulch were placed to establish vegetation consistent with existing grasses in the area.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of Site L17 for SRU4 soils is documented in *Joliet Army Ammunition Plant Wilmington, Illinois Final PCB Sites RA Closure Report Load-Assemble-Package Area* (MWH 2001b).

5.15.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the RA take place at the site.

5.15.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site L17:

- **Land use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells

shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations (note; there are no monitoring wells on the site)

- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA (note; there are no monitoring wells on the site)
- **Groundwater Restrictions** – Groundwater above the Maquoketa confining bed shall not be used for potable purposes, drilling, constructing, pumping or for groundwater supply wells

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.15.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to assess current site conditions.

Changed conditions since the second five-year review report were not observed. The site is vacant and not being used; open grass land dominates the area with occasional scrub brush and small trees present. Land uses incompatible with the restrictions identified in Section 5.15.2.3 were not observed. The entire LAP area is surrounded by a perimeter fence.

5.15.4 Progress Since Last Five-Year Review

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred at the site since this time.

5.15.5 Technical Assessment

5.15.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site L17 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the ICs identified in Section 5.1.3.8. Costs or issues associated with

monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.15.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8 of this report. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. However, for the COCs at this site, the RGs established in the 1998 ROD remain protective of human health. A review of the ARARs used to develop RGs established in the 1998 and 2004 RODs was performed (Attachment 7). The only ARAR-based RG listed the RODs was for PCBs in soil. Cleanup goals for the remainder of the COCs for the SOU remedy at JOAAP were developed using a risk-based approach. A review of the current regulations to address PCB-contaminated soil is presented in Attachment 7. Changes to PCB regulations from those listed in the 1998 ROD do not affect the protectiveness of the SOU remedy.

5.15.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD.

5.15.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.15.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.15.8 Protectiveness Statement

The SOU remedy at Site L17 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site
- Land use is consistent with the restrictions and covenants included in the deed
- The cleanup levels and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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Approximate Site Boundary

SRU 4 - PCB Remediation Area

Reference:
Montgomery Watson Harza, 2001. "Joliet Army Ammunition Plant Final PCB Sites RA Closure Report Load-Assembly-Package Area". December.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
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WILL COUNTY, ILLINOIS

FIGURE 5-13

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5.16 SITE L23A – DISPOSAL PIT

5.16.1 Background Information

Site L23A is approximately 1 acre in size and located in the northern portion of the LAP Area along Chicago Road. An aerial photograph from 1946 identified a small (less than 0.5 acre) disposal pit located in the southwestern corner of the site. The materials that were placed in the pit are unknown and aerial photos from 1952 indicated that disposal activities had ceased.

The site is owned by the U.S. Army and is not being used.

Site L23A contained the following SRU (refer to Figure 5-14):

- SRU2 – metals in soil

Lead was the COC for SRU2 soil.

5.16.2 Remedial Actions

5.16.2.1 Implementation

RA activities were conducted between April 5 and May 18, 2007. Approximately 5,492 CY of unscreened SRU2 soil was excavated and disposed at the Prairie View RDF.

Approximately 270 CY of buried transite panels were also excavated and disposed at the Prairie View RDF.

Table 5-17 Volume of Contaminated Soil Removed from Site L23A

Media	Volume (CY)	Notes
SRU2 Soil	5,492	Disposed at the Prairie View RDF

Backfill was obtained from an earthen berm located at Site L7. The backfill was placed, compacted, and re-graded consistent with the adjacent terrain. The remediated areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable* Unit (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). The RA has removed SRU2 soils and closure of the site is documented in the *Final Closure Report, Sites L2, L5, L23A, M3, M4, and M12* (MWH 2009).

5.16.2.2 Operation, Maintenance and Monitoring

No operation and maintenance activities related to the SOU RA take place on the site.

5.16.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.16.3 Site Inspection

The site was inspected on April 16, 2013 to assess current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. A photograph is included in Attachment 5. 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and the photograph.

The site is vacant and consists of open grassland and scrub-brush. Land uses incompatible with the restrictions identified in Section 5.16.2.3 were not observed. The entire LAP area is surrounded by a perimeter fence.

5.16.4 Progress Since Last Five-Year Review

Site L23A achieved closure status for the SOU and a final closure report was issued (MWH 2009).

5.16.5 Technical Assessment

5.16.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The selected SOU remedy for Site L23A was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the 2004

ROD. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.16.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.16.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the 2004 ROD.

5.16.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.16.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP

- Assess the U.S. Army's compliance with ICs annually

5.16.8 Protectiveness Statement

The SOU remedy at Site L23A is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site
- Land use is consistent with the IC objectives identified in the 2004 ROD
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

Legend

- Approximate Site Boundary
- SRU 2 - Metals Remediation Area

Reference:
MWH 2009. "Final Closure Report Sites L2, L5, L23A, M3, M4 and M12 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunitions Plant." October.

0 200 400 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE L23A REMEDIAL ACTION

Name: 300713_L23A_SitePlan.mxd
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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-14

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5.17 SITE M1 – SOUTHERN ASH PILE

5.17.1 Background Information

Site M1 is comprised of approximately 68 acres located in the southwestern part of the MFG Area. The Southern Ash Pile was used from 1965 through 1974 as a landfill for ash residues generated from the incineration of wastewater produced in the TNT manufacturing processes. Red water ash in the Southern Ash Pile was derived from K047-listed hazardous wastes.

The ash pile covered approximately 8 acres and was 10 to 15 ft high. It was estimated to contain 205,200 CY of material. Upon closure, the ash pile was originally covered with polyvinyl chloride (PVC) barriers, 12 inches of fill, and 6 inches of topsoil. Due to erosion, the ash pile was re-covered in 1985 with an additional 12 inches of clay and 6 inches of topsoil. Additional repairs to the cover were performed in 1993 and a temporary geosynthetic liner was installed in 1996 by the U.S. Army.

In 1998 the IEPA notified the U.S. Army that since the ash residues at M1 no longer exhibited the characteristic of reactivity (for which they were listed), they were not hazardous wastes regulated under 35 IAC 721.103(a)(2)(C). RCRA hazardous waste was not identified at the site based on testing results.

The site is owned by U.S. Army (southern half) and USDA/FS (northern half). It is located within a GMZ for GRU2.

Site M1 contained the following SRU (refer to Figure 5-15):

- SRU6 – Landfill

Characterization activities performed during the Phase 2 RI (Dames and Moore 1993a) and subsequent investigation performed in 1999 (MWH 1999b) did not identify COCs above the RGs (MKM 2009c). Sodium and water-soluble sodium sulfate were present in the ash in concentrations greater that background levels. No RCRA hazardous waste was identified at the site.

5.17.2 Remedial Actions

5.17.2.1 Implementation

RA activities were conducted from March 05, 2006 to June 23, 2008. The ash pile was excavated and 326,385 CY of primarily red water ash was disposed at the Prairie View RDF. Shallow excavations (to 1 ft bgs) were dug in drainage ditches and areas of stressed vegetation west of the ash pile.

Table 5-18 Volume of Contaminated Soil Removed from Site M1

Media	Volume (CY)	Notes
SRU 6 (Red Water Ash and Soil)	326,385	Disposed at the Prairie View RDF

Field observations conducted by USACE, USEPA, IEPA, and the contractor verified that the ash had been completely removed. Approximately 44,888 CY of treated soil from the BTF and reused clean cover soil from the landfill was used as backfill. The restored area was hydroseeded using a USDA/FS-approved grass mixture.

Closure of the SOU at Site M1 is documented in the *Final M1 Remedial Action Completion Report Soils Operable Unit M1 Southern Ash Pile* (MKM 2009c).

5.17.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring is being performed pursuant to the GRU2 remedy (refer to Section 6.4.2.2 for monitoring details).

5.17.2.3 Land Use/Institutional Controls

USDA/FS Property

The following LUC/ICs and restrictions apply for the portion of Site M1 that has been transferred to the USDA/FS:

- **Soil Exposure** – Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels identified in the 2004 ROD; prevent the migration of contaminants in accordance with the 1998 ROD
- **Land Use** – The land shall be used as a tall grass prairie and may not be used for residential housing, elementary and secondary schools, childcare facilities, playgrounds, industrial operations, and camping. The U.S. Army will notify the USDA/FS, USEPA, and IEPA of any apparent violations of land or groundwater use restrictions and the USDA/FS will take actions to correct incompatible uses.
- **Monitoring Wells** – The integrity of groundwater monitoring wells shall be maintained
- **Groundwater Use** – The use or disturbance of groundwater in a way that could cause the migration of contaminated plumes is prohibited. Groundwater above the Maquoketa shale shall not be used for potable water supply.
- **GMZ Restrictions** – Activities that may result in the migration of groundwater contamination are restricted. The use of groundwater potable purposes is prohibited.
- **Notifications of Violations** – The USDA/FS shall notify the U.S. Army and regulators of any land use restriction violations within 30 days and address the obligation to comply with CERCLA Section 120 on future land transfers.
- **Access to Property** – The U.S. Army shall retain an easement, running with the land, that grants a right of access for the U.S. Army, the USEPA, and the IEPA for the purpose

of conducting any activity related to the ROD and FFA, including, but not limited to the following activities:

- Monitoring the work
- Verifying any data or information submitted to the United States or the State of Illinois
- Conducting investigations relating to contamination at or near the site
- Obtaining samples
- Assessing the need for, planning, or implementing additional response actions at or near the site
- Implementing the work pursuant to the conditions set forth in the FFA and ROD
- Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by the U.S. Army or their agents, consistent with the FFA's section on access
- Assessing the U.S. Army's compliance with the FFA and the RODs
- Determining whether the site or other property subject to the RODs is being used in a manner that is prohibited or restricted or that may need to be prohibited or restricted by, or pursuant to, the FFA and the RODs

- **Annual Reporting** – The USDA/FS will submit an Annual Certification letter certifying that the land and groundwater uses remain the same and that the integrity of the land and groundwater restrictions has not been compromised.

U.S. Army Property

The following requirements and restrictions apply to the portion of the site that is owned by the U.S. Army and will be transferred to the USDA/FS for inclusion in the MNTP.

Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. I4Cs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. Land use restrictions include:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the properties. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.17.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photographs.

The site is vacant and contains open grassland and wetlands. Land uses incompatible with the restrictions identified in Section 5.17.2.3 were not observed.

5.17.4 Progress Since Last Five-Year Review Report

Site M1 achieved closure status for the SOU and a final closure report has been issued (MKM 2009c).

5.17.5 Technical Assessment

5.17.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected SOU remedy for Site M1 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs (U.S. Army property) and consistent with the LUCs/ICs and restrictions incorporated into the Prairie Plan (USDA/FS property). Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.17.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Site M1 is one of the SRU6 sites that will become part of the MNTP. The RA objectives and risk-based RGs for SRU6 sites were finalized in the 1998 ROD. However, some of the COCs that were identified for SRU6 soils were revised for other SRUs as part of the 2004 ROD (as discussed in Attachment 8). Since the 2004 ROD risk-based RGs were based generally on protection of the environment and were more stringent than the RGs developed for protection of human health, meeting the 1998 ROD RGs may not be protective of the environment at the site.

The Remedial Action Completion Report for this site (MKM 2009c) was reviewed. After excavation of the landfill area, the off-site soil identified for backfill was evaluated to determine whether or not it was suitable for use for that purpose. Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs protective of human health in Table 4-1 of the Remedial Action Completion Report (MKM 2009c), most of the organic COCs were not detected or detected at low levels (PAHs), and all of the metals would also be below ecological RGs from the 2004 ROD. Therefore, the excavation and backfilling of the landfill area at M1 is protective of both human health and the environment.

5.17.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the 1998 ROD.

5.17.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- The USDA/FS noted that there is no IC that prohibits camping on its property and the ICs originated from the Environmental Condition of Property statements and record of decision documents, not as deed restrictions
- Annual IC reporting by the USDA/FS has not been received since 2009. The USDA/FS has committed to adding an appendix to the Annual Prairie Management Plan to specifically address the issues associated with the transferred land that has restrictions.

5.17.7 Recommendations for Follow-up Actions

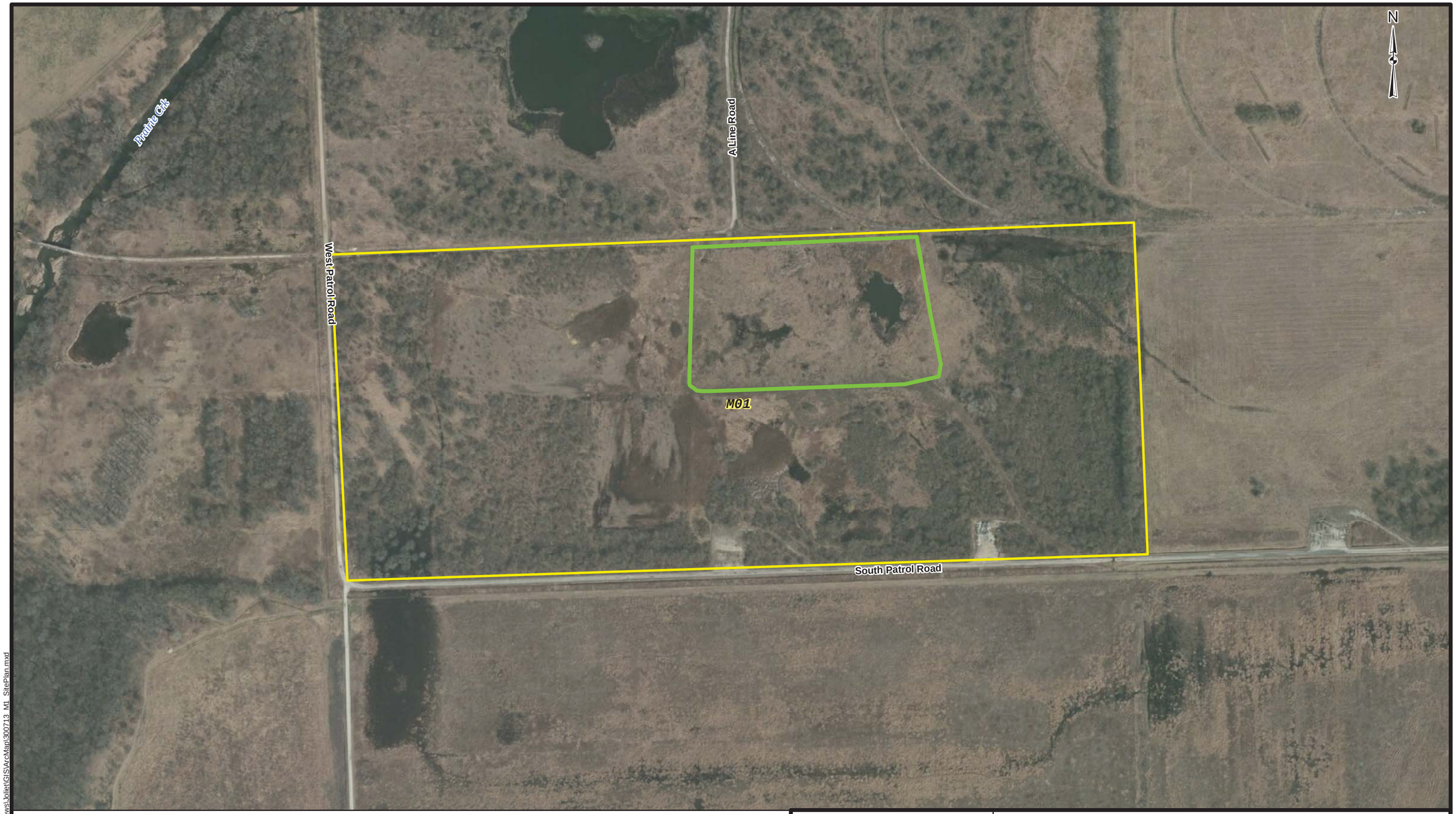
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Revise wording on the Questionnaire and Statement of Compliance form to indicate that there is no IC that prohibits camping on USDA/FS property and the ICs originated from Environmental Condition of Property statements and record of decision documents, not as deed restrictions
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.17.8 Protectiveness Statement

The SOU remedy at Site M1 is protective of human health and the environment. This assessment is based on the following information and observations:

- Landfilled materials have been excavated and disposed off site
- Land use is consistent with the IC objectives identified in the 1998 ROD (U.S. Army property) and restrictions applicable to the USDA/FS property
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 6 - Former M1 Southern Ash Pile, Excavated and Disposed

Reference:
MKM Engineers, Inc. 2009. "Final Remedial Action Completion Report Soils Operable Unit M1 Southern Ash Pile". December.

0 300 600 Feet

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BUFFALO, NY

SITE M1 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-15

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5.18 SITE M2 – EXPLOSIVE BURNING GROUND

5.18.1 Background Information

Site M2 is a 25 acre site located in the south central part of the MFG Area, adjacent to Site M11. Open burning of explosives waste was performed on a 4 acre burning pad until 1965. The burning pad consisted of gravel placed over the topsoil. Multiple areas of explosives stained soil and absent vegetation were visible in the northern portion of this site. Berms surrounded much of the burning pad area.

More than 400 tons of suspected red water ash were encapsulated in an impermeable membrane and buried at a shallow depth in the northern section of the explosives burning pad. The color, odor, texture, and apparent solubility of the buried waste were indicative of potentially untreated explosives sludge.

The site is owned by the U.S. Army and not being used. It is located within a GMZ for GRU2.

Site M2 contained the following SRU (refer to Figure 5-16):

- SRU1 – explosives in soil

Explosives COCs for soil included 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, and 2,6-DNT.

5.18.2 Remedial Actions

5.18.2.1 Implementation

RA activities were conducted between March 29 and July 7, 2006. A total of 13,900 CY of unscreened SRU1 soil was excavated and transported to the BTF for screening and treatment. An ash pillow (encapsulated red water ash) consisted of black soil intermixed with ash. The liner/cover was brittle and could not be removed separately. The entire pillow was excavated and transported to the BTF for screening and treatment.

Concrete foundations, concrete debris, and other debris were removed and disposed at the Prairie View RDF. Protruding rebar and other metal debris were sent to a scrap yard for recycling. Buried transite was excavated and disposed at the Prairie View RDF.

Table 5-19 Volume of Contaminated Soil Removed from Site M2

Media	Volume (CY)	Notes
SRU1 Soil	13,900	Treated at the BTF

Treated soil from the BTF (17,005 CY) was used for backfill. The excavated area was allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the

Phase 2 – Remedial Design/Remedial Action Work Plan (MWH 2005). Closure of Site M2 for SRU1 soil is documented in the *Final Closure Report, Sites L1, L7, L8, L9, L10, L14, and M2* (MWH 2006b).

5.18.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RA take place at the site.

5.18.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater (within a GMZ) may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater
    - Damaging of confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
    - Shall not be used for potable water supply
    - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.18.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. A photograph is included in

Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photograph.

The site is vacant and not being used. It is dominated by grassland vegetation with some scrub brush and small trees present. Land uses incompatible with the restrictions identified in Section 5.18.2.3 were not observed.

5.18.4 Progress Since Last Five-Year Review

Monitoring well MW109 has been abandoned since the second five-year review.

5.18.5 Technical Assessment

5.18.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site M2 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the 2004 ROD. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.18.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.18.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 2004 ROD.

5.18.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.18.7 Recommendations for Follow-up Actions

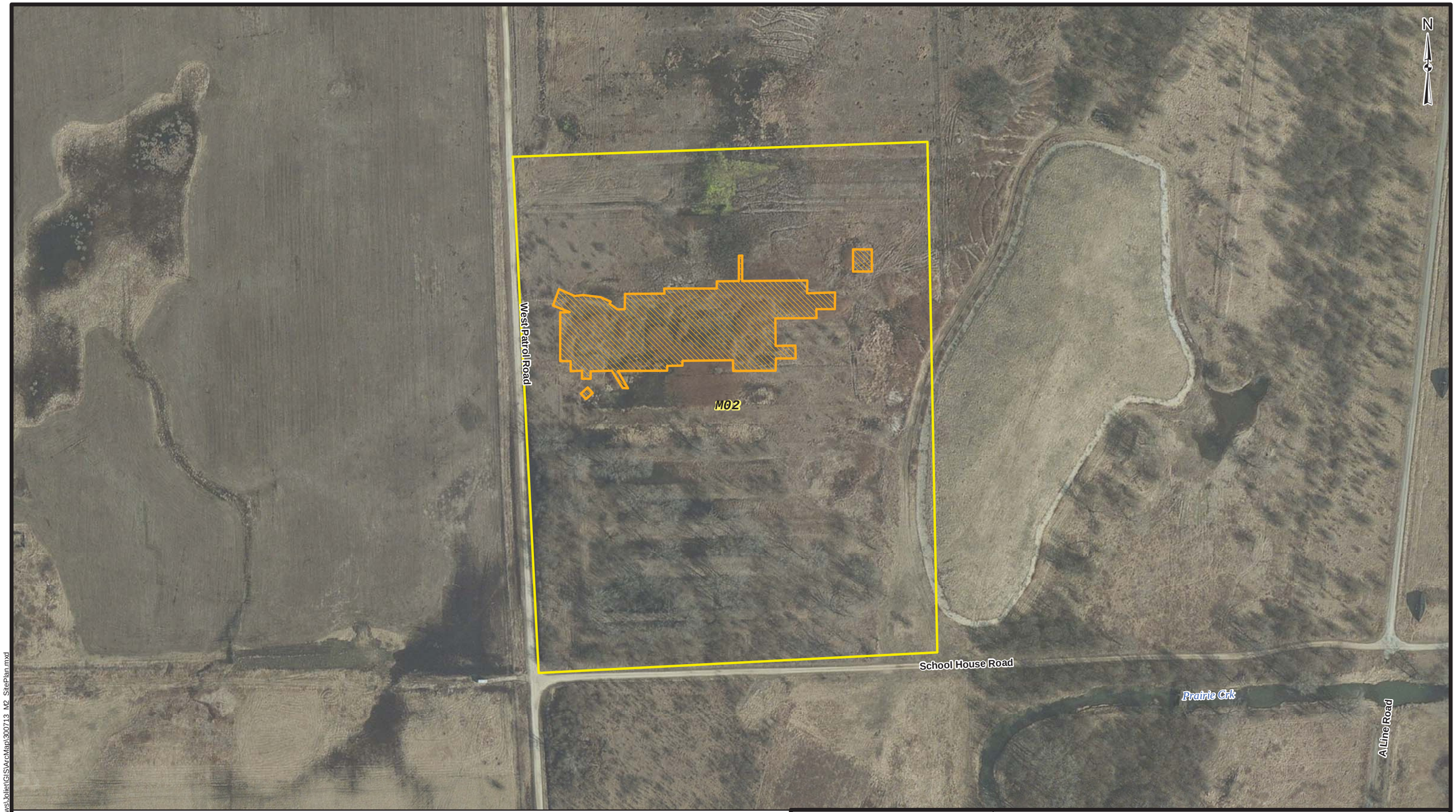
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.18.8 Protectiveness Statement

The SOU remedy at Site M2 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site
- Land use is consistent with the IC objectives identified in the 2004 ROD
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area

Reference:
MWH, 2006. "Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunition Plant." August.

0 200 400 Feet

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BUFFALO, NY

SITE M2 REMEDIAL ACTION

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FIGURE 5-16

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5.19 SITE M3 – FLASHING GROUNDS

5.19.1 Background Information

Site M3 covers an area of approximately 66 acres in the west central portion of the MFG Area adjacent to Grant Creek. From 1942 until 1988, the principal activity conducted at the site was flash burning of equipment and demolition materials to remove explosives residues. The flash burning was performed at two primary locations within a 6 acre fenced area. An area of explosives-stained soil, where trucks were washed after dumping explosives materials, was located between primary burning pads and a dumping area/pad.

Four additional burning pads, located south of a fenced area, were identified in aerial photographs. Each of these burning pads encompassed an area of approximately 2 acres. Numerous craters adjacent to the burning pads were indicative of TNT block testing. Later photographs indicated that the area containing these burning pads had been covered with a layer of soil but portions of the pads were still visible.

The site is owned by the U.S. Army and is not being used. It is located within a GMZ for GRU3.

Site M3 contained the following SRUs (refer to Figure 5-17):

- SRU1 – explosives in soil
- SRU2 – metals in soil
- SRU3 – explosives and metals in soil

SRU1 COCs included 1,3,5-TNB, 2,4,6-TNT and 2,4-DNT. Lead was the COC for SRU2 soils. SRU3 COCs included 1,3,5-TNB, 2,4,6-TNT and lead.

5.19.2 Remedial Actions

5.19.2.1 Implementation

RA activities were conducted between July 6, 2006 and September 25, 2007. Approximately 55 CY of unscreened SRU1 soils were excavated and treated at the BTF. Approximately 23,612 CY of unscreened SRU2 and SRU3 soils were excavated and disposed at the Prairie View RDF.

Table 5-20 Volume of Contaminated Soils Removed from Site M3

Media	Volume (CY)	Notes
SRU 1 Soil	55	Treated at the BTF
SRU2 and SRU3 Soils	23,612	Disposed at the Prairie View RDF

Approximately 14,820 CY of treated SRU1 soil from the BTF was used for backfill. Remaining backfill was obtained from a clean area of the site. The sides of the excavation were pushed in and the excavated area was converted into a wetland.

According to the *Final Second Five-Year Review Report [for] Soils Operable* Unit (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). Closure of Site M3 is documented in the *Final Closure Report, Sites L2, L5, L23A, M3, M4, and M12* (MWH 2009).

5.19.2.2 Operation, Maintenance and Monitoring

No operation, maintenance, and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring is being performed pursuant to the GRU3 remedy (refer to Section 6.5.2.2 for monitoring details).

5.19.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater (within a GMZ) may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater
    - Damaging of confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
    - Shall not be used for potable water supply
    - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.19.3 Site Inspection

The site was inspected on April 16, 2013 to assess current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. A photograph is included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and the photograph.

The site is vacant and contains constructed wetlands within and adjacent to the remediated area. Surrounding areas consist of open grassland. Land uses incompatible with the restrictions identified in Section 5.19.2.3 were not observed.

5.19.4 Progress Since Last Five-Year Review

Site M3 achieved closure status for the SOU and a final closure report was issued (MWH 2009).

5.19.5 Technical Assessment

5.19.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected remedies for Site M3 were implemented and the RA is complete. Closure report documentation and site observations indicate that the remedies were properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.19.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.19.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the 1998 ROD.

5.19.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.19.7 Recommendations for Follow-up Actions

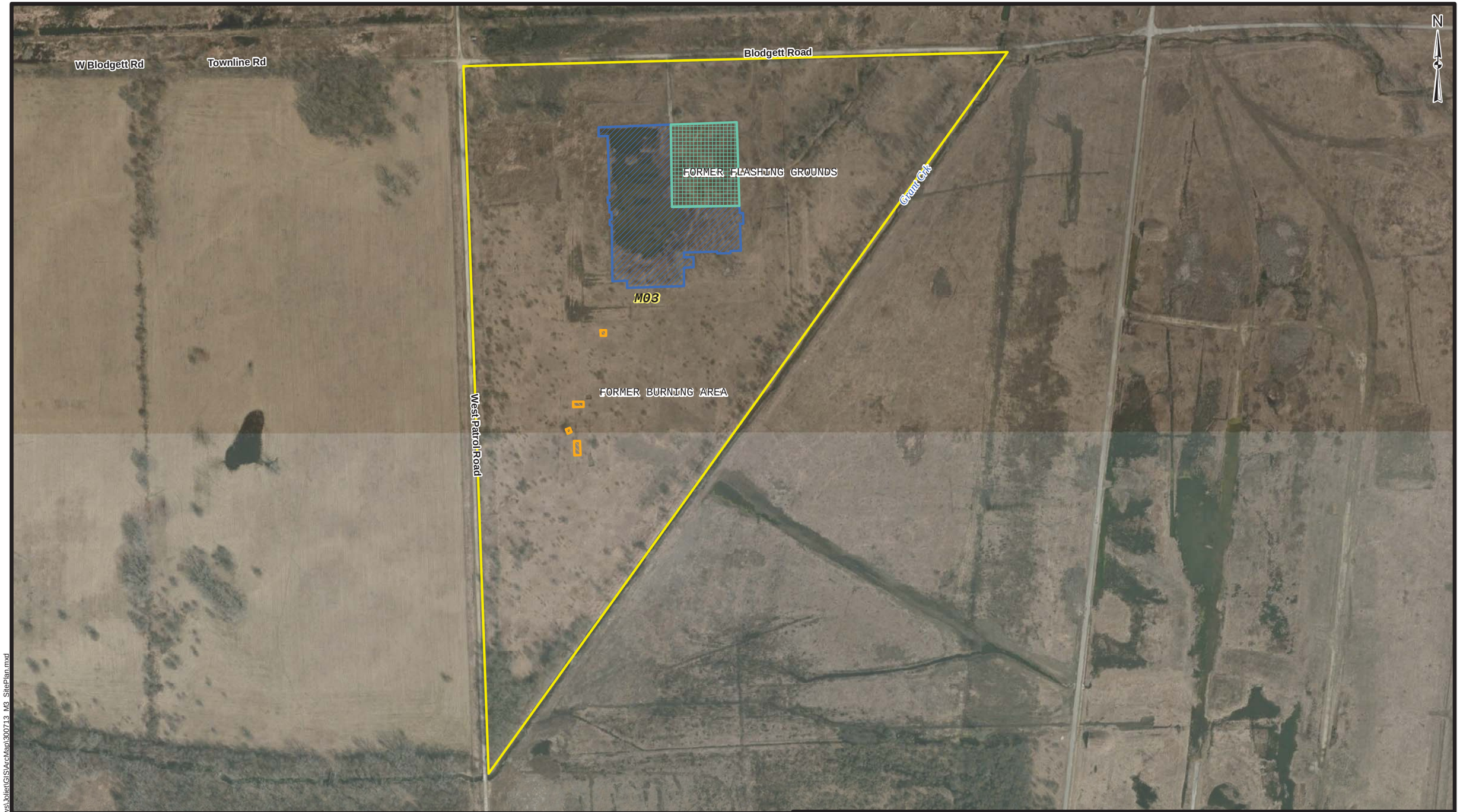
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.19.8 Protectiveness Statement

The SOU remedy at Site M3 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site or excavated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 2 - Metals Remediation Area
- SRU 3 - Explosives and Metals Remediation Area

Reference:
MWH 2009. "Final Closure Report Sites L2, L5, L23A, M3, M4 and M12 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunitions Plant." October.

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US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M3 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-17

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5.20 SITE M4 – LEAD AZIDE AREA

5.20.1 Background Information

Site M4 (Lead Azide Area) is located in the west central part of the MFG Area and covers approximately 136 acres. Lead azide, a primary initiating explosive, was produced at the site from the early 1940s through the Korean War and again during the Vietnam War from 1966 to early 1968. The principal feature in the western part of the site was a Lead Azide Lagoon that was used as a settling basin to store wastewater treatment sludge from the manufacturing and formulation of a lead-based initiating compound. The sludge was neutralized and subsequently discharged to Grant Creek. Remaining lagoon sludge was classified as K046 hazardous waste. The Lead Azide Lagoon covered approximately 2,000 SF. In 1982, the production facility in the central portion of the site was demolished and the debris was burned within the lagoon.

The site is owned by the U.S. Army and not being used.

Site M4 contained the following SRU (refer to Figure 5-18):

- SRU2 – metals in soil

Lead exceeding the RGs was detected in 14 of 20 soil samples from the site. Lead was detected in an area covering approximately 47,500 SF and extended to a depth of 3 ft bgs.

5.20.2 Remedial Actions

5.20.2.1 Implementation

RA activities were conducted between December 6, 2006 and September 24, 2007. Approximately 8,150 CY of unscreened SRU2 soil was excavated and disposed at the Prairie View RDF. The Lead Azide Lagoon was excavated to bedrock, which ranged from 2 to 4 ft bgs.

Table 5-21 Volume of Contaminated Soil Removed from Site M4

Media	Volume (CY)	Notes
SRU2 Soil	8,150	Disposed at the Prairie View RDF

Backfill consisted of soil obtained from a clean location on site and treated soil from the BTF (approximately 7,000 CY). The backfill was placed, compacted, and re-graded to drain consistent with adjacent terrain. The backfilled areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable* Unit (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Phase 2 – Remedial Design/Remedial Action Work Plan* (MWH 2005). RA activities at the site are complete. The RAOs established in the 2004 ROD were satisfied and closure of Site M4 is documented in the *Final Closure Report – Sites L2, L5, L23A, M3, M4, and M12* (MWH 2009).

5.20.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site.

5.20.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained (note; there are no monitoring wells on the site)
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.20.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

The site is vacant and consists of open grassland and scrub-brush. Land uses incompatible with the restrictions identified in Section 5.20.2.3 were not observed.

5.20.4 Progress Since Last Five-Year Review

Site M4 achieved closure status for the SOU and a final closure report was issued (MWH 2009).

5.20.5 Technical Assessment

5.20.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The SOU remedy at Site M4 is functioning as intended by the decision documents. The RA was implemented and is complete. Closure report documentation and site observations indicate that

the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the RODs. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.20.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that would call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.20.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the RODs.

5.20.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.20.7 Recommendations for Follow-up Actions

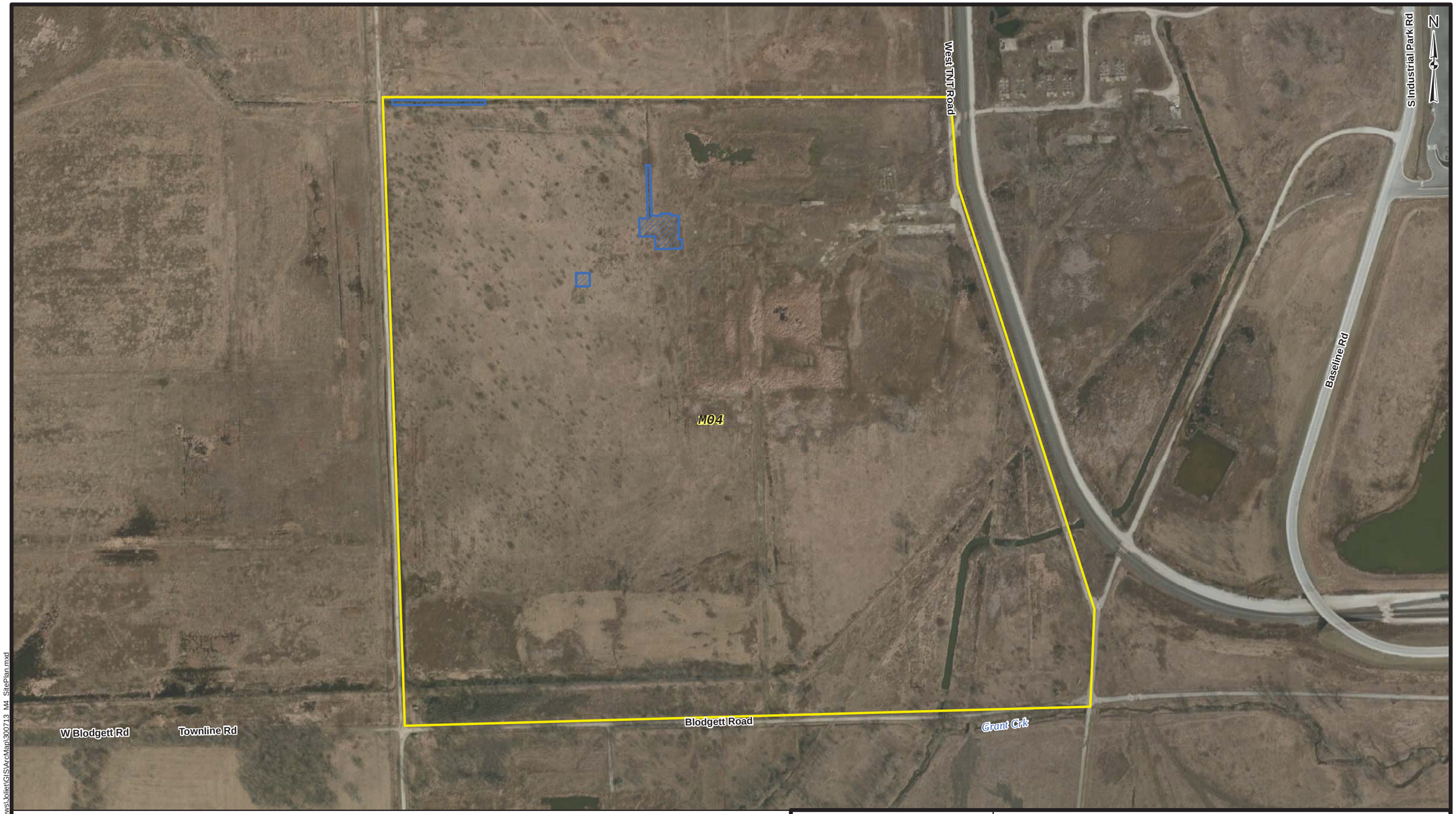
Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.20.8 Protectiveness Statement

The SOU remedy at Site M4 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated and disposed off site
- Land use is consistent with the IC objectives identified in the RODs
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy



Legend

- Approximate Site Boundary
- SRU 2 - Metals Remediation Area

Reference:
MWH 2009. "Final Closure Report Sites L2, L5, L23A, M3, M4 and M12 Phase 2 Remedial Action Soils Operable Unit Joliet Army Ammunitions Plant." October.

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US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M4 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-18

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5.21 SITE M5 – TETRYL PRODUCTION AREA

5.21.1 Background Information

Site M5 encompasses approximately 244 acres in the central portion of the MFG Area. Tetryl production was the principal activity conducted at the site during World War II, the Korean War, and again during the Vietnam War until 1973. A tetryl ditch (oriented from north to south) bisected the site. Six production lines (1 through 6) were located west of the ditch and six production lines (7 through 12) were located east of the ditch. Lines 1-6 were burned and removed. A nitrating ditch, oriented east to west, was located immediately north of nitrating buildings in the tetryl production lines.

Each tetryl production line consisted of four separate houses, oriented north to south, for nitrating, refining, wet storage and drying. Wastewater from tetryl manufacturing in the nitrating and refining houses flowed into settling boxes located west of the buildings. Wastewater from the nitrating buildings was discharged into open drainage ditches that flowed north and into the nitrating ditch, which in turn drained into the tetryl ditch and thereafter into Grant Creek, south of the production area. Tetryl was visible within the settling boxes at the refining houses.

Wastewater from acid spills and daily floor cleaning was discharged from floor drains directly to the settling boxes at the nitrating and refining houses. Dust traps were constructed outside of the eastern doors of these buildings to collect tetryl residues.

Wastewater from the tetryl drying process was discharged to a settling box constructed immediately west of each drying house. Tetryl was present within the settling boxes for production lines 7 through 12. A concrete weir was located in the nitrating ditch that formed a settling basin south of the acid recovery building for these lines. Crystalline explosives compounds were present in the basin sediment where wastewater from an acid fume recovery building and the nitrating buildings on lines 10, 11, and 12 collected.

Buildings in the western section of the site were removed in 1988 and the area was backfilled, re-graded, and re-vegetated. Buildings in the eastern section of the site were demolished in 1998 in conjunction with the liquidation activities at JOAAP. Unlike the western section, the concrete floor slabs and footings within the eastern section remained in place prior to the onset of SOU RA activities.

The site is located in the Deer Run Industrial Park and is owned by CenterPoint Intermodal LLC (CPI LLC) and Burlington Northern and SantaFe (BNSF) Railway, both private entities. It is within the GMZ for GRU2.

Site M5 contained the following SRUs (refer to Figure 5-19):

- SRU1 – explosives in soil
- SRU3 – explosives and metals in soil

<u>SRU1 Soil</u>

SRU1 COCs included 2,4-DNT, 2,6-DNT, 1,3,5-TNB, 2,4,6-TNT, and tetryl.

SRU3 Soil

SRU2 COCs included 2,4-DNT, 2,6-DNT, 2,4,6-TNT, and lead.

5.21.2 Remedial Actions

5.21.2.1 Implementation

RA activities were conducted between July 7 and November 19, 1999. Due to relatively low concentrations of lead in the soil, the remedy for SRU3 soils was "excavation and bioremediation". A total of 1,537 CY of unscreened SRU1 soil and 4,102 CY of unscreened SRU3 soil were excavated and transported to the BTF for sorting and treatment.

Table 5-22 Volume of Contaminated Soils Removed from Site M5

Media	Volume (CY)	Notes
SRU1 Soil	1,537	Treated at the BTF
SRU3 Soil	4,102	Treated at the BTF

The excavations were backfilled with clean soil from the blast shields and berms within the site. Following placement of the backfill, the soil was compacted and graded to drain consistent with adjacent terrain. Seed and mulch was placed throughout the disturbed portion the site.

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH 1999b). Closure of Site M5 is documented in *Final Site M5 Closure Report, Former Tetryl Production Area, Joliet Army Ammunition Plant, Wilmington, Illinois* (MWH 2000).

5.21.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site.

5.21.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site M5:

- **Land Use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations

- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – The use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, pumping or the use of groundwater supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.21.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to assess current conditions and access controls.

Changed conditions since the second five-year review report were not observed. The site has been developed into an intermodal rail system, which includes a rail spur, roadways for truck traffic, and large areas reserved for warehouses. A stormwater detention basin is present in the western portion of the site, east of South Industrial Park Road. Further west, between Tetryl Road and South Industrial Park Road, the site is undeveloped and consists of open grass land and a rectangular pond. A perimeter fence and security system is used to restrict access. Land uses incompatible with the restrictions identified in Section 5.21.2.3 were not observed.

5.21.4 Progress Since Last Five-Year Review

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred at the site since this time.

5.21.5 Technical Assessment

5.21.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected remedy was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was property executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in Section 5.1.3.8. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.21.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The draft Closure Report for M5 (MWH 2000) was reviewed and residual soil concentrations of lead and tetryl were extracted from summary tables of confirmation samples and entered into the ProUCL program (EPA 2010) to determine 95th percent upper confidence limits (UCL95) on the mean of residual concentrations (Tables A8-5 and A8-6 of Attachment 8). As seen in Table A8-5, the UCL95 concentration of lead at this site is 375 mg/kg, which is below the current USEPA industrial RSL for lead, as well as a calculated PRG soil concentration that would be protective of a fetus (Table A.8-4).

The average residual concentration of tetryl (UCL95 estimated to be 236 mg/kg, Table A8-6), while well below the 1998 ROD cleanup goal of 4,100 mg/kg, is approximately four times greater than the current USEPA industrial RSL of 62 mg/kg. However, the USEPA RSL for tetryl was set using an appended screening level toxicity criterion provided in a provisional peer-reviewed toxicity value (PPRTV) document discussed in Appendix A, Table A.8-1. The U.S. Army's position is that there is too much uncertainty surrounding these appended screening level PPRTV criteria to use them to quantify risk. Furthermore, an examination of current conditions at Site M5 indicates that after remediation, the site was redeveloped into a rail yard (Figure 5-19). The majority of the remediated areas are covered by railroad lines, although a couple of the remediated areas lie adjacent to and beneath a detention pond. The exposure assumptions utilized for development of PRGs for an industrial worker (exposure to open soil areas for 8 hours a day, 250 days a year, for 25 years) are no longer valid for this site. Little to no direct human contact to soils currently occurs at this site. Therefore, the cleanup remains protective for tetryl.

5.21.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD.

5.21.6 Issues

The following issue that does not affect protectiveness of the remedy was identified:

- A copy of the *Final Site M5 Closure Report* was not available in the project file
- GIS records have not been maintained for ICs monitoring

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.21.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Place a copy of the *Final Site M5 Closure Report* in the project file
- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.21.8 Protectiveness Statement

The SOU remedy at Site M5 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated, and disposed off site
- Land use is consistent with the IC objectives identified in Section 5.1.3.8
- The toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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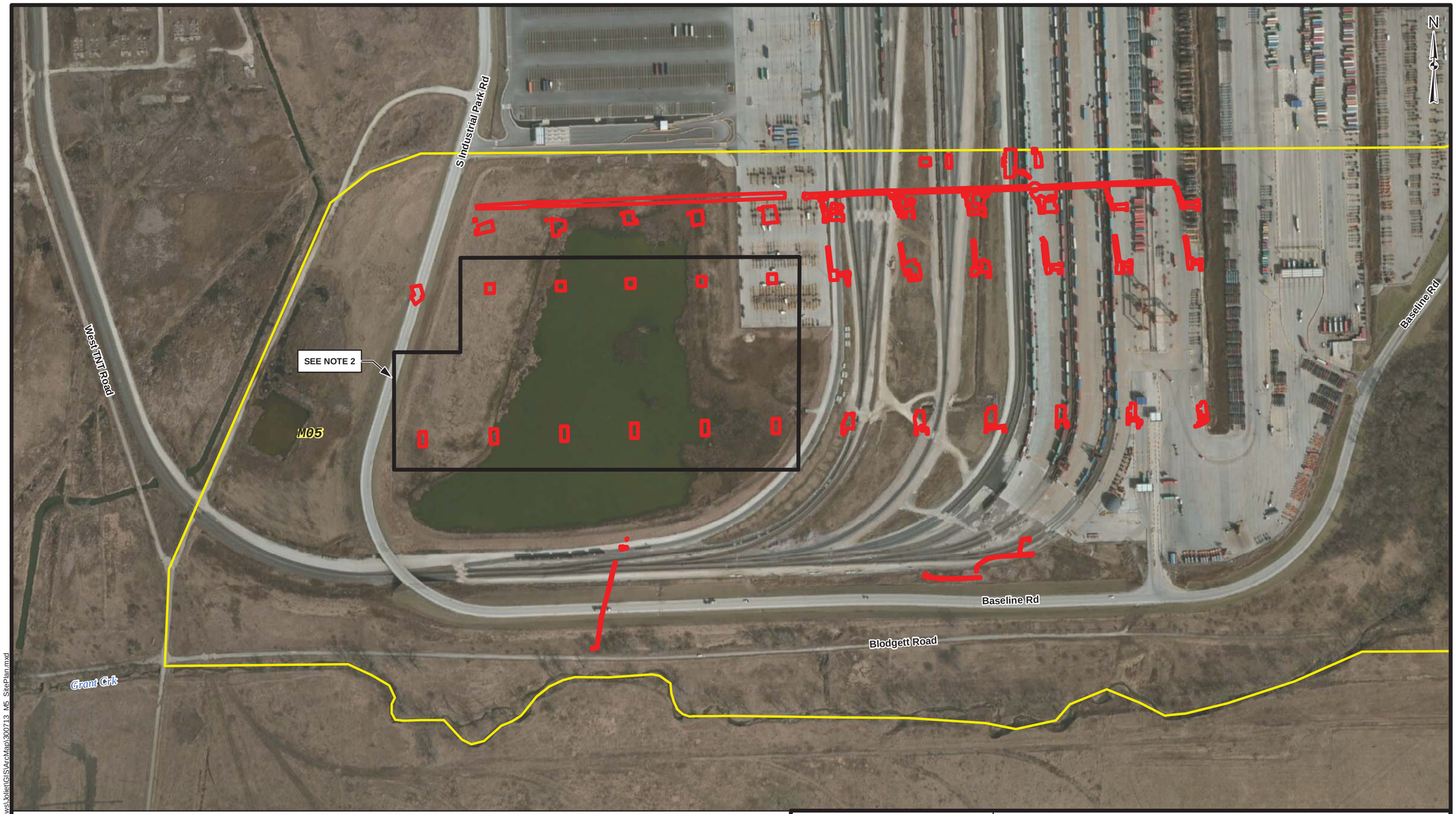

Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 3 - Explosives and Metals Remediation Area

Reference:
MWH. 2000. "Draft Site M5 Closure Report Joliet Army Ammunition Plant." April.

Notes:
1. Unable to distinguish SRU1 and SRU3 remediation areas from the reference document.
2. Illustrated remediation areas are approximate and taken from M5 Remedial Design Plan.

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SITE M5 REMEDIAL ACTION

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FIGURE 5-19

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5.22 SITE M6 – TNT DITCH COMPLEX

5.22.1 Background Information

Site M6 covers approximately 271 acres in the central part of the MFG Area. TNT and DNT were produced at the site during World War II, the Korean War, and the Vietnam War. During each inter-war period the plant mission was changed to a research and development (R&D) role in which explosive compounds, such as nitroxylenes, were produced. TNT production ceased in 1977.

Twelve parallel TNT "batch" production lines were initially constructed in the TNT Ditch Complex from south to north, with a total production capacity of 32,000,000 lbs of TNT per month. The principal buildings in each TNT production line were oriented east to west. The batch production lines were constructed in pairs; each line began with a "mono-house," followed by a "bi-house," and a "tri-house" for the nitration of toluene.

An AFR building (sometimes referred to as an AFR house) was located to the south of each bi-house. A "wash house" was located to the west of each tri-house. Process piping connected each of the nitrating buildings, the AFR building, and the wash house. Each pair of production lines shared a "nail house," which was connected by a conveyor line to the wash house. Materials were loaded onto trucks and transported to the north of each nail house. Explosives impacted soil identified at the nail houses has been attributed to incidental spillage during loading and unloading operations.

Crude TNT was manufactured in a three-step process by the successive chemical addition of nitric acid to a toluene base product using sulfuric acid as a catalyst. The initial nitration was performed in the mono-house with weak nitric acid to produce "mono-oil" (2-NT), which was then pumped to the bi-house for a second nitration using oleum, a mixture of sulfuric acid and sulfur trioxide, and recycled nitric acid, resulting in "bi-oil" (primarily 2,4-DNT). The DNT "bi-oil" was then pumped to the tri-house. Each tri-house contained two "nitrator" tanks in which "bi-oil" was combined with oleum and a mix of nitric and sulfuric acids to produce "tri-oil" (2,4,6-TNT). The crude TNT was transferred to the wash house for neutralization with sodium carbonate (soda ash) and purification using sodium sulfite (sellite). The crystallized TNT was then dried, washed, and flaked prior to being packaged in boxes. A conveyor finally transferred the boxed TNT to the nail house where the containers were sealed.

Six DNT production lines, with DNT as the final product, were constructed between the paired TNT production lines. At each DNT production line the "mono" and "bi" nitration steps were performed in a combined nitrating building. DNT purification was performed in a "sweating-and-graining" building located to the west of the DNT nitrating building. Total capacity for DNT production was 7,200,000 lbs per month.

In 1974, batch lines 11 and 12, at the north end of Site M6, were demolished and three continuous operation TNT production lines were constructed in their place. The remaining buildings within the batch-line area (lines 1 through 10) were demolished in conjunction with liquidation activities at JOAAP in 1998. The concrete floor slabs and footings remained intact, while the building debris was largely deposited near the original structures.

TNT process wastewater from each tri-house and wash house, known as "red water," was initially discharged from wooden holding tanks to open clay-lined ditches that drained into a 9,100-feet-long "TNT Ditch." The original wastewater drainage system was replaced in 1965 by a system of wooden flumes constructed in the TNT Ditch. The wash house red water was then diverted to the Red Water Area (Site M7) for treatment.

DNT-contaminated wastewater from the bi-houses and DNT sweating-and-graining buildings was discharged via wooden settling tanks into open troughs and ditches that flowed directly into the storm water sewer system and discharged into the TNT Ditch. Wastewater discharged directly to the TNT Ditch was not treated in the Red Water Area and flowed directly into Grant Creek.

Occasionally, operational problems developed during the nitrating processes. To avoid potential explosion hazards, the explosives batch in progress could be flooded with water that was stored in large wooden "drowning" tubs. During the period from March 16, 1972 through September 14, 1974, there were more than 30 recorded instances in which batches of explosives were drowned. The batch drownings primarily occurred at the tri-houses during the final nitration step. Approximately 4,800 pounds of DNT "bi-oil," 5,600 pounds of Oleum (fuming sulfuric acid), and 2,800 pounds of nitric acid were released to the TNT Ditch with each event. Similar drowning tubs were located at each bi-house.

A main rail line and spurs were located on the eastern edge of the site. The main line was approximately 6,000 ft long. Thirty–five (35) rail spurs, each approximately 200 ft long, ran off at a slight angle to the southwest.

The site is owned by CPI LLC (western half and southern section) and BNSF (eastern section). It is located in the Deer Run Industrial Park and is within the GMZ for GRU2.

Site M6 contained the following SRUs (refer to Figure 5-20):

- SRU1 – explosives in soil
- SRU3 – explosives and metals in soil

SRU1 Soil

Explosives COCs included 2,4-DNT, 2,6-DNT, 2-NT, 1,3,5-TNB, 2,4,6-TNT, and RDX. Areas exceeding RGs included soils adjacent to each of the TNT wash houses, bi-houses, tri-houses, between the wash houses and TNT Ditch, at AFR Buildings, and around the perimeter of a laboratory building.

SRU3 Soil

Soil analytical results for SRU3 soils indicated that 2,4-DNT, 2,4,6-TNT, arsenic, beryllium, and lead exceeded compound-specific RGs.

Soils included the following RCRA characteristic wastes: soils contaminated with TCLP extractable 2,4-DNT (RCRA waste code D030) and soils contaminated with TCLP extractable lead (RCRA waste code D008). The soils also contained RCRA-listed wastes if contaminated

with red water (RCRA waste code K047) and DNT production waste waters (RCRA waste code K111).

Additional site investigations were conducted in 1999 at a "Continuous Lines Area" that was not previously covered in the RI/FS but suspected of containing soil contamination. The results indicated that explosives contamination was limited to discrete locations and in soil beneath an elevated red water discharge pipe.

5.22.2 Remedial Actions

5.22.2.1 Implementation

The rail lines were salvaged for scrap in 1998 prior to initiation of RA activities. The RA activities were conducted from August 12, 1999 to February 18, 2005. During each construction season, contaminated soil excavations began at Line 1 and proceeded north, line by line. Approximately 86,575 CY of SRU1 soils and 60,703 CY of SRU3 soils (147,278 total) were excavated and treated at the BTF. During 1999 RA activities 14,880 lbs of explosives raw product was excavated, placed in a secured bunker, and ultimately disposed of by the Bureau of Alcohol, Tobacco, and Firearms. During the 2002 RA activities, nuggets of raw explosives were handpicked and dissolved in water. The resulting solutions were added to soil destined for treatment at the BTF. Soil with TNT concentrations greater than 100,000 ppm from the TNT ditch were blended with soils containing lesser amounts of TNT prior to treatment.

Table 5-23 Volume of Contaminated Soils Removed from Site M6

Year/Activity	Seasonal Total (CY) [a]	SRU1 (CY) [a]	SRU3 (CY) [a]
1999 (August 12 – December 16)	47,955	45,911	2,044
2002 (July 18 – November 15)	34,064	34,064	0
2003 (August 22 – November 14)	18,472	6,600	11,872
2004-2005 (January 10, 2004 - February 18, 2005)	46,787	0	46,787
TOTAL	**147,278**	**86,575**	**60,703**

Notes:

a – converted from tons to CY (1.3 tons/CY)

RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/ Remedial Action Work Plan – Phase 1* (MWH 1999b). Visual observations and confirmation sampling were used to verify that the remaining soils in excavations did not exceed the RGs and TCLP standards. The excavations were backfilled and regraded using clean soils

from surrounding areas or from a sand and gravel pit south of the site. Closure of Site M6 is documented in *Final Closure Report Site M6* (MWH 2006a).

5.22.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring is being performed pursuant to GRU2 (refer to Section 6.4.2.2 for monitoring details).

5.22.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site M6:

- **Land Use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – The use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, pumping or the use of groundwater supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.22.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photographs.

The site is vacant and contains remnant MFG Area structures, roads, and utility appurtenances. Prairie grasses and scrub-brush dominate open areas. Commercial development has not occurred. Land uses incompatible with the restrictions identified in Section 5.22.2.3 were not observed.

5.22.4 Progress Since Last Five-Year Review

Monitoring well MW163 has been abandoned since the second five-year review.

5.22.5 Technical Assessment

5.22.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy at Site M6 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in Section 5.1.3.8. Cost or issues associated with monitoring and performance of the SOU are not anticipated. Opportunities for optimization were not identified.

5.22.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8 of this report. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. Only a few sites had COCs for which the 1998 RG would now represent an unacceptable risk. This includes the RGs for 2-NT and lead at the site (Attachment 8).

The Closure Report for Site M6 (MWH 2006) was reviewed and residual soil concentrations of 2-NT and lead were evaluated to determine the UCL95 of residual concentrations (Tables A8-7, A8-8). As seen in Table A8-7, the UCL95 concentration of 2-NT was estimated to be up to 0.661 mg/kg, which is well below USEPA's 2013 Industrial Regional Screening Level (Table A.8-2), indicating that the residual concentrations are protective of human health.

Based on recommendations made by the ProUCL program, the UCL95 concentrations of lead at the site were estimated to be either 943 or 1,213 mg/kg (Table A.8-8). The difficulty in determining a UCL95 for the lead concentrations may be due to the high number of results that were reported below detection limits. Only 10 of the 733 soil samples had detected concentrations of lead, although the detection limit was up to 800 mg/kg. It is not known why the laboratory could not report lower concentrations. Current laboratory detection limits for soil lead samples are typically around 1 mg/kg. Use of lower laboratory analytical detection limits may have revealed a lower average concentration of lead at the site. The range of estimated UCL95 concentrations are comparable to both the ROD cleanup goal as well as the industrial soil PRG developed using the latest USEPA Adult Lead Model PRG calculation (Table A.8-4), although they are slightly above the current USEPA industrial RSL. The site is located adjacent to a rail yard parking lot and is not currently being used (Figure 5-20). The current estimated concentrations of lead at or below the calculated PRG of 1,120 mg/kg are considered protective, especially since the site is not being occupied or used.

5.22.5.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD.

5.22.6 Issues

The Center for Disease Control (CDC) is recommending a lower acceptable blood lead level (discussed in Attachment 8). If this level becomes adopted by the USEPA in the future (for its CERCLA program), the lead in soil RG may need to be re-evaluated in order to remain protective of human health, especially if the site were to be used and occupied in the future (it is currently vacant).

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.22.7 Recommendations for Follow-up Actions

If the USEPA accepts the CDC's recommended lead in blood level, additional soil confirmation sampling and analysis should be performed to evaluate lead concentrations down to approximately 1 mg/kg. This should be conducted to determine whether or not there are truly elevated lead concentrations across the site.

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.22.8 Protectiveness Statement

The SOU remedy at Site M6 currently protects human health and the environment because contaminated soils exceeding the RGs have been excavated and treated. Land use is consistent with the IC objectives identified in the 1998 ROD and subsequent land use restrictions. However, in order for the remedy to be protective in the long-term, additional soil confirmation sampling and analysis should be performed to evaluate lead concentrations down to approximately 1 mg/kg if the USEPA accepts CDC's recommended lead in blood level (5 micrograms per deciliter - µg/dL).

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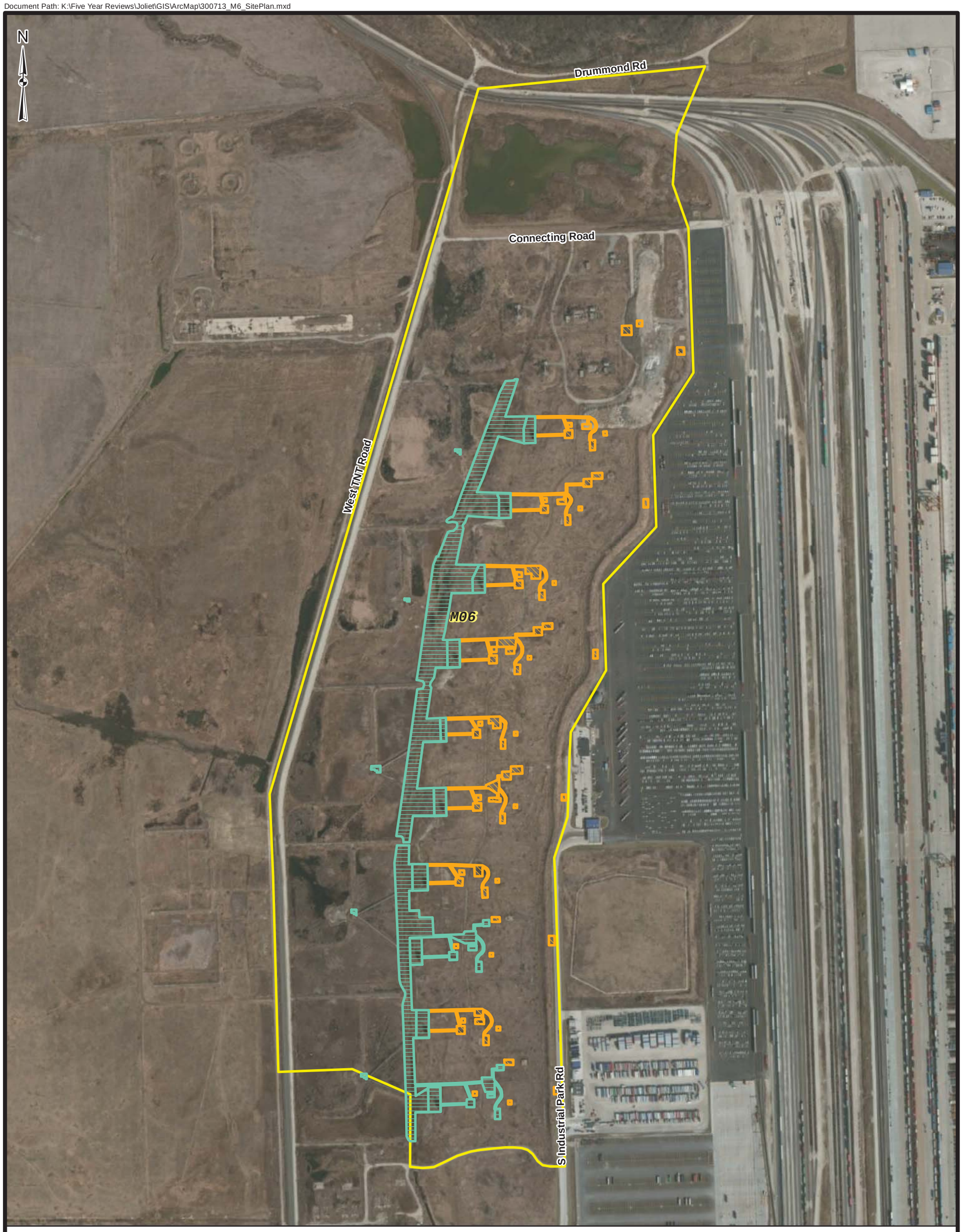

Legend

- Approximate Site Boundary
- SRU 1 - Explosives Remediation Area
- SRU 3 - Explosives and Metals Remediation Area

Reference:
MWH Americas, Inc. 2006. "Final Closure Report Site M6 Soils Operable Unit Joliet Army Ammunition Plant." June.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M6 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-20

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5.23 SITE M7 – RED WATER AREA

5.23.1 Background Information

Site M7, the Red Water Incineration Area, encompasses approximately 49 acres in the central part of the MFG Area immediately south of the TNT Ditch Complex (Site M6). Former facilities included three separate groups of storage tanks, pumping stations, evaporators, incinerators, and a lagoon. Beginning in 1965, these facilities were used to treat wastewater (red water) containing explosives residues and derivatives produced in the TNT manufacturing process. Red water from TNT wash houses was diverted from the TNT ditch into wooden flumes. It was collected in storage tanks; overflow was stored in a 3.3-acre lagoon (4.1 million gallon capacity), which was remediated in 1985.

Explosives contaminated soils were identified throughout the east side of the site at a depth of less than 1 ft, except for a drainage area located in the northwest corner of the site were contamination extended approximately to bedrock (3 to 8 ft bgs). A RA was conducted during 1983 to 1985 by Uniroyal (JOAAP's operating contractor) to remove contaminated surface water and sediments from a "Red Water Lagoon".

Site M7 contained the following SRU (refer to Figure 5-21):

- SRU1 – explosives in soil

The COCs for SRU1 soil included 1,3,5-TNB, 2,4-DNT, 2-6-DNT, 2,4,6-TNT, and RDX. Soils contaminated with red water were considered listed wastes (RCRA waste code K047) and DNT production waste water (RCRA waste code K111).

The site is located within the Deer Run Industrial Park and is owned by CPI LLC and BNSF Railway Co. The remediated area, located on the northern section of the site, is owned by BNSF. The remainder is owned by CPI LLC. Site M7 is within the GMZ for GRU2.

5.23.2 Remedial Actions

5.23.2.1 Implementation

RA activities were conducted during three separate events:

- July 10 to November 16, 2001 – Original RA scope activities
- December 16 to 26, 2001 – Contaminated sediment removed from a "cattail area"
- April to November, 2002 – Pipe and sumps removed from an easement area

A summary of contaminated soils that were excavated from the site is provided in Table 5-24 and discussed below.

Original RA Scope

Approximately 16,855 CY of SRU1 soils were excavated, screened on site, and transported to the BTF for treatment. Backfilling and revegetation was not conducted because the site was to be transferred for commercial development.

Cattail Area

Approximately 6 inches of sediment (75 CY) was removed from a stained area adjacent to the west boundary of a previously delineated area. The excavated sediment was treated at the BTF.

Pipe and Sump Area

Underground piping and sumps in the middle and eastern sections of the site were remediated. Pipes and components were treated in a flash burning building in the LAP area and then disposed off site. Approximately 137 CY of contaminated soil was treated at the BTF. The northwest section of the excavated area was backfilled with clean soil from the site. Other areas were not backfilled or revegetated because the site was to be transferred for commercial development.

Table 5-24 Volume of Contaminated Soils and Sediment Removed from Site M7

Media	Volume (CY) [a]	Notes
SRU1 Soil		
Original RA Scope	16,855	Treated at the BTF
Cattail Area	75	Treated at the BTF
Pipe and Sump Area [b]	137	Treated at the BTF

Note:

a – converted from tons to CY (1.3 tons/CY)
b - pipes and components were flash treated and disposed off site

According to the *Final Second Five-Year Review Report [for] Soils Operable Unit* (Aerostar, 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the *Final Soils Operable Unit Remedial Design/Remedial Action Work Plan – Phase 1* (MWH April 1999b). The RA removed SRU1 soil above the RGs and is complete. Closure of Site M7 is documented in *Final Closure Report Site M7* (MWH 2003c).

5.23.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring has been performed pursuant to GRU2 (refer to Section 6.4.2.2 for monitoring details).

5.23.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site M7:

- **Land Use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – use of groundwater above the Maquoketa confining bed for potable purposes; drilling, constructing, pumping or use of groundwater supply wells

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.23.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. A photograph is included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and the photograph.

The site is not being used. The north end contains remnant JOAAP structures; the central and southern sections are vacant. Open areas contain grassland and scrub-brush. Land uses incompatible with the restrictions identified in Section 5.23.2.2 were not observed.

5.23.4 Progress Since Last Five-Year Review

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred at the site since this time.

5.23.5 Technical Assessment

5.23.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The selected SOU remedy on site M7 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in Section 5.1.3.8. Cost or issues associated with monitoring and performance of the SOU are not anticipated. Opportunities for optimization were not identified.

5.23.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. However, for the COCs at this site, the RGs established in the 1998 ROD remain protective of human health.

5.23.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD.

5.23.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents

- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.23.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.23.8 Protectiveness Statement

The SOU remedy at Site M7 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been excavated, treated and disposed off site
- Land use is consistent with the IC objectives identified in Section 5.1.3.8
- The toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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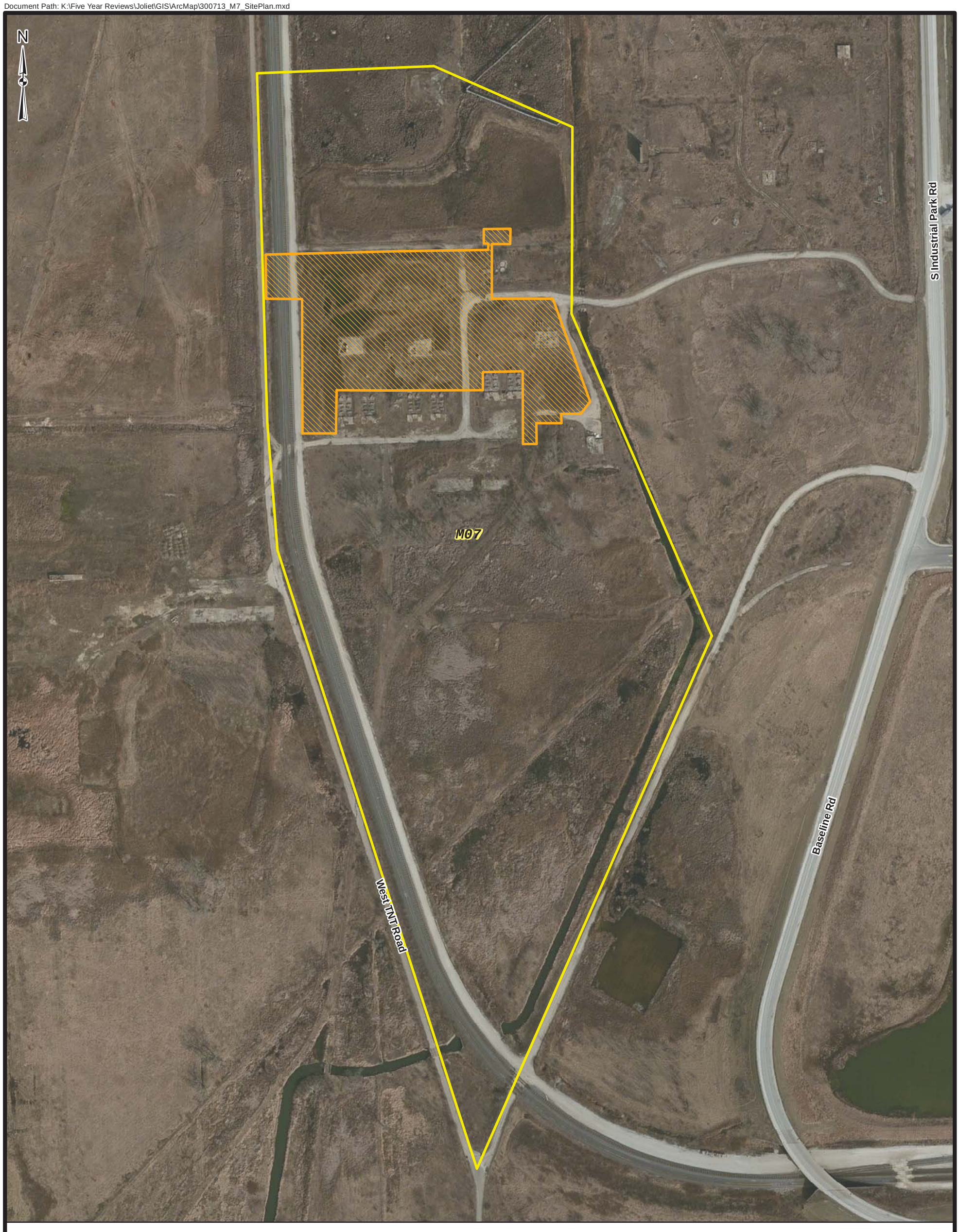

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Approximate Site Boundary

SRU 1 - Explosives Remediation Area

Reference:
MWH Americas, Inc. 2003. "Final Closure Report Site M7 Joliet Army Ammunition Plant." November.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M7 REMEDIAL ACTION

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WILL COUNTY, ILLINOIS

FIGURE 5-21

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5.24 SITE M8 – ACID MANUFACTURING AREA

5.24.1 Background Information

Site M8 covers an area of approximately 304 acres in the central portion of the MFG Area. It contained four areas where nitric and sulfuric acids were produced and combined into various strength "mixes" for use in the manufacturing of DNT, TNT, and tetryl. It is located within the GMZ for GRU2.

Acid Area 3 was located in the northeast corner of the site. The production of Oleum (fuming sulfuric acid), strong nitric acid, and other acids used in the production of explosives was the principal activity in this area. Principal structures and operations included an Oleum Plant, Northern Ammonia Oxidation Plant, and Northern Acid Area.

The Oleum Plant was located in the northern portion of Acid Area 3. The southern half of the plant was used for the receiving and storage of bulk sulfur. Raw sulfur was readily apparent throughout this area and along a southern railroad spur. The site was classified SRU7 – Sulfur. No RCRA hazardous wastes were identified at the site. Sulfur is not a CERCLA regulated waste and was not identified in the October 1998 ROD as a risk to industrial receptors in any media at the site.

On August 10, 2000, the site was transferred to the State of Illinois. Following the land transfer, the State of Illinois sold the site. Subsequent activities included the construction of an intermodal rail facility that is owned and operated by BNSF railroad. According to the Finding of Suitability to Transfer (FOST) (MWH 2001a), there were no exceedances of soil industrial RGs.

5.24.2 Remedial Actions

5.24.2.1 Implementation

Sulfur was removed from surficial soils during liquidation activities at the site, prior to the transfer of property to the State of Illinois. The remediation of sulfur at the site was required by the 1998 ROD. Sulfur is not a CERCLA-regulated substance and the cleanup was conducted outside of the U.S. Army's CERCLA-based program.

5.24.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site. Groundwater monitoring is being performed pursuant to GRU2 (refer to Section 6.4.2.2 for monitoring details).

5.24.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site M8:

- **Land Use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – The use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, pumping or the use of groundwater supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.24.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

Changed conditions since the second five-year review report were not observed. The site is developed and used as an intermodal rail system. Principal structures include a rail spur, roadways for truck traffic and warehouses. Land uses incompatible with the restrictions identified in Section 5.24.2.3 were not observed. A perimeter fence and security system is used to restrict access.

5.24.4 Progress Since Last Five-Year Review

The RA was completed and a final closure report was issued prior to the second five-year review. No additional SOU RA activities have occurred at the site since this time.

5.24.5 Technical Assessment

5.24.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy at Site M8 was implemented and the RA is complete. Closure documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in Section 5.1.3.8. Cost or issues associated with monitoring and performance of the SOU are not anticipated. Opportunities for optimization were not identified.

5.24.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8 of this report. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. However, for the COCs at this site, the RGs established in the 1998 ROD remain protective of human health.

5.24.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the 1998 ROD.

5.24.6 Issues

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- GIS records have not been maintained for ICs monitoring
- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.24.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.24.8 Protectiveness Statement

The SOU remedy at Site M8 is protective of human health and the environment. This assessment is based on the following information and observations:

- Sulfur was removed from surficial soils at the site
- Land use is consistent with the IC objectives identified in Section 5.1.3.8
- The toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

5.25 SITE M9 – NORTHERN ASH PILE

5.25.1 Background Information

Site M9 is comprised of approximately 20 acres located on an escarpment in the north-central part of the MFG Area. The Northern Ash Pile was constructed during 1966 and 1967 as a landfill for ash residues from the incineration of TNT manufacturing wastes. Red water ash in the pile was derived from K047-listed hazardous wastes.

The ash pile covered approximately 5 acres and was 10 to 15 ft high. It was estimated to contain 124,000 CY of material. Upon closure, the ash pile was originally covered with PVC barriers, 12 inches of fill, and 6 inches of topsoil. The pile was recapped in 1985 with an additional 12 inches of clay and 6 inches of topsoil. The cap was repaired by the U.S. Army in 1993.

During routine inspections of the cap, a leachate seep from at south side of the pile was observed stressing vegetation and staining soils in a drainage channel. The IEPA requested interim measures to prevent the leachate seepage until permanent closure activities could be initiated. The interim measures were performed from March 31 to May 10, 1999, which included the installation of a leachate collection and recirculation system.

Greater than anticipated leachate volumes prompted the U.S. Army to conduct additional interim measures during July and August 2001. Three (3) to 4 ft of treated soil from Site M4 was spread and compacted over the ash pile surface. This action reduced the volume of leachate being collected.

The landfill portion of the site is owned by the U.S. Army and not being used. The eastern portion of the site is owned by CPI LLC. The site is located within the GMZ for GRU2.

Site M9 contained the following SRU (refer to Figure 5-22):

- SRU 6 – Landfill

Characterization activities performed during the Phase 2 RI (Dames and Moore 1993a) and a subsequent investigation performed in 1999 (MWH 1999b) did not identify RCRA characteristic wastes (MKM 2007b). Sodium and water-soluble sodium sulfate were present in the ash in concentrations greater that background levels. IEPA notified the U.S. Army that since the ash residues no longer exhibited the characteristic of reactivity (for which they were listed), they were not hazardous wastes regulated under at 35 IAC 721.103(a)(2)(C).

5.25.2 Remedial Actions

5.25.2.1 Implementation

RA activities were conducted from November 15, 2005 to April 28, 2006. The ash pile was excavated and 50,535 CY of primarily red water ash disposed at the Prairie View RDF. Components of the leachate collection and recirculation system were removed and either used at the BTF or disposed at the Waste Management Calumet City Industrial Disposal facility.

Table 5-25 Volume of Contaminated Soils Removed from Site M9

Media	Volume (CY)	Notes
SRU 6 (Red Water Ash and Soil)	50,535	Disposed at the Prairie View RDF

Field observations by USACE, USEPA, IEPA, and the contractor verified that the red water ash has been completely removed. Approximately 34,850 CY of treated soil from the BTF and reused clean cover soil was used as backfill. The restored area was hydroseeded using a USDA/FS-approved grass mixture.

Closure of Site M6 for SRU6 soil is documented in the *Final M9 Remedial Action Completion Report Soils Operable Unit M9 Northern Ash Pile* (MKM 2007b).

5.25.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site.

5.25.2.3 Land Use/Institutional Controls

U.S. Army Property

Future use of Site M9 will be industrial. Any formal ICs will be documented in the U.S. Army conveyance documents to inform future land owner of applicable land use restrictions. ICs prescribed in the 1998 ROD and *Final Remedial Design/Remedial Action Work Plan* (MWH, October 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. IC objectives identified in the 1998 ROD include:

- Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels
- Prevent the development and use of [the] property for industrial or residential uses
- Prevent exposure to/use of contaminated groundwater

Based on these objectives, the following restrictions apply:

- The land cannot be used for residential purposes
- Groundwater may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume
- Groundwater above the Maquoketa shale shall not be used for potable water supply

CPI LLC Property

- **Land Use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations

- **CERCLA Remediation -** Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – The use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, pumping or the use of groundwater supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.25.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

Changed conditions since the second five-year review report were not observed. The site is vacant and contains open grassland. Land uses incompatible with the restrictions identified in Section 5.24.2.3 were not observed.

5.25.4 Progress Since Last Five-Year Review

Monitoring well MW218 has been abandoned since the second five-year review.

5.25.5 Technical Assessment

5.25.5.1 Question A: Is the remedy functioning as intended by the decision documents:

The remedy is functioning as intended by the decision documents. The selected SOU remedy for Site M9 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the 1998 ROD. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.25.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. However, for the COCs at this site, the RGs established in the 1998 ROD remain protective of human health.

5.25.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the site as described in the 1998 ROD.

5.25.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

Issues identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.25.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.25.8 Protectiveness Statement

The SOU remedy at Site M9 is protective of human health and the environment. This assessment is based on the following information and observations:

- Landfilled materials have been excavated and disposed off site
- Land use is consistent with the IC objectives identified in the 1998 ROD
- The toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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Legend

- Approximate Site Boundary
- SRU 6 - Former M9 Northern Ash Pile, Excavated and Disposed Off-Site

Reference:
MKM Engineers, Inc. 2007. "Final M9 Remedial Action Completion Report Soils Operable Unit M9 Northern Ash Pile". September

0 200 400 Feet

US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M9 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-22

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5.26 SITE M11 - LANDFILL

5.26.1 Background Information

Site M11 is located in the southwest portion of the MFG Area and encompasses 133 acres immediately east and south of the former explosives burning grounds (Site M2). The landfill is situated on a former gravel quarry that was operated as an uncontrolled dump during previous JOAAP operations. Three dump areas were used; a south area, a northeast area, and a northwest area. Construction materials and miscellaneous debris placed in the quarry included asbestos, insulation, rubble, 55-gallon drums, creosote-treated wood, paint cans, and scrap metal. Fill was identified to depths greater than 2 ft bgs. The M11 Landfill is approximately 10.5 acres and occupies the northwest dump area.

The site is owned by the U.S. Army.

Site M11 was classified as SRU6 – Landfill (refer to Figure 5-23). COCs included arsenic and lead. RCRA characteristic wastes are potentially present in the landfill as TCLP-extractable lead (RCRA waste code D008).

5.26.2 Remedial Action

5.26.2.1 Implementation

RA activities were conducted between July 16, 2006 and August 15, 2008. Soil and debris from the south (67,965 CY) and northeast (41,755 CY) areas were excavated and consolidated in the northwest area. Treated soil from the BTF and clean soil from off-site locations were used for backfill at the south and northeast area excavations.

A RCRA Subtitle C cap was placed on the consolidated fill, which included the following elements:

- Three gas vents
- General fill consisting of stripped soil cover from the excavations and treated soil from the BTF (22,641 CY)
- A 6-inch granular grading layer (19,440 CY)
- Geocomposite clay liner
- Linear low-density polyethylene geomembrane
- Geonet geocomposite drainage layer
- 30-inch thick rooting zone and 6-inch thick topsoil layer consisting of treated soil from the BTF and clean off-site fill
- 12 inch thick rip rap layer along the perimeter of the landfill cap
- Five-wire barbed fence around the landfill perimeter with warning signs placed every 150 ft
- Revegetation

Repairs were made in July and August 2008 and final seeding and mulching was completed in August 2008.

Two wetlands were disturbed during the RA and new wetlands were created south, southeast, and west of the landfill.

Closure of Site M11 is documented in the *Final M11 Remedy In Place Report Guaranteed Fixed Price Remediation Performance Based Contract for Environmental Restoration Services at Joliet Army Ammunition Plant* (MKM 2009a).

5.26.2.2 Operation, Maintenance and Monitoring

Maintenance and monitoring of the landfill is performed pursuant to IAC Title 5, Subtitle G, Chapter 1, subchapter c, Part 724, Subpart G and the *Final Long-Term Monitoring Plan* (Toltest 2010). The objectives of the maintenance and monitoring program are:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened
- Ensure that the cap is maintained in a manner that will not increase future infiltration or otherwise allow waste to be exposed
- Keep survey points protected and visible to facilitate future identification

The landfill maintenance and monitoring program started in October 2008 and will be conducted for 30 years. The following activities are performed:

- Landfill inspections to assess site conditions and land uses:
    - Quarterly for the first five years
    - Annually for the remaining 25 years
- Semi-annual groundwater monitoring

Groundwater monitoring results are discussed in Section 6.6.7.

Landfill inspections are documented in the following reports:

- *Final 2009 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011a)
- *Final 2009 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011b)
- *Final 2010 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011d)
- *Final 2010 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012a)
- *Final 2011 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012b)
- *Final 2011 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013a)
- *Final 2012 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013b)
- *Final 2012 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2014a)

These documents include landfill inspection reports for October 2008, February 2009, May 2009, July 2009, October 2009, January 2010, April 2010, July 2010, November 2010, January 2011, April 2011, July 2011, October 2011, January 2012, April 2012, July 2012, and October 2012. The following were noted:

- The October 2008 report identified subsidence in three locations near the top of the landfill, minor rutting caused by a vehicle, and an approximate 1 inch diameter metal cable protruding (approximately 14 inches) from the landfill cap. These observations were not provided in subsequent inspection reports, which imply that repairs were made.
- All reports indicate that the gate was chained shut and a lock was not used. This is identified as an action item in the reports.

5.26.2.3 Land Use/Institutional Controls

The site will be transferred to the USDA/FS for inclusion in the MNTP. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the USDA/FS of applicable land use restrictions. ICs prescribed in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. The following restrictions apply:

- The land cannot be used for residential development, educational (grades K-12) facilities, child or adult care facilities, landfilling (solid and hazardous waste), quarry operations, incineration of solid waste, and as a concrete or asphalt batch plant
- The integrity of groundwater monitoring wells shall be maintained
- Soil shall not be removed from the site unless it is tested first and determined that it can be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- Groundwater may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume, which includes the following prohibitions:
    - Activities that would increase the volume or area of contaminated groundwater
    - Damaging of confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
- Groundwater above the Maquoketa shale:
    - Shall not be used for potable water supply
    - Shall be safely managed, discharged, disposed, or treated in accordance with applicable laws and regulations

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.26.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in

Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes and photographs.

A five-strand barbed wire fence with postings surrounds the landfill, which is located within a secure (i.e. locked) area. The landfill vegetative cover consists of grass that does not exhibit signs of stress and woody vegetation. Irregular features such as bulges, unstable slopes, or eroded channels were not observed. Rip rap is present at the toe of slope around the entire landfill. Three passive gas vents are situated within the landfill. Monitoring wells are located outside the landfill; they were locked and appeared to be in good condition. Reconstructed wetlands are located east and west of the landfill. Land uses incompatible with the restrictions identified in Section 5.26.2.3 were not observed.

5.26.4 Progress Since Last Five-Year Review

The Second Five-Year Review Report identified the following issues and provided recommendations (Aerostar 2009b):

Issue: A small area of standing water with an oily/rusty sheen was present at the toe of the rip rap on the west-northwest side of the landfill.
Recommendation: Inspect the cap/liner on the west-northwest side of the landfill and collect surface water and soil samples for analysis of COCs present in the landfill.

Issue: The vegetative cover on the cap was excessive, which made inspection of the cap integrity difficult.
Recommendation: Mow the cap as needed.

Issue: Minor surface erosion of the cap was observed.
Recommendation: Backfill and seed as necessary to eliminate minor surface erosion.

Issue: A lock was not present on the landfill gate.
Recommendation: Place a lock on the gate.

A response to the first issue was addressed in *Responses to United States Environmental Protection Agency Comments Draft Final 2010 Semi-Annual Groundwater Monitoring Report Former Joliet Army Ammunition Plant Wilmington, Illinois* (Toltest 2011c). The document indicates that the standing water/sheen area was subsequently inspected during routine sampling events and the sheen was not observed. The response indicated that the area was located in a low-lying wetland with reducing environment that typically produces the type of sheen observed. It was attributed to naturally occurring processes.

The third five-year review inspection did not identify evidence of standing water with an oily/rusty sheen, excessive vegetation on the landfill cap, and minor erosion. A lock was not present on the landfill gate; however the site is enclosed within a larger perimeter fence that is locked.

5.26.5 Technical Assessment

5.26.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site M11 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in the 1998 ROD. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.26.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Site M11 is one of the SRU6 sites that will become part of the MNTP. The RA objectives and risk-based RGs for SRU6 sites were finalized in the 1998 ROD. However, some of the COCs that were identified for SRU6 soils were revised for other SRUs as part of the 2004 ROD (as discussed in Attachment 8). Since the 2004 ROD risk-based RGs were based generally on protection of the environment and were more stringent than the RGs developed for protection of human health, meeting the 1998 ROD RGs may not be protective of the environment at the site.

The Remedy in Place Report for this site was reviewed (MKM 2009a). After excavation of the southern and northeastern debris areas, both the bioremediated soil and off-site soil selected for backfill were evaluated to determine whether or not they were suitable for use as backfill in the excavated areas. Although the COC concentrations in those soil source samples were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels below the ecological RGs (primarily individual PAHs at up to 0.015 mg/kg each but also low levels of DNT and TNT in the bioremediated soils, up to 4.6 mg/kg) and all of the metals concentrations were below ecological RGs from the 2004 ROD (Tables 3-6 and 3-7 of MKM 2009a). Finally, there were several soil samples obtained in the limits of the excavation (sidewalls, bottoms). Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels well below the RGs (average DNTs detected less than 2.2 mg/kg, TNT up to 2.4 mg/kg, individual PAHs up to 0.48 mg/kg, and PCBs – Aroclors up to 0.33 mg/kg). All of the metals were detected below ecological RGs from the 2004 ROD (Table 3-8, MKM 2009a). Therefore, the excavation and backfilling of the southern and northeastern debris areas at M11 is protective of both human health and the environment.

5.26.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

5.26.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

5.26.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually

5.26.8 Protectiveness Statement

The SOU remedy at Site M11 is currently protective of human health and the environment. This assessment is based on the following information and observations:

- Landfilled materials and contaminated soils have been consolidated on site and enclosed with a RCRA Subtitle C cap
- Land use is consistent with the IC objectives identified in the 1998 ROD
- The toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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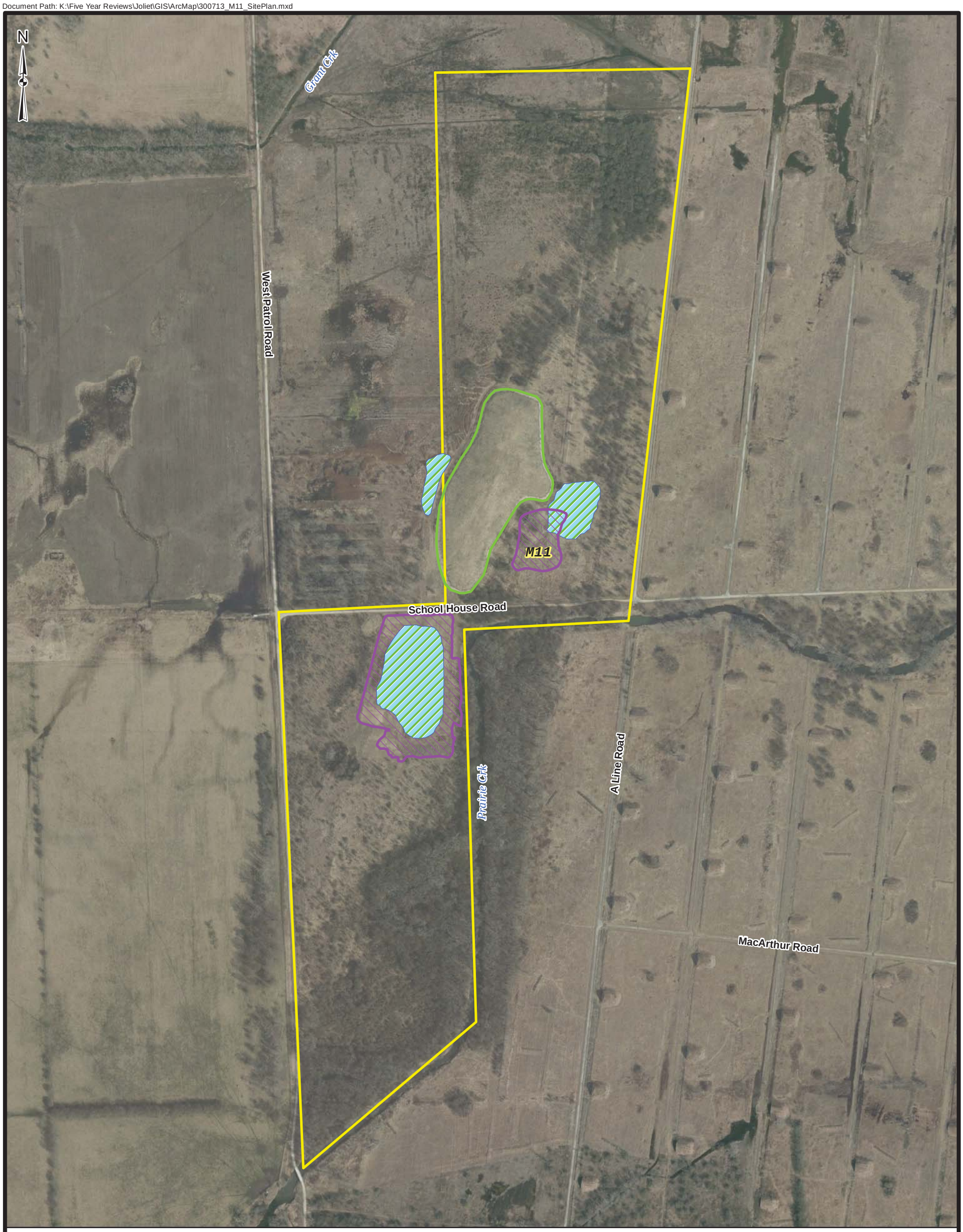

Legend

- Approximate Site Boundary
- SRU 6 - M11 Northwest Landfill, Capped In-Place
- SRU 6 - Former M11 South and M11 Northeast Landfills, Excavated and Consolidated in M11 Northwest Landfill
- Constructed or Restored Wetland

Reference:
MKM Engineers, Inc. 2009. "Final M11 Remedy In-Place Report". September.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M11 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-23

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5.27 SITE M12 – SELLITE MANUFACTURING AREA

5.27.1 Background Information

Site M12 (Sellite Manufacturing Area) is located in the northwestern portion of the MFG area. Sellite was manufactured for use in the purification of crude 2,4,6-TNT. Sellite consists of a solution of sodium sulfite and sodium sulfate. The site included two production units, a wastewater lagoon and drainage ditches.

The site is owned by the USDA/FS and is part of the MNTP. It is located within the GMZ for GRU2.

Site M12 contained the following SRUs (refer to Figure 5-24):

- SRU2 – metals in soil
- SRU7 – sulfur in soil

Lead in lagoon sediment and in drainage ditch soils was the COC for SRU2 soil. SRU 7 consisted of raw sulfur in surface soils. Sulfur is not a CERCLA-regulated substance and the cleanup was conducted outside of the U.S. Army's CERCLA-based program. The remediation of sulfur at the site was required by the 1998 ROD.

5.27.2 Remedial Actions

5.27.2.1 Implementation

RA activities were conducted between November 14, 2006 and September 26, 2007. Approximately 8,469 CY of unscreened SRU2 and SRU7 soils were excavated and disposed at the Prairie View RDF. SRU7 soil (raw sulfur) was handpicked and scraped with excavating equipment and mixed with the SRU2 soil prior to disposal. Contaminated soils were excavated from the wastewater lagoon, drainage ditch, and outfall (refer to Figure 5-24).

Table 5-26 Volume of Contaminated Soils Removed from Site M12

Media	Volume (CY)	Notes
SRU 2 Soil	8,457	Disposed at the Prairie View RDF
SRU7 Soil	12[a]	Disposed at the Prairie View RDF

Note:

a – SRU2 and SRU7 soils were combined prior to disposal (total volume was 8,469 CY)

Backfill was obtained from spoil piles along the excavation edges. The backfill was placed, compacted, and regarded to drain consistent with the surrounding terrain. The remediated areas were allowed to naturally revegetate.

According to the *Final Second Five-Year Review Report [for] Soils Operable* Unit (Aerostar 2009b), USEPA and IEPA verified that all RA activities were conducted in accordance with the

Phase 2 – Remedial Design/Remedial Action Work Plan (MWH 2005). The RAOs established in the 2004 ROD were satisfied and closure of Site M12 is documented in the *Final Closure Report – Sites L2, L5, L23A, M3, M4, and M12* (MWH 2009).

5.27.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities related to the SOU RA take place at the site.

5.27.2.3 Land Use/Institutional Controls

The following LUC/ICs and restrictions apply:

- **Soil Exposure** – Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels identified in the 2004 ROD; prevent the migration of contaminants in accordance with the 1999 ROD
- **Land Use** – The land shall be used as a tall grass prairie and may not be used for residential housing, elementary and secondary schools, childcare facilities, playgrounds, industrial operations, and camping. The U.S. Army will notify the USDA/FS, USEPA, and IEPA of any apparent violations of land or groundwater use restrictions and the USDA/FS will take actions to correct incompatible uses.
- **Groundwater Use** – The use or disturbance of groundwater in a way that could cause the migration of contaminated plumes is prohibited. Groundwater above the Maquoketa shale shall not be used for potable water supply.
- **GMZ Restrictions** – Activities that may result in the migration of groundwater contamination are restricted.
- **Notifications of Violations** – The USDA/FS shall notify the U.S. Army and regulators of any land use restriction violations within 30 days and address the obligation to comply with CERCLA Section 120 on future land transfers
- **Access to Property** – The U.S. Army shall retain an easement, running with the land, that grants a right of access for the U.S. Army, the USEPA, and the IEPA for the purpose of conducting any activity related to the ROD and FFA, including, but not limited to the following activities:
    - Monitoring the work
    - Verifying any data or information submitted to the United States or the State of Illinois
    - Conducting investigations relating to contamination at or near the site
    - Obtaining samples
    - Assessing the need for, planning, or implementing additional response actions at or near the site
    - Implementing the work pursuant to the conditions set forth in the FFA and ROD
    - Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by the U.S. Army or their agents, consistent with the FFA's section on access
    - Assessing the US Army's compliance with the FFA and the RODs

  - Determining whether the site or other property subject to the RODs is being used in a manner that is prohibited or restricted or that may need to be prohibited or restricted by, or pursuant to, the FFA and the RODs
- **Annual Reporting** – The USDA/FS will submit an Annual Certification letter certifying that the land and groundwater uses remain the same and that the integrity of the land and groundwater restrictions has not been compromised

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.27.3 Site Inspection

A drive-by site inspection was performed on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

Changed conditions since the second five-year review report were not observed. The remediated wastewater lagoon and drainage ditch contain standing water and wetland vegetation. Vacant structures associated with previous manufacturing operations are present in the northern portion of the site. Surrounding areas consist of open grassland. Land uses incompatible with the restrictions identified in Section 5.27.2.3 were not observed.

5.27.4 Progress Since Last Five-Year Review

Site M12 achieved closure status for the SOU and a final closure report was issued (MWH 2009).

5.27.5 Technical Assessment

5.27.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedies selected for SRU2 and SRU7 soils on Site M12 were implemented and the RA is complete. Closure report documentation and site observations indicate that the remedies were properly implemented and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the LUC/ICs and restrictions incorporated in the Prairie Plan. Costs or issues associated with monitoring and performance are not anticipated. Opportunities for optimization were not identified.

5.27.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. All RGs listed in the 1998 and 2004 RODs for the SOU remedy for this

site were risk-based. A review of the risk assessment methods and toxicity criteria used to develop RGs established in the 2004 ROD was performed (Attachment 8). These RGs were developed to protect ecological receptors and are generally more stringent than the RGs needed to protect prairie workers or visitors. They were established following a comprehensive literature search of ecotoxicological resources, as well as site-specific ecotoxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the Ecological Work Group (Ecological Work Group 2000) is still in place and no major updates in the ecological risk assessment process have been published since that time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for development of ecological soil screening levels is presented in Attachment 8. That review did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological RGs for the portion of the JOAAP lands identified to become part of the MNTP.

5.27.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come into light that would call into question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD and 2004 ROD.

5.27.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- The review of RA closure sampling data performed during this five-year review indicates that residual COC concentrations in soil at the remediated areas may be suitable for UU/UE classification of the site; a risk assessment was not done after the RA was completed
- GIS records have not been maintained for ICs monitoring

Issues also identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- The USDA/FS noted that there is no IC that prohibits camping on its property and the ICs originated from the Environmental Condition of Property statements and record of decision documents, not as deed restrictions
- Annual IC reporting by the USDA/FS has not been received since 2009. The USDA/FS has committed to adding an appendix to the Annual Prairie Management Plan to specifically address the issues associated with the transferred land that has restrictions.

5.27.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Revise wording on the Questionnaire and Statement of Compliance form to indicate that there is no IC that prohibits camping on USDA/FS property and the ICs originated from Environmental Condition of Property statements and record of decision documents, not as deed restrictions
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.27.8 Protectiveness Statement

The SOU remedy at Site M12 is protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs and sulfur have been excavated and disposed off site
- Land use is consistent with the IC objectives identified in Section 5.1.3.8
- The toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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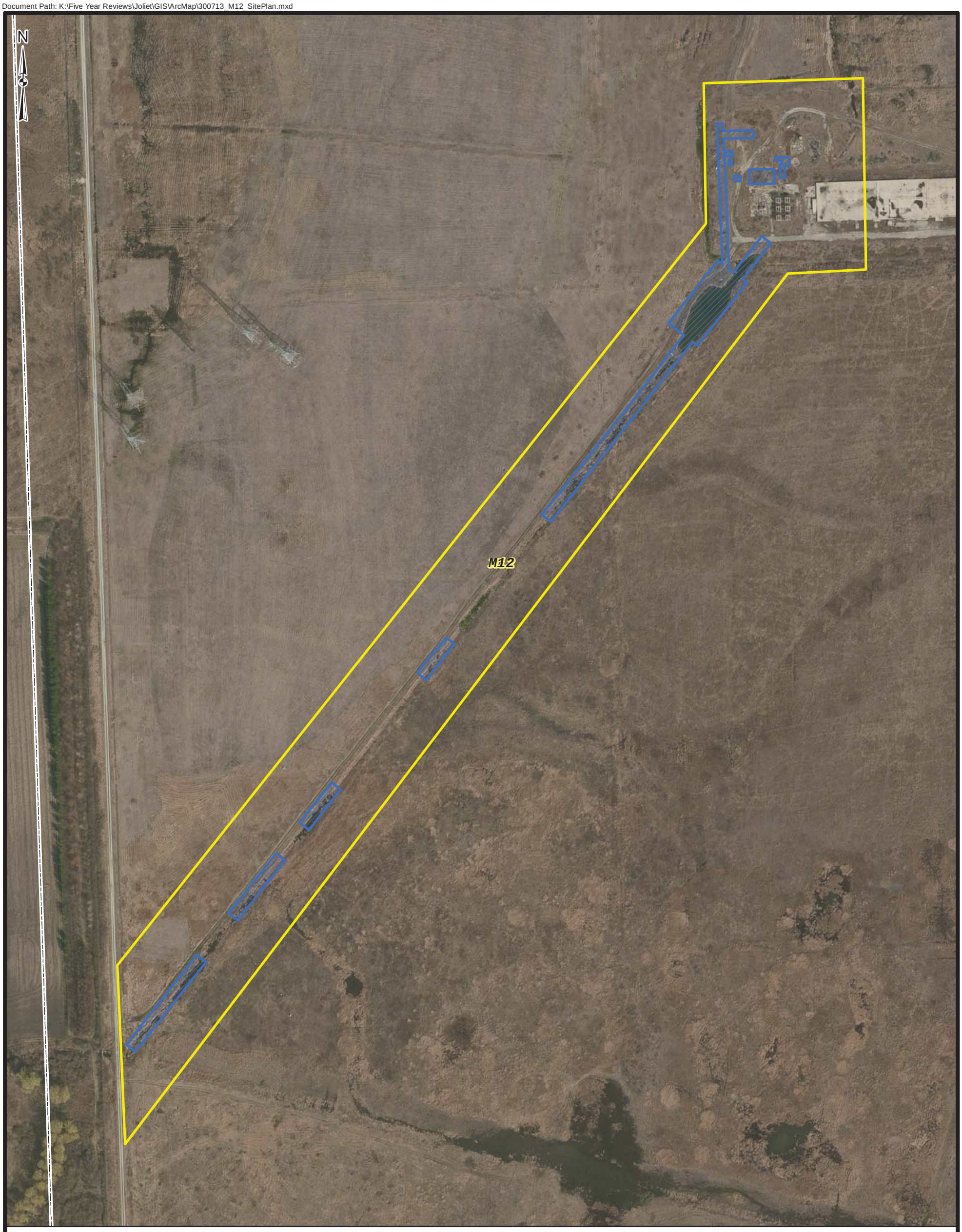

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Approximate Site Boundary

SRU 2 - Metals Remediation Area

Note: Approximately 12 cubic yards of SRU 7 Soils (Sulfur) were remediated from a northern concrete pad and adjacent ditch.

Reference:
MWH 2009. "Final Closure Report Sites L2, L5, L23A, M3, M4 and M12 Joliet Army Ammunitions Plant." October.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M12 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-24

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5.28 SITE M13 – GRAVEL PITS

5.28.1 Background Information

Site M13 is located in the northern portion of the MFG Area and is bounded by an above ground utility line to the north, an access road to the south, Snake Road to the west, and the CenterPoint Intermodal Center to the east. The site contained a gravel pit that was subsequently used for disposal during JOAAP operations. Four disposal areas were identified during the RI. The Northern Gravel Pit disposal area occupied approximately 10.2 acres and contained scrap metal, creosote-treated railroad ties and telephone poles, office waste, and construction debris. The three other disposal areas did not contain waste that posed a threat to human health or the environment.

The capped landfill at M13 is owned by the U.S. Army; the remainder of the site is owned by BNSF and CPI, LLC. The entire site is located within a GMZ for GRU2.

Site M13 was classified as SRU6 – Landfill. Site-related contaminants include beryllium, lead, and benzo(a)pyrene.

5.28.2 Remedial Action

5.28.2.1 Implementation

RA activities were conducted between October 2006 and July 2008. A RCRA Subtitle D cap was installed on the Northern Gravel Pit disposal area, which included the following elements:

- Six gas vents
- 12-inch soil grading layer (8,703 CY)
- Linear low-density polyethylene geomembrane (40-mil)
- Geonet geocomposite drainage layer
- 36-inch thick rooting zone and topsoil layer consisting of treated soil from the BTF and clean off-site fill
- 12-inch thick rip rap along the perimeter of the landfill cap
- Five-wire barbed fence around the landfill perimeter with warning signs placed every 150 ft
- Revegetation

A drainage swale on the west side of the landfill was re-contoured and a culvert pipe was added to improve surface water flow.

Closure of Site M13 is documented in the *Final M13 Remedy In Place Report Guaranteed Fixed Price Remediation Performance Based Contract for Environmental Restoration Services at Joliet Army Ammunition Plant* (MKM 2009b).

5.28.2.2 Operation, Maintenance and Monitoring

Maintenance and monitoring of the landfill is performed pursuant to IAC Title 5, Subtitle G, Chapter 1, subchapter c, Part 724, Subpart G and the *Final Long-Term Monitoring Plan* (Toltest 2010). The objectives of the maintenance and monitoring program are:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened
- Ensure that the cap is maintained in a manner that will not increase future infiltration or otherwise allow waste to be exposed
- Keep survey points protected and visible to facilitate future identification

The landfill maintenance and monitoring program started in October 2008 and will be conducted for 15 years. The following activities are performed:

- Quarterly landfill inspections to assess site conditions and land uses
- Quarterly groundwater monitoring

Landfill inspections are documented in the following reports:

- *Final 2009 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011a)
- *Final 2009 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011b)
- *Final 2010 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011d)
- *Final 2010 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012a)
- *Final 2011 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012b)
- *Final 2011 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013a)
- *Final 2012 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013b)
- *Final 2012 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2014a)

The documents provide landfill inspection reports for October 2008, February 2009, May 2009, July 2009, October 2009, January 2010, April 2010, July 2010, November 2010, January 2011, April 2011, July 2011, October 2011, January 2012, April 2012, July 2012, and October 2012. The following were noted:

- The October 2008 report identified minor damage attributed to animal burrowing at the southern side of the landfill and subsidence near the top of the landfill. Subsequent inspection reports to not identify these observations, which implies that repairs were made.
- All reports indicate that the landfill gate was chained shut and a lock was not used.

5.28.2.3 Land Use/Institutional Controls

U.S. Army Property

Site M13 will be used for industrial purposes. Any formal ICs will be documented in the U.S. Army conveyance documents to inform the future landowner of applicable land use restrictions. ICs prescribed in the 1998 ROD and administrative LUCs identified in the *Final M13 Remedy In Place Report Guaranteed Fixed Price Remediation Performance Based Contract for Environmental Restoration Services at Joliet Army Ammunition Plant* (MKM 2009b) will be continued until the concentrations of hazardous substances in the soil and groundwater reach levels that allow for UU/UE and regulatory agreement is reached. IC objectives include:

- Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels
- Prevent the development and use of the property for the following purposes or activities: residential, educational, child or adult care, landfill, quarry operations, incineration, and concrete batch or asphalt plant (an exception is included for the existing landfill)
- Maintain the integrity of the landfill cap
- Prevent exposure to/use of contaminated groundwater

Based on these objectives, the following restrictions apply:

- The land cannot be used for residential purposes
- Future development or construction is prohibited within the LUC boundary, which includes the construction of buildings, roads, or paving
- No intrusive work may be conducted within the LUC boundary, including but not limited to excavation, drilling, and regrading or modification of the landfill cap
- The surface water flow from the landfill may not be altered or prevented from draining as the result of any future construction activities in the vicinity of the site
- Vehicle or equipment traffic of any kind is prohibited on the landfill cap except for vehicles and equipment necessary for maintenance and repair of the cap
- Groundwater may not be used or disturbed in a way that would cause the migration of the contaminated groundwater plume
- The integrity of groundwater monitoring wells shall be maintained
- Groundwater above the Maquoketa shale shall not be used for potable water supply

BNSF/CPI, LLC Property

- **Land Use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations
- **CERCLA Remediation** - Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations

- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – The use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, pumping or the use of groundwater supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.28.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. Photographs are included in Attachment 5. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement the site inspection notes and photographs.

A five-strand barbed wire fence with postings surrounds the landfill. A lock is present on the fence gate. The landfill vegetative cover consists of grass that did not exhibit signs of stress and woody vegetation. Irregular features such as bulges, unstable slopes, or eroded channels were not observed. Rip rap is present at the toe of slope around the entire landfill. Passive gas vents are situated within the landfill. Monitoring wells are located outside the landfill; they were locked and appeared to be in good condition. Land uses incompatible with the restrictions identified in Section 5.28.2.3 were not observed.

5.28.4 Progress Since Last Five-Year Review

The Second Five-Year Review report identified the following issues and provided recommendations (Aerostar 2009b):

Issue: Minor animal burrowing (approximately 3 inches diameter) was observed on the southeastern section of the cap.

Recommendation: Repair animal burrow holes in the cap.

Issue: The vegetative cover on the cap was excessive, which made inspection of the cap integrity difficult.
Recommendation: Mow vegetation on the cap as necessary.

Issue: Minor surface erosion of the cap and a small surveyor hole were observed.
Recommendation: Backfill and seed as necessary to eliminate minor surface erosion.

Issue: A lock was not present on the landfill gate.
Recommendation: Place a lock on the gate.

The following responses were provided in *Responses to United States Environmental Protection Agency Comments Draft Final 2010 Semi-Annual Groundwater Monitoring Report Former Joliet Army Ammunition Plant Wilmington, Illinois* (Toltest 2011c):

- The animal disturbances were described as superficial and do not endanger the integrity of the cap; animal activity has been routinely noted during the quarterly inspections
- Vegetation on the landfill is regulated to ensure the integrity is intact
- A lock will be installed on the gate

The third five year review inspection did not identify evidence of animal burrowing, excessive cap vegetation, surface erosion, and a surveyor hole. A lock was present on the gate.

5.28.5 Technical Assessment

5.28.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. The SOU remedy for Site M13 was implemented and the RA is complete. Closure report documentation and site observations indicate that the remedy was properly executed and satisfied the RAOs. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in 1998 ROD. Opportunities for optimization were not identified.

5.28.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. Only a few sites had COCs for which the 1998 RG would now represent an unacceptable risk. This includes lead at Site M13. The Remedy in Place Report for M13 (MKM 2009b) was reviewed for residual lead concentrations. The maximum residual lead

concentration at the site was 18 mg/kg (Table A8-9 of Attachment 8), which is comparable to background. Therefore, the cleanup is fully protective of human health.

5.28.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

5.28.6 Issues

This five-year review has identified the following issues that do not affect protectiveness of the remedy:

- GIS records have not been maintained for ICs monitoring
- The U.S. Army's compliance with ICs has not been assessed annually

Issues also identified in the Site Wide deed Restriction Implementation report (Attachment 12) are summarized below.

- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.28.7 Recommendations for Follow-up Actions

Recommendations for follow-up actions to address issues that do not affect protectiveness of the remedy are summarized below.

- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Assess the U.S. Army's compliance with ICs annually
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.28.8 Protectiveness Statement

The SOU remedy at Site M13 is protective of human health and the environment. This assessment is based on the following information and observations:

- Landfilled materials have been enclosed with a RCRA Subtitle D cap
- Land use is consistent with the IC objectives identified in the 1998 ROD
- The RA objectives used at the time of the remedy are still valid
- No other information has come into light that could call into question the protectiveness of the remedy

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Approximate Site Boundary

SRU 6 - M13 Landfill, Capped In-Place

Reference:
MKM Engineers, Inc. 2009. "Final M11 Remedy In-Place Report". September.

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US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

SITE M13 REMEDIAL ACTION

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JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

FIGURE 5-25

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5.29 SITE M16 – MOTOR POOL AREA

5.29.1 Background Information

Site M16 is located along Hoff Road in the northern section of Site M8 and occupied approximately 8 acres. During the most active period of MFG Area operations, a fleet of approximately 400 vehicles was serviced regularly at the Motor Pool Area. Wastewater was generated from vehicle and floor washing and steam cleaning of engines.

During typical operations, precautions were generally taken to keep oil and grease that were removed from serviced vehicles out of the wastewater drainage system. The floor drains were equipped with traps that collected oil, grease, and settled solids. These traps were periodically removed and emptied into 55-gallon drums kept on site. In addition, spent oil and grease from vehicle maintenance were also containerized on site. These wastes were eventually moved to a 10,000-gallon UST located in the Salvage Yard (Site L5).

A site reconnaissance conducted in 1991 did not identify oil staining on the ground surface. There was no evidence of a storm water discharge point from the Motor Pool to the adjacent Acid Ditch. JOAAP personnel indicated that the sewer lines at the Motor Pool may have previously discharged into the old process sewer lines from the Acid Area, which discharged into the Tetryl Ditch rather than into the Acid Ditch. No drawings could be found to determine if the old process sewer lines ever received discharge from the Motor Pool; however, in past years, oil slicks have been reported in both the Tetryl Ditch and Grant Creek.

The baseline risk assessment for M16 indicated that no risk was calculated because samples were not obtained (i.e. no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). There is no evidence to indicate the presence of soil COCs at the site.

Site M16 is currently owned by BNSF and is within the GMZ for GRU2.

5.29.2 Remedial Actions

5.29.2.1 Implementation

No SOU RA activities were performed at the site.

5.29.2.2 Operation, Maintenance and Monitoring

No operation, maintenance and monitoring activities take place at the site.

5.29.2.3 Land Use/Institutional Controls

The following land use restrictions apply to Site M16:

- **Land use** - The property may not be used for residential, educational (grades K-12), child or adult care, landfilling (solid or hazardous waste), quarry operations, incineration of solid waste, and concrete/asphalt batch plant operations

- **CERCLA Remediation -** Any construction and development activities shall be performed in a manner that is consistent with the RODs; groundwater monitoring wells shall not be tampered with, damaged, destroyed, or interfered with in a manner that interferes with the ongoing remedial operations (note: there are no monitoring wells on the site)
- **Monitoring Well Restrictions** – Monitoring wells shall not be used, moved, accessed, modified, removed, disturbed, closed, abandoned, or otherwise harmed or destroyed without permission from the U.S. Army, USEPA, and IEPA (note; there are no monitoring wells on the site)
- **Soil Removal** – Soil shall not be removed from the property to an off-site location unless it is tested first and determined that it may be relocated in compliance with all local, state, and federal laws and regulations without posing a threat to human health or the environment
- **GMZ Restrictions** – The following are prohibited in a GMZ:
    - Activities that would increase the volume or area of the contaminated water (e.g. deep excavation, drilling or pumping a well within the Silurian dolomite aquifer)
    - Damaging the confining layers that underlie the contaminated groundwater
    - Creating pathways of exposure to human or ecological receptors from the contaminated groundwater
    - Use of shallow groundwater above the Maquoketa confining bed for potable purposes; encountered shallow groundwater shall be properly managed, discharged, disposed, or treated in accordance with applicable laws and regulations
- **Additional Groundwater Restrictions** – The use of groundwater above the Maquoketa confining bed for potable purposes, drilling, constructing, pumping or the use of groundwater supply wells is prohibited

An assessment was performed to verify whether ICs that were put in place through deed restrictions are being implemented by entities that now own the property. Attachment 12 contains the *Annual Summary Report Site Wide Deed Restriction Implementation* (URS 2013) that presents results of the assessment.

5.29.3 Site Inspection

The site was inspected on April 16, 2013 to assess the current conditions and access controls. A five-year review inspection checklist is provided in Attachment 4. 2012 and 2013 aerial photography available from http://www.bing.com was evaluated to supplement site inspection notes.

The site is developed and used as an intermodal rail system. Principal structures include a rail spur, roadways for truck traffic and warehouses. Land uses incompatible with the restrictions identified in Section 5.29.2.3 were not observed. A perimeter fence and security system is used to restrict access.

5.29.4 Progress Since Last Five-Year Review

SOU RA activities have not occurred at the site since the previous five-year review.

5.29.5 Technical Assessment

5.29.5.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. Site M16 was classified as a NFA site in the 1998 ROD and RA activities were not performed. COCs remain at the site at levels that do not permit UU/UE. The site inspection and Site-Wide Deed Restriction Implementation Report (Attachment 12) indicate that land use is consistent with the IC objectives identified in 1998 ROD.

5.29.5.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

All RGs listed in the 1998 ROD for the SOU remedy for this site were risk-based. The first review of toxicity and risk assessment methodology changes since the 1998 ROD is presented in Attachment 8. Since 1998, there have been multiple human health toxicity criteria changes for several COCs. In addition, there have been updates to several human health risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program. Only a few sites had COCs for which the 1998 RGs would now represent an unacceptable risk. This includes potential COCs at Site M16. The Baseline Risk Assessment for Site M16 indicates that no risk was calculated because soil samples were not obtained (no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of M8 instead (Dames and Moore 1993a, 1994b). The 1998 ROD should not have identified soil COCs for this site, as it did in Table 6-3. There is no new evidence to indicate the presence of soil COCs at the site.

5.29.5.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

5.29.6 Issues

The following issue was identified in the five-year review:

- There is no evidence to indicate the presence of soil COCs at the site.

Issues identified in the Site Wide Deed Restriction Implementation report (Attachment 12) are summarized below.

- The wording on a Statement of Compliance questionnaire used to assess whether ICs are being implemented caused confusion for some respondents
- Property owners are not submitting annual reports to the U.S. Army verifying their compliance with ICs

5.29.7 Recommendations for Follow-up Actions

The following recommendation is provided pursuant to this five-year review:

- Discontinue future five-year reviews at Site M16
- Revise wording on the Questionnaire and Statement of Compliance form to avoid confusion
- Make annual requests for Statement of Compliance questionnaires from the property owner

5.29.8 Protectiveness Statement

The remedy at Site M16 is protective of human health and the environment. This assessment is based on the following information and observations:

- There is no evidence to suggest the presence of COCs at the site
- Land use is consistent with the IC objectives identified in Section 5.1.3.8
- No other information has come into light that could call into question the protectiveness of the remedy

6.0 GROUNDWATER OPERABLE UNIT SITES

The GOU includes sites where impacted groundwater has been identified. Three GRUs were developed according to contaminant type and geographic location. Groundwater monitoring wells and surface water collection points located inside and/or near the borders of GMZs monitor the extent of contaminant plumes. The GRU designations provided in the 1998 ROD are identified below.

- **GRU1** refers to explosives in groundwater at LAP Area sites L1, L2, L3 and L14. The primary COCs are explosives including 1,3,5-TNB, TNT, 2,4-DNT, 2,6-DNT, 2-NT, 3-NT, and 4-NT, and RDX.
- **GRU2** refers to explosives and other contaminants in groundwater at MFG Area sites M1, M5, M6, M7, M8, and M13. The primary COCs are sulfate, explosives (including 1,3,5-TNB, TNT, 2,4-DNT, 2,6-DNT, NB, 1,3-DNB, RDX, and HMX, VOCs (including PCE), and metals (including iron, antimony, and cadmium).
- **GRU3** refers to VOCs in groundwater at MFG Area sites M3 and M10. The primary COCs are VOCs including benzene (Site M3) and toluene (Site M10).

Groundwater is monitored at three SOU sites for SRU6 (Landfills); L3, M11, and M13. Site L3 is included in GRU1 and Site M13 is included in GRU2 (both of which have GMZs). Site M11 is not within a GRU and does not have a GMZ. Groundwater monitoring results for all GRUs are presented in this section together with monitoring results for the landfill at Site M11.

Groundwater is present in glacial till alluvium (overburden) and underlying bedrock at JOAAP. The GMZs established in the 1998 ROD are three-dimensional areas containing groundwater that is managed to mitigate impairment according to the IAC. The horizontal boundaries of each GMZ completely contain the contaminant plumes at each site and include a buffer to allow for potential plume migration. The GMZs comprise the overburden and shallow bedrock (Silurian Dolomite) aquifers and are bounded at depth by a confining unit (Maquoketa Shale). In February 2003, USACE submitted the *Explanation of Significance Difference Site M1 – Southern Ash Pile (ESD)* (USACE 2003), which requested a modification to expand the northern boundary of the GMZ for Site M1 to encompass sulfate concentrations in excess of the RG that had migrated beyond the original boundary established in the ROD. The ESD was approved in February 2003.

6.1 REMEDIAL ACTION OBJECTIVES AND REMEDIATION GOALS

6.1.1 Remedial Action Objectives

The cleanup objective established in the 1998 ROD was intended to mitigate and minimize threats to and provide adequate protection of human health and the environment.

The following RAOs were established in the ROD:

- Cleanup contaminants to site-specific and chemical-specific RGs
- Prevent human health and environmental exposure to contamination at concentrations above the RGs

- Eliminate soil contamination as a continuing source of groundwater contamination
- Prevent [the] migration of contaminants
- [Remedial] actions would not leave behind any characteristically hazardous RCRA wastes

6.1.2 Remediation Goals

RGs presented in the 1998 ROD were established to prevent human exposure by dermal contact or incidental ingestion of COCs in groundwater. The RGs consisted of:

- IEPA Class I (potable use) and Class II (industrial use) groundwater standards for all COCs except explosive compounds.
- Risk-based concentrations (RBCs) for explosive compounds based on a USEPA commercial/industrial exposure scenario. The RBC calculations assumed that groundwater would only be used by an industrial worker and the RBCs were established at the 1x 10^{-6} level for carcinogens and a hazard index of 1 for non-carcinogens.

RGs for COCs in groundwater are listed in Table 6-1.

Table 6-1 Groundwater Remediation Goals (µg/L)

Contaminant	Class I Groundwater [1]	Class II Groundwater [2]	RBC [3]
Explosives			
1,3,5-TNB	NA	NA	5.1
1,3-DNB	NA	NA	10
2,4,6-TNP	NA	NA	200
2,4,6-TNT	NA	NA	9.5
2,4-DNT	NA	NA	0.42
2,6-DNT	NA	NA	0.42
2-Nitrotoluene	NA	NA	5,100
DNAP	NA	NA	200
HMX	NA	NA	5,100
Nitrobenzene	NA	NA	51
RDX	NA	NA	2.6
Tetryl [3]	NA	NA	200
Metals			
Aluminum	NA	NA	100,000
Antimony	6	24	NA
Arsenic	50	200	NA
Cadmium	5	50	NA
Chromium (+3)	100	1,000	NA
Chromium (+6)	100	1,000	NC
Iron	5,000	5,000	NA
Lead	7.5	100	NA
Manganese	150	10,000	NA
Silver	50	511	NA

Table 6-1 Groundwater Remediation Goals (µg/L)

Contaminant	Class I Groundwater [1]	Class II Groundwater [2]	RBC [3]
Zinc	5,000	10,000	NA
Volatile Organic Compounds			
1,1,1-Trichloroethane	200	1,000	NA
1,1,2-Trichloroethane	5	50	NA
1,1-Dichloroethane	700	3,500	NA
1,2-Dichloroethane	5	25	NA
1,2-Dichloroethene	70	200	NA
Benzene	5	25	NA
Chlorobenzene	100	500	NA
Ethylbenzene	700	1,000	NA
Tetrachloroethene	5	25	NA
Toluene	1,000	2,500	NA
Trichloroethene	5	25	NA
Xylenes	10,000	10,000	NA
Semivolatile Organic Compounds			
Benzyl Alcohol	NA	NA	31,000
Butyl benzyl phthalate	NA	NA	20,000
Anions			
Nitrate/Nitrite	10,000	100,000	NA
Sulfate	400,000	400,000	NA

Notes:

1 Illinois Groundwater Quality Standards for Class I Groundwater (35 IAC 620.410), 1998
2 Illinois Groundwater Quality Standards for Class II Groundwater (35 IAC 620.420), 1998
3 RBC for Groundwater based on USEPA commercial/industrial exposure scenario as presented in the PRG Report (OHM 1996)
NA Not applicable
NC Chemical is not a contaminant of concern in given media
µg/L micrograms per liter

6.1.3 Remedy Selection

A limited action alternative (MNA) was chosen for GRU1, GRU2, and GRU3 in the 1998 ROD. Under this alternative, steps are taken to prevent or limit the likelihood of human consumption or exposure to impacted groundwater and natural attenuation is relied upon to lower the concentrations of COCs in groundwater. Natural attenuation relies upon natural processes such as biological degradation, sorption, dispersion, and dilution to reduce the concentrations of COCs in the plumes.

The MNA remedy was predicated on completing the SOU RAs, which would eliminate the potential for contaminated soils to be a continuing source of groundwater contamination in the GRUs. Source removal and control were factors considered in the selection of the GOU remedy. Monitoring is a component of the remedy and long-term monitoring (LTM) plans were

developed for each site within the GRUs.

The MNA remedy included the following activities:

- Establishing GMZs
- Developing, implementing, and enforcing deed and zoning restrictions (ICs)
- Periodic site inspections
- Monitoring of groundwater and surface water quality
- Evaluating the progress of natural attenuation processes

The combination of source removal (COC-impacted soils) and MNA is expected to meet the RAOs. The MNA remedy relies on the physical/chemical attenuation properties of a contaminant within each aquifer that will affect its transport and decay.

6.1.4 Remedy Implementation

The GOU remedial design was conducted between July 1998 and April 1999. The *Final Groundwater Operable Unit Remedial Design/Remedial Action Work Plan* (MWH 1999a) was approved and signed on April 8, 1999. Additional work plans for individual sites were prepared between 1999 and 2007.

The *Final Long-Term Monitoring Plan Environmental Remediation Services Joliet Army Ammunition Plant* (Toltest 2010) has been the governing document for groundwater monitoring activities at JOAAP during this five-year review period. The LTM Plan describes the process by which data is collected and analyzed to determine if the RAOs are being met and describes the nature of monitoring results that, if observed, would indicate action should be taken because the remedy does not appear to be sufficiently protective. The LTM Plan establishes monitoring frequencies, identifies monitoring wells to be sampled, and prescribes analytical parameters. A framework for LTM of the GOU was presented in the 1998 ROD.

The following are included in the LTM Plan:

- Data collection and analysis methods to determine if the GOU remedies are protective of human health and the environment
- The nature of monitoring results that, if observed, would indicate further action is required because the remedy does not appear to be sufficiently protective
- A decision logic to ramp down and eventually terminate groundwater monitoring activities

Samples are collected from monitoring wells and surface water locations that have been classified into one of the following categories:

- In-plume (or source control) monitoring
- Early warning (or pathway) monitoring
- Compliance (or sentinel) monitoring
- Upgradient (for landfills)
- Downgradient (for landfills)

In-plume locations are monitored to ensure that former source areas do not release contaminants in a manner that will cause groundwater concentrations to exceed the RGs at the point of compliance, which is the downgradient GMZ boundary. Because the SOU RAs have been completed, the in-plume locations are expected to exhibit declining COC concentrations with

time.

At the landfills (L3, M11, and M13), monitoring wells are identified as being upgradient or downgradient in accordance with the LTM Plan. Detected concentrations in downgradient monitoring wells are compared to concentrations in the upgradient monitoring wells. As time progresses, the concentrations of the downgradient monitoring wells are expected to approach the concentrations detected in the upgradient monitoring wells. At Site L3, there are dual designations for some of the monitoring points associated with Site L3 and Landfill L3. Landfill L3 is adjacent to Prairie Creek, which is a groundwater discharge point. Therefore there are no downgradient monitoring wells at this location. Surface water samples are collected at the downstream extent of the GMZ, which serves as the point of compliance.

6.2 DATA REVIEW

LTM activities and results are evaluated and summarized in semi-annual and annual reports. The annual reports document data from the previous year and present long-term data trends or changes observed since the last annual report. The annual reports also provide a mechanism to optimize the LTM program. The following reports were issued during the five-year review period:

- *Final 2009 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011a)
- *Final 2009 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011b)
- *Final 2010 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2011d)
- *Final 2010 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012a)
- *Final 2011 Semi-Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2012b)
- *Final 2011 Annual Groundwater Monitoring Report, Joliet Army Ammunition Plant Will County, Illinois*. (Toltest 2013a)
- *Final 2012 Semi-Annual Groundwater Monitoring Report, Joliet U.S. Army Ammunition Plant, Will County, Illinois* (Toltest 2013b)
- *Final 2012 Annual Groundwater Monitoring Report, Joliet U.S. Army Ammunition Plant, Will County, Illinois* (Toltest 2014a)

Groundwater analytical data from the RI through LTM has been maintained in a database by contractors performing O&M activities for the GOU. This database was used to produce analytical data tables and determine trends for this five-year review. Data summary tables are provided in Attachment 1 for GRU1, GRU2, and GRU3. The data tables were reviewed to verify that all scheduled analyses listed in the LTM Plan were completed during this five-year review period. Historic explosive compound results in the tables are included for the past 10 years. The Target Analyte List (TAL) metals results represent data collected during this five-year review period since the data is not used to determine long-term trends.

The U.S. Air Force Center for Environmental Excellence (AFCEE, now referred to as U.S. Air Force Civil Engineer Center [AFCEC]) BIOSCREEN model was chosen at the GOU RD/RA

Work Plan preparation stage to model potential contaminant travel distances to evaluate whether GMZs assigned to GOU sites would be appropriate. The BIOSCREEN model was used to evaluate potential contaminant travel distances during the first and second five-year review periods. BIOSCREEN was not used for this current review period due to uncertainty of many variables and therefore, the resulting model output.

6.2.1 Trend Analysis

Historical laboratory analytical results for explosive compounds were used to produce graphs of applicable COC concentrations versus time (trend graphs in Attachment 1). The analytical dataset used to complete the trend analysis includes sampling conducted since completion of the RA activities for each GRU site. Additionally, results from the last sampling conducted prior to completion of the RA for each site was maintained in the dataset to provide a baseline. The trend graphs are used to evaluate the effectiveness of natural attenuation at each site. There is a possibility of a short-term lag effect from the completion of the RAs that may affect observed groundwater concentrations.

In previous five-year reviews, only COCs with the greatest historical concentration relative to their RGs were evaluated. If more than one well was available at a site for trend analysis, wells were preferentially selected where historical RG exceedances were the greatest. The trend analysis for this five-year review generally includes monitoring wells with explosive compounds and sulfate that exceeded RGs during the review period. This was done because the SOU RAs have been completed and the resulting change in site conditions may have a preferential effect on certain COCs over time.

Exponential curve fitting was applied to these data plots to calculate first-order rate decay constants and predict estimated clean-up times. Mann-Kendall U Statistical Tests were used to evaluate whether statistically valid trends could be documented. The Mann-Kendall U Statistical Tests used data from April 2009 through October 2012. These steps provided conservative data sets with a sufficient number of detected concentrations from which estimated COC reduction rates may be calculated to estimate site clean-up times. Specific trends for each GRU are discussed in Section 6.3.7 (GRU1), Section 6.4.7 (GRU2), Section 6.5.7 (GRU3) and Section 6.6.7 (Landfill M11).

Each analysis is mutually exclusive with different datasets and variations in the results are expected. Trend graphs are based on data from immediately prior to and following completion of the individual site RAs while the Mann-Kendall statistical analysis includes data only from the past four years (April 2009 through October 2012). In some cases, the result from the trend graphs and Mann-Kendall statistical tests do not present the same conclusion. This is acceptable considering the different data sets used for each analysis. However, the trend analysis was performed consistently for all wells by using the time since completion of the RAs and the Mann-Kendall analysis was performed using consistent data sets for all wells (last four years).

6.2.2 Estimated Cleanup Time

The projected site clean-up times for specific COCs are based on trend analyses to estimate degradation rates at selected wells for individual sites in accordance with the LTM Plan. The target concentration used to calculate the cleanup time for site remediation is the compound-specific RG. The COC degradation rate includes the physical, chemical, and biological

attenuation mechanisms active within the aquifer. Estimates of COC degradation rates are determined by fitting an exponential curve through each graph produced from analytical data. Plotting site data and applying a best-fit exponential curve is a standard way to calculate first-order rate decay constants and predict estimated clean-up times. The exponential model ($y=\exp(x)$) is the typical governing equation describing first-order biological degradation ($C/C_0 = \exp(-kt)$) and is used by most contaminant transport models to describe the biological degradation component of the transport equation*; Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies* (EPA/540/S-02/500, USEPA 2002). Where:

- C = the predicted concentration at time t
- C_0 = the concentration at time zero
- k = first-order decay rate
- t = the time (years) for C_0 to degrade to C

Where no distinct trend was apparent due to seasonal fluctuations, an exponential curve was used to maintain consistent results. The clean-up time (t) was then calculated using the highest observed concentration within the dataset as C_0. The calculated value of t was then added to the date when the highest observed concentration in the dataset was detected to get an estimated timeframe for concentrations to reach the RG. However, there is uncertainty in the estimated timeframe to reach the RG based on an upper and lower bound not being calculated to provide a range of time to reach the RG. Additionally, in the few instances where detected concentrations were below their respective analytical reporting limits, ½ of the reporting limit was used. Substituting ½ of the reporting limit increases uncertainty and may result in overestimating the decreasing trend curve slopes, thereby decreasing the estimated timeframe for COCs to reach their RGs. Graphs and curve fitting analyses for determining first-order decay rates are presented in Attachment 1.

R^2 values are displayed on the graphs and were used to interpret the results. The R^2 value is an indicator of how well a regression equation explains the relationship among the variables. An R^2 value of 1.0 is an exact fit and values that approach zero suggest a very poor fit. For this analysis, R^2 values were generally range between approximately 0.1 and 0.5. However, there are some R^2 values that are less than 0.1. The primary cause for the low R^2 values is seasonal variability of the concentrations. Based on the variability of the data, the calculated cleanup times are only an estimate and there is low confidence in the resulting estimated timeframe to reach the RG. Additional information regarding this analysis and an example calculation for estimated clean-up times are provided in Attachment 1. Discussions of specific site clean-up times are included in Section 6.3.7 (GRU1), Section 6.4.7 (GRU2), and Section 6.5.7 (GRU3).

6.2.3 Mann-Kendall U Statistical Tests

Laboratory analytical results for groundwater obtained during LTM events from 2009 through 2012 were evaluated using Mann-Kendall trend analysis for compounds that exceeded the RG in one or more sampling events. The Mann-Kendall U Statistical Test is a nonparametric statistical test used to evaluate whether there are statistically valid trends in groundwater contamination concentrations in a monitoring well. The software used for this analysis for the current and previous five-year reviews was obtained from the Wisconsin Department of Natural Resources (WDNR) and was set up to analyze data from up to the ten most recent monitoring events with a

consistent time-lapse between events. The test does not evaluate the rate at which concentrations are changing over time.

The Mann-Kendall U Statistical Test is not valid for data that exhibit seasonal behavior. For data exhibiting seasonal behavior, testing only data from the seasons with the highest contaminant concentrations may produce valid results. To demonstrate that natural attenuation is occurring, the statistical test must show decreasing contaminant concentrations at an appropriate confidence level. The Mann-Kendall U Statistical Test yields results at both the 80 percent and the 90 percent confidence level. If no trend exists at the 80 percent confidence level, the test will indicate whether the detections in a well are stable. Non-stable results indicate that there is too much scatter in the data to make a valid determination.

The Mann-Kendall U Statistical Test does not take into account the magnitude of scatter in the data. A data set with a great deal of scatter may return a Mann-Kendall U Statistical Test indicating there is no observable trend, when, in fact, no conclusion can be drawn regarding the trend because of data variability. The Mann-Kendall test does not demonstrate the absence of trends, only the presence of trends. The inability to demonstrate a significant trend using the Mann-Kendall test is an inconclusive result (i.e., insufficient evidence to demonstrate a trend at the specified level of confidence) regardless of the magnitude of the coefficient of variation (CV). The CV (i.e., the standard deviation divided by the mean) is a measure of variability. The mean can be constant in time when the CV is large or small. In this case, additional data collection may be necessary to determine that the plume is stable, declining, or increasing. As a simple test, the CV can provide an indication of the scatter in the data. The CV should be less than or equal to 1 to indicate that the no-trend hypothesis also indicates a stable plume configuration.

Historical plots of groundwater elevation and contaminant concentration data indicate that the groundwater elevation does not vary regularly with the seasons and also indicates the contaminant concentrations are often affected by differences in groundwater elevation. These variations can result in a great deal of variability or scatter in the data that may make it difficult to determine a trend.

Mann-Kendall U Statistical Test results are summarized in Attachment 1. A discussion of the results is provided in Section 6.3.7 (GRU1), Section 6.4.7 (GRU2), Section 6.5.7 (GRU3) and Section 6.6.7 (Landfill M11).

Because wells exhibiting the highest concentrations are normally associated with the majority of the contaminant mass at a site, the trends exhibited by these wells provide an indication as to what is occurring near the historic sources of contamination.

Decreasing trends near a source indicate a likelihood that natural attenuation is occurring. An increasing trend near a source may indicate additional source loading to groundwater and consequently an expanding plume. However, increasing trends at wells near the former sources could occur because the recently completed SOU RAs may have mobilized contaminants and caused spikes in the groundwater concentrations. The use of statistical trend analysis was limited to the same wells used in the other analyses for consistency in reporting results.

6.3 GRU1

GRU1 is located entirely within the LAP Area and consists of separate plumes emanating from unique sources at sites L1, L2, L3, and L14. The GMZ boundaries are shown on Figure 3-3, Figure 6-1 (Site L1), Figure 6-5 (Site L2), Figure 6-8 (Site L3), and Figure 6-11 (Site L14). Explosive compounds are the only contaminants identified in these plumes that could pose a risk to human health or the environment. The plumes are present in the glacial drift aquifer at each site and extend into the upper bedrock aquifer at sites L1, L2, and L3.

The estimated volumes of impacted groundwater in the GRU1 plumes identified in the 1998 ROD are presented in Table 6-2.

Table 6-2 Volume of Impacted Groundwater at GRU1 Sites

Site	Subarea/Plume	Volume (Million Gallons)
L1	Groundwater related to the ridge-and-furrow area	69
L2	Groundwater downgradient of burning pad area	4
L3	Groundwater downgradient of burning cage	2
	Groundwater downgradient of bermed area	10
L14	Groundwater downgradient of sumps at Building 4-5	2
Total		87

6.3.1 Background Information

6.3.1.1 Site L1 – Building Group 61

A description of Site L1 and historic activities during operation of JOAAP are summarized in Section 5.2. The GMZ for Site L1 is shown on Figure 6-1. The site is vacant and not located near a heavily populated area.

Unconsolidated deposits at the site generally consist of silt, clay, silty sand, and sandy silt. Intermittent clayey sands and gravelly sand seams were reported in three of the boring logs. The dolomite bedrock surface ranges from 6.5 to 21 ft bgs. A fracture trace map indicates that two small east-west trending fractures are present in the east portion of the site and a small northeast-southwest trending fracture is present in the center of the site.

Explosive compounds in soil were present in a ridge and furrow impoundment, the western most of two ponds, an area south of a washout building, and in soil around a sump. The underlying groundwater historically contained elevated levels of 2,4-DNT, 2,6-DNT, TNB, TNT, and RDX as well as degradation products from these compounds in the overburden and in the shallow weathered bedrock. The contaminant concentrations were determined to pose an unacceptable risk to human health and the environment. Removal of explosives-contaminated soil was conducted in 1999 (PCBs) and from October 2005 to March 2006 (explosives and organics).

Prairie Creek, a surface water body draining the area, is south of the remediated areas. It is incised into the bedrock and groundwater appears to discharge directly into the creek or upwells

into the streambed by virtue of the head relief available in the open channel. The contaminated area is a residual groundwater plume that migrates to the southeast towards Prairie Creek where it is believed to primarily discharge into the creek through upwelling. There is no evidence that contamination flows beneath Prairie Creek and further to the south. Contaminant concentrations are expected to decrease with time and distance due to biological degradation and dilution in the groundwater and in Prairie Creek.

Groundwater sampling was first conducted in 1981. Groundwater monitoring has generally been completed on a semi-annual basis since 1998 to evaluate progress towards attaining the RGs. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation because source materials have been removed. However, there may be a short-term lag effect to groundwater from the completion of the soil RA.

According to the 1998 ROD, risk assessment studies determined that surface waters at JOAAP posed no risk to human health and the environment and were therefore not addressed as a contaminated medium. However, groundwater discharge to surface water is a major component of the shallow groundwater system and localized detections of COCs may occur in surface water under certain conditions near contaminated groundwater sites. Therefore, surface water is routinely sampled.

6.3.1.2 Site L2

A description of Site L2 and historic activities during operation of JOAAP are summarized in Section 5.3. The GMZ for Site L2 is shown on Figure 6-5. The site is vacant and not located near a heavily populated area.

Unconsolidated deposits at the site generally consist of silt, clay, clayey sands, and clayey gravels. The dolomite bedrock surface ranges from 12 to 25 ft bgs. No significant bedrock fractures were evident on a fracture trace map.

Soil at the site was contaminated with explosive residues and metals (arsenic, cadmium, and lead). Only RDX has been detected in the overburden and shallow weathered bedrock water bearing zones at concentrations that exceeded the RGs. HMX has been observed in groundwater at concentrations below the RG. Solvent pits at the site were remediated during a removal action in 1996. The SOU RA was completed in October 2007.

Prairie Creek is northwest of the remediated areas. It is incised into the bedrock and groundwater appears to discharge directly into the creek or upwells into the streambed by virtue of the head relief available in the open channel. Additionally, two drainage ditches flow from the north to Kemery Lake and a gulley is present in the southwest corner that catches runoff from the former popping furnaces area. The contaminated area is now a residual groundwater plume that migrates northwest towards Prairie Creek where it is believed to discharge into the creek through upwelling. There is no evidence that contamination flows beneath Prairie Creek and further to the northwest. The plume is expected to separate from the source area over time and migrate in the overburden and shallow bedrock until it discharges to Prairie Creek. Concentrations should decrease with time and distance due to biological degradation and dilution in the groundwater and in Prairie Creek.

Groundwater monitoring was first conducted in 1981 and has generally been completed on a semi-annual basis since 1998. The monitoring has been performed to evaluate the progress of

the site towards attaining the RGs. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation because source materials have been removed. However, there may be a short-term lag effect to groundwater from the completion of the soil RA.

According to the 1998 ROD, risk assessment studies determined that surface waters at JOAAP posed no risk to human health and the environment and were therefore not addressed as a contaminated medium. However, groundwater discharge to surface water is a major component of the shallow groundwater system and localized detections of COCs may occur in surface water under certain conditions near areas of contaminated groundwater. Therefore, surface water is routinely sampled.

6.3.1.3 Site L3

A description of Site L3 and historic activities during operation of JOAAP are summarized in Section 5.4. The GMZ for Site L3 is shown on Figure 6-8. The site is vacant and not located near a heavily populated area.

Unconsolidated deposits at the site generally consist of silty clay and silt. A thin (1 ft) sand seam at 10 to 13 ft bgs may be continuous across the site. Sand and sandy clays increase in thickness near Prairie Creek. The dolomite bedrock surface ranges from 3 to 28 ft bgs. No significant bedrock fractures are evident on a fracture trace map near the site.

The SOU remedy was completed in October 2008 and consisted of the excavation and off-site disposal of contaminated soil and on-site consolidation and capping of waste material/contaminated soil. The landfill is located on the western edge of the GMZ and east bank of Prairie Creek. It is unlined and believed to contain metals and explosive compounds. Contaminated soil and/or waste materials that were placed during construction of the landfill are not believed to be in direct contact with groundwater. The distance between the contaminated soil/waste and the water table is unknown.

Two unconnected areas of groundwater contamination have been observed at Site L3; RDX downgradient of a former burn cage and RDX in the area where the landfill is located (the former burn area berms). Contaminated groundwater occurs in the overburden and in the shallow weathered bedrock.

Prairie Creek, a surface water body draining the area, is contiguous with the west boundary of the site. It is incised into the bedrock and groundwater appears to discharge directly into the creek or upwells into the streambed by virtue of the head relief available in the open channel. Surface water elevation in the northern portion of the site is dictated by a dam located on Prairie Creek just north of Central Road. An unnamed tributary of Prairie Creek is located east of the site.

The landfill is bordered by Prairie Creek and any contamination that might leach from the landfill is expected to migrate to the creek and be quickly discharged by upwelling. There is no evidence that contamination flows beneath Prairie Creek and further to the west. Given these observations, the plumes are expected to separate from the source areas over time and migrate in the overburden and shallow bedrock until they discharge to Prairie Creek. Concentrations are anticipated to decrease with time and distance due to biological degradation and dilution in the groundwater and in Prairie Creek.

Groundwater sampling was first conducted in 1981. Groundwater monitoring has generally been

completed on a semi-annual basis since 1998 to evaluate the progress of the site towards attaining the RGs. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation due to the removal of contaminated soil and reduced infiltration through the constructed landfill cap where contaminated materials remain. However, there may be a short-term lag effect to groundwater from the completion of the soil RA.

According to the 1998 ROD, risk assessment studies determined that surface waters at JOAAP posed no risk to human health and the environment and were therefore not addressed as a contaminated medium. However, groundwater discharge to surface water is a major component of the shallow groundwater system, and localized detections of COCs may occur in surface water under certain conditions. Therefore, surface water is routinely sampled.

6.3.1.4 Site L14 – Production and Storage Area

A description of Site L14 and historic activities during JOAAP operations are summarized in Section 5.13. The GMZ for Site L14 is shown on Figure 6-11. The site is vacant and not located near a heavily populated area.

Unconsolidated deposits at the site generally consist of silty clay, sandy silts, and silt. A sand seam was reported at MW511 and 1-ft thick gravel seams overlie the bedrock at MW511 and MW512. The dolomite bedrock surface ranges from 12 to 22 ft bgs. An extensive northwest-southeast trending bedrock fracture is present through the center of the site.

Explosive compounds in soil resulted from sump overflows. The SOU RA was completed in August 2005, which included removal and off-site treatment of explosives contaminated soil. Only RDX has been observed in groundwater in the shallow bedrock. The contamination is now a residual groundwater plume migrating to the southwest.

Groundwater sampling was first conducted in 1993. Groundwater monitoring has generally been completed since 1998 on a semi-annual basis to evaluate the progress towards attaining the RGs. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation due to removal of source materials. However, there may be a short-term lag effect to groundwater from the completion of the soil RA.

6.3.2 Remedial Action

GOU RA activities are described in the following sections. SOU RA activities are described in Section 5.2 (Site L1), Section 5.3 (Site L2), Section 5.4 (Site L3), and Section 5.13 (Site L14).

6.3.2.1 Remedy Selection

A limited action alternative (MNA) was chosen for GRU1 in the 1998 ROD.

6.3.2.2 Remedy Implementation

The *Final Remedial Design/Remedial Action Work Plan, Site M9, Joliet Army Ammunition Plant, Wilmington, Illinois* (GOU RD/RA Workplan) documents remedial design/remedial action activities for the GOU. Since implementation of the GOU RD/RA Work Plan, semi-annual groundwater monitoring has generally been conducted at JOAAP as part of the MNA remedy. A sampling schedule presented in the LTM Plan included a list of monitoring wells that were to be

sampled, sampling frequencies, and analytical requirements.

Site L1

The LTM Plan for Site L1 includes the following requirements:

- Determine if source control has been established in the area of the former ridge and furrow pond
- Determine if there are concentrations of TNT, TNB, and RDX in transit that will expand the plume beyond the GMZ boundary
- Verify that COC concentrations in excess of the RGs are not migrating beyond the GMZ

Monitoring at Site L1 includes in-plume, early warning, and compliance sampling points that are identified below.

- In-plume
  - MW131
  - WES1
- Early warning
  - MW172
  - MW173
  - MW174
  - WES3
- Compliance
  - MW401
  - SW550 (surface water location in Prairie Creek)

Monitoring is performed for explosive compounds. Locations and parameters are summarized in Table A1-1 (Attachment 1). Monitoring well information is summarized in Table A1-6 (Attachment 1).

MW401 is not a traditional compliance sampling point because it is not located at the GMZ boundary. MW401 has been used as a compliance sampling point to confirm that contamination is not flowing under Prairie Creek and further to the southeast.

Water levels are routinely measured at monitoring wells that are sampled as part of LTM and at MW171, MW172, MW175, MW176, MW177, MW178, MW400, MW401, MW610, MW511, and WES2. Surface water elevation is monitored at SW550.

Site L2

The LTM Plan for Site L2 includes the following requirements:

- Determine if source control has been established in the northwest corner of the site near MW404
- Determine if there are concentrations of RDX in transit that will expand the plume beyond the GMZ boundary
- Determine if heavy metals were mobilized by soil RA activities at the former popping furnace
- Verify that COC concentrations in excess of the RGs are not migrating beyond the GMZ

Monitoring at Site L2 includes in-plume, early warning, and compliance sampling points that are

identified below.

- In-plume
  - MW404
  - MW502
- Early warning
  - MW620
- Compliance
  - SW555 (surface water location in Prairie Creek at the GMZ boundary)
  - MW810
  - MW621

Monitoring is performed for explosive compounds. Monitoring locations and analytical parameters are summarized on Table A1-1; monitoring well information is summarized in Table A1-6 (Attachment 1).

MW810 is not a traditional compliance sampling point because it is located outside of the GMZ boundary. MW810 is used as a compliance measuring point to confirm that contamination is not flowing under Prairie Creek and further to the northwest.

According to the LTM Plan, if groundwater samples collected from MW502 do not exhibit RG exceedances for heavy metals for four consecutive quarters, a recommendation to cease monitoring will be included in the applicable semi-annual or annual groundwater monitoring report.

Site L3

The LTM Plan for Site L3 includes the following requirements:

- Determine if source control has been established in the two source areas near MW410 and MW412
- Determine if there are concentrations of RDX in transit that will expand the plume beyond the GMZ boundary
- Verify that COC concentrations in excess of the RG are not migrating beyond the GMZ

Post-closure monitoring requirements for Landfill L3 follow IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G. Monitoring at Site L3 and Landfill L3 includes upgradient, in-plume, early warning, downgradient, and compliance sampling points. Monitoring of the landfill will be conducted on a semi-annual basis for 30 years or until the data support a successful petition to reduce the frequency or terminate monitoring based on results showing no statistical difference from background conditions.

Monitoring locations included in the LTM Plan are identified below.

- Upgradient Locations
  - MW1
  - MW3
  - SW004 (surface location where Prairie Creek first enters the GMZ boundary and upstream of a storm water outfall)
- In-plume
  - MW410

  - MW412

- Early warning
  - MW630
  - MW631
  - MW633

- Downgradient Locations
  - MW412
  - MW630
  - MW631
  - MW632
  - MW633
  - SW777 (surface water location in Prairie Creek near the GMZ boundary)
  - SW557 (surface water location in Prairie Creek upstream of a discharge point from a landfill drainage swale)
  - SW558 (surface water location at a constructed drainage swale along the southwest side of the landfill)

- Compliance
  - SW777 (surface water location in Prairie Creek near the point where the creek leaves the GMZ boundary)
  - MW632

Monitoring is performed for explosive compounds and TAL metals. Monitoring locations and analytical parameters are summarized on Table A1-1; monitoring well information is summarized in Table A1-6 (Attachment 1).

MW632 is not a traditional compliance sampling point because it is located outside of the GMZ boundary. MW632 has been used as a downgradient/compliance measuring point to confirm that contamination is not flowing under Prairie Creek and further to the northwest.

Site L14

The LTM Plan for Site L14 includes the following requirements:

- Determine if source control has been established at the sump at Building 4-5
- Determine if there are concentrations of RDX in transit that will expand the plume beyond the GMZ boundary
- Verify that COC concentrations in excess of the RG are not migrating beyond the GMZ

Monitoring at Site L14 includes in-plume, early warning, and compliance sampling points that are identified below.

- In-plume
  - MW508
  - MW511
  - MW512

- Early warning
  - H7

- Compliance
  - MW603
  - MW604

Monitoring is performed for explosive compounds. Monitoring locations and parameters are summarized on Table A1-1; monitoring well information is summarized in Table A1-6 (Attachment 1).

6.3.3 Operation and Maintenance

Periodic maintenance of the groundwater monitoring network occurs during the groundwater sampling events. There have been no major modifications to the monitoring network. As noted in the Second Five-Year Review report, concrete pads have deteriorated at many wells. The pads have not been repaired/replaced due to the likelihood that frost-heaving could irreparably damage the wells. Many protective casings have had weep holes drilled to allow condensation between the protective casing and the well riser to drain and prevent ice damage to the wells.

6.3.4 Site Inspections

Representatives from Toltest (Gary Reside) and MWH (Jeff Ramsby) conducted site inspections during April 8 to 16, 2013. The purpose of the inspections was to assess current conditions, access controls, and use restrictions at each site. The inspections were conducted in accordance with the Five-Year Review Site Inspection Checklist *(OSWER No. 9355.7-03B-P)*. Completed site inspection checklists are provided in Attachment 4.

Results of the inspections indicated that the sites are being maintained in good condition. Groundwater monitoring infrastructure issues were not identified. Monitoring wells are routinely maintained during groundwater sampling activities.

The GRU1 sites are publically accessible via the MNTP. Site L1 is fenced and there is a hole in the fencing of the entrance gate that would allow access. There is no fencing at Site L2 restricting access. Site L3/Landfill L3 is fenced except along Prairie Creek. There is no fencing at Site L14 restricting access.

6.3.5 Land Use/Institutional Controls

Institutional controls for the sites included in GRU1 are discussed in Section 5.2.2.3 (Site L1), Section 5.3.2.3 (Site L2), Section 5.4.2.3 (Site L3), and Section 5.13.2.3 (site L14). The sites are intended to be incorporated into the USDA/FS MNTP.

6.3.6 Progress Since Last Five-Year Review

Changes in LTM monitoring for GRU1 sites since inception of the LTM Plan are summarized below.

6.3.6.1 Site L1

The following changes were made pursuant to recommendations provided in the 2010 and 2011 annual groundwater monitoring reports (Toltest 2012a, 2013a):

- Compliance well MW401 and upgradient early warning wells were removed from the LTM (spring 2012) because explosive compounds were not detected
- Early warning well MW172 was removed from LTM (spring 2012) because sampling was redundant with early warning well MW173
- The designation of MW173 was changed from "early warning" to "in-plume" due to the migration of explosive compounds in groundwater

6.3.6.2 Site L2

The following changes were made pursuant to recommendations provided in the 2009 and 2010 annual groundwater monitoring reports (Toltest 2011b, 2012a):

- The sampling frequency was reduced (spring 2012) to occur exclusively during the fall event, in accordance with Section 4.1.2.5 of the LTM Plan, since that season consistently had the highest detected concentrations of COCs
- In-plume monitoring well MW501 was removed from LTM (fall 2011) in accordance with Section 4.1.2.5 of the LTM Plan since no RG exceedances were observed for four consecutive rounds
- Compliance monitoring well MW810 was removed from LTM (fall 2012) due to upgradient early warning monitoring wells consistently having no explosive compound detections

6.3.6.3 Site L3

The following changes were made pursuant to recommendations provided in the 2009, 2010, and 2011 annual groundwater monitoring reports (Toltest 2011b, 2012a, 2013a):

- TAL metals sampling at in-plume well MW410 was eliminated (fall 2011) because no exceedances were observed since sampling was re-initiated in 2008
- Compliance/downgradient well MW632 was removed from LTM (spring 2012) because explosive compounds were not detected and the well was not located in the flow path
- Upgradient surface water sampling location SW004 was removed from fall sampling (fall 2012) because upstream sample point SW555 is collected in fall
- Upgradient well MW03 was removed from LTM (spring 2012) because no RG exceedances were observed at in-plume well MW410

6.3.6.4 Site L14

The following changes were made pursuant to recommendations provided in the 2010 and 2011 annual groundwater monitoring reports (Toltest 2012a, 2013a):

- The sampling frequency was reduced (spring 2012) to occur during the fall events in accordance with the LTM Plan because that season was found to consistently exhibit the highest concentrations
- In-plume well MW508 was removed from LTM (spring 2012) because RG exceedances were not observed
- Compliance wells MW603 and MW604 were eliminated from LTM (spring 2012) because RG exceedances were not observed in upgradient early warning well H7

6.3.7 Data Review

The following sections present a summary of site characteristics and groundwater quality results based on the LTM. The purpose of these summaries is to evaluate whether the MNA remedy is performing as intended by the 1998 ROD. Statistical test outputs, trend plots, and data tables are provided in Attachment 1.

6.3.7.1 Site L1

Hydrogeology

Groundwater levels measured during the five-year review period are summarized in Table A1-7 and surface water elevations are summarized in Table A1-8. The depths to groundwater ranged from less than 1 to approximately 35 ft bgs.

Groundwater flow directions in the water table (overburden zone) are illustrated on Figure 6-1 (October 2011) and Figure 6-2 (October 2012). The October 2012 flow direction is toward the northwest, away from Prairie Creek. This is contrary to the typical water table flow direction, which is southeast toward Prairie Creek (refer to Figure 6-2). Drought conditions in 2012 are believed to have caused the reversal in groundwater flow. Based on historic groundwater flow data, Prairie Creek is the likely discharge point for shallow groundwater in the vicinity of the site. The groundwater flow direction in the bedrock aquifer is generally toward the southeast as shown on Figure 6-3. This is consistent with flow directions observed historically.

Hydraulic gradients are summarized in Table A1-9 (vertical) and Table A1-11 (horizontal-overburden zone). The calculated vertical gradients were generally upward at paired wells MW172/MW173, MW177/MW171, and MW401/MW610 and downward at paired wells MW178/MW176. Upward vertical gradients were observed in 2012 at paired wells MW177/MW171 (April) and at MW172/MW173 and MW401/MW610 (April and October). Downward vertical gradients were observed at MW178/MW176 in April; MW176 was dry in October. The horizontal gradient in the overburden zone at the northern part of the site was 0.0118 ft/ft in April 2012 and could not be determined in October 2012 because MW176 was dry. In the southern part of the site the horizontal gradient was 0.0126 ft/ft in April 2012 and 0.0036 ft/ft in October 2012.

Groundwater velocities in the overburden are presented in Table A1-11 and were calculated using the reported average hydraulic conductivity of 9.2×10^{-6} centimeters per second (cm/sec) and an assumed porosity of 0.3. The calculated velocity was approximately 0.001 ft per day (ft/day) or 0.4 ft per year (ft/yr) in April 2012. Only groundwater velocities in the southern part of the site could be calculated in October 2012 and were 0.001 ft/day or 0.3 ft/yr.

Analytical Results

Groundwater at the site is monitored for explosive compounds. Table A1-2 provides a summary of data for compounds analyzed for the LTM program. Detected compounds are shown on Figure 6-4. A brief discussion of explosive compound RG exceedances by well type follows:

In-Plume Wells (MW131, MW173, and WES1 – all overburden wells):

- **MW131;** 2,4,6-TNT exceeded the RG in April 2012 (2,200 µg/L) and again in October 2012 (1,000 µg/L)

- **MW173;** RDX exceeded the RG in April 2012 (10 µg/L) and again in October 2012 (6.2 µg/L, duplicate sample); 2,4,6-TNT exceeded the RG in April 2012 (12 µg/L)
- **WES1;** 1,3,5 - TNB (40 µg/L) and 2,4,6-TNT (38 µg/L) exceeded the RG in April 2012

Early Warning Wells (MW174 and WES3):

- **MW174** (overburden well); explosive compounds were not detected
- **WES3** (bedrock well); explosive compounds were not detected above the RGs

Compliance Point (SW550): Explosive compounds were not detected

Trend Analysis

Trend analysis was performed for compounds that exceeded the RG in one or more sampling events during the five-year review period using the Mann-Kendall U Statistical Tests. The explosive compounds meeting these criteria include 2,4-DNT, 2,6-DNT, 1,3,5-TNB, 2,4,6-TNT, and RDX. Results are summarized in Table A1-5 and discussed below. Statistical test outputs are provided in Attachment 1.

- **MW131;** 2,6-DNT, 1,3,5-TNB, and 2,4,6-TNT exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. 2,6-DNT exhibits no trend, however with a coefficient of variation greater than 1 (not stable), while 1,3,5-TNB and 2,4,6-TNT exhibit decreasing trends at the 80 and 90 percent confidence levels.
- **MW173;** 2,4-DNT, RDX, and 2,4,6-TNT exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. All compounds exhibit no trends at the 80 and 90 percent confidence levels.
- **WES1;** 2,4-DNT, 1,3,5-TNB, and 2,4,6-TNT exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. All compounds exhibit no trends at the 80 and 90 percent confidence levels. The Stability Test, performed if no trend exists at the 80 percent confidence level, was stable for 2,4-DNT and 2,4,6-TNT and not stable for 1,3,5-TNB.
- **WES3;** 2,4,6-TNT exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. No trends are exhibited at the 80 and 90 percent confidence levels.

Trend Plots and Cleanup Time Estimates

In-Plume Wells (MW131, MW173, and WES1):

Trend plots were prepared for TNT and TNB at MW131 (Graphs 1 and 2) and for RDX and TNT at MW173 (Graphs 3 and 4) using data beginning after completion of the RA in March 2006 and the result from a sampling event conducted prior to completion of the RA (to provide a baseline). Trend plots were not prepared for WES1 due to significantly higher concentrations at MW131 and MW173. Therefore, their cleanup times would be expected to exceed those of WES1. Results and observations are discussed below. Table A1-4 summarizes the results of the analysis.

- **MW131** (overburden well) exhibits an increasing trend for TNT (Graph 1) and a decreasing trend for TNB (Graph 2). Due to the increasing trend for TNT, cleanup time estimates could not be made. This estimate has low confidence based on the available

data which exhibits a high degree of variability and a low R^2 value (0.0031). Decreasing concentrations should eventually be observed for TNT as time from the SOU RA (completed in 2006) increases. Based on the equation to the best-fit curve, the estimated year at which TNB will naturally degrade to less than the RG is 2016. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.3598).

- **MW173** (overburden well) exhibits decreasing trends for RDX (Graph 3) and TNT (Graph 4). Based on the equation to the best-fit curve, the estimated year at which RDX will naturally degrade to less than the RG is 2015. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.3134). The estimated year at which TNT will naturally degrade to less than the RG is 2016. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.0198).

Early Warning Wells (MW174 and WES3):

- **MW174** (overburden well); explosive compounds were not detected and a trend graph was not prepared
- **WES3** (bedrock well); explosive compounds were detected at low concentrations below the RGs and a trend graph was not prepared

Compliance Point (SW550):

- Explosive compounds were not detected and a trend graph was not prepared

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The 1998 ROD estimated time for explosive compounds to reach the RG at Site L1 was 340 years or by 2338.

Bioparameters

At wells MW131, MW173, and WES1, 2-A-4,6-DNT and 4-A-2,6-DNT have been routinely detected. These compounds are byproducts of TNT biodegradation and their presence suggests that anaerobic degradation is occurring within the plume.

6.3.7.2 Site L2

Hydrogeology

Groundwater levels measured during the five-year review period are summarized in Table A1-7 and surface water elevations are summarized in Table A1-8. The depths to groundwater ranged from approximately 2 to 23 ft bgs.

Groundwater flow direction in the water table (overburden zone) is northwest toward Prairie Creek (October 2012) as shown on Figure 6-5. Based on historic groundwater flow data, Prairie Creek is the likely discharge point for shallow groundwater at Site L2. The groundwater flow direction in the bedrock aquifer is generally toward the northwest as shown on Figure 6-6. The overburden and bedrock aquifer flow directions are consistent with historic observations.

Hydraulic gradients are summarized in Table A1-9 (vertical) and Table A1-10 (horizontal-overburden zone). The calculated vertical gradients are generally upward in the fall and downward in the spring at paired wells MW620/MW621. These wells are adjacent to Prairie

Creek and the seasonal variation is likely the result of the higher hydraulic head within the creek during the spring. The horizontal gradient was 0.0099 ft/ft in October 2012.

Groundwater velocities in the overburden are presented in Table A1-11 and were calculated using an average hydraulic conductivity of 1.6×10^{-3} cm/sec and an assumed porosity of 0.3. The calculated groundwater velocity is approximately 0.15 ft/day or 54.6 ft/yr.

Analytical Results

Groundwater at the site is monitored for explosive compounds and metals. Analytical data is summarized in Table A1-2 (explosive compounds) and Table A1-3 (TAL metals). Explosive compound detections are shown on Figure 6-7. The 2012 Semi-Annual Groundwater Monitoring Report (Toltest 2013b) and the draft final 2012 Annual Groundwater Monitoring Report (Toltest 2013c) identify wells and surface water locations that were sampled in 2012. Site L2 is no longer sampled in the spring. Analysis for TAL metals (at MW501) was discontinued in the fall of 2011. A brief discussion of RG exceedances in October 2012 by well type follows:

In-Plume Well (MW404):

- RDX (130 µg/L) exceeded the RG; MW404 is a combination well

Early Warning Well (MW620):

- There were no RG exceedances for explosive compounds; MW620 is an overburden well

Compliance Points (MW621 and SW555):

- **MW621** (bedrock well); there were no RG exceedances
- **SW555** (Prairie Creek); explosive compounds were not detected

Trend Analysis

Trend analysis was performed for RDX in MW404, which exceeded the RG in one or more sampling events from 2009 to 2012. Data from this time period was evaluated by using the Mann-Kendall Test and the results indicate that RDX exhibits increasing trends at the 80 percent and 90 percent confidence levels. Statistical test results are summarized in Table A1-5 and the calculation output is presented in Attachment 1.

Trend Plots and Cleanup Time Estimates

A trend plot (Graph 5) was prepared for RDX in MW404 using data after completion of the RA in October 2007 plus results from a sampling event conducted prior to completion of the RA (to provide a baseline). Only results from the fall sampling events are included in the trend plot to reduce the data variability and increase the accuracy of the projected time for RDX to reach the RG. LTM was reduced to the fall season because the highest explosives concentrations were consistently observed at this time. Results and observations are discussed below. Table A1-4 summarizes the results of this analysis.

- **MW404** (in-plume well); exhibits a decreasing trend for RDX (Graph 5). The SOU RA for explosives and metals contaminated soils was completed in 2007. Based on the equation to the best-fit curve, the estimated year at which RDX will naturally degrade to less than the RG is 2031. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.2231).

Trend plots were not prepared for early warning and compliance locations as described below.

- **MW620** (early warning well); explosives were detected at low concentrations below the RG in October 2012 and a trend plot was not prepared
- **MW621** (compliance well); explosives were detected at low concentrations below the RG in October 2012 and a trend plot was not prepared
- **SW550** (compliance point); explosive compounds were not detected and a trend plot was not prepared

There may be a short-term lag effect from the soil RA which is affecting groundwater concentrations. The 1998 ROD estimated time for explosive compounds to reach the RG at Site L2 was 20 years or by 2018.

Bioparameters

No byproducts of biodegradation were identified.

6.3.7.3 Site L3

Hydrogeology

Groundwater levels measured during the five-year review period are summarized in Table A1-7 and surface water elevations are summarized in Table A1-8. The depths to groundwater ranged from approximately 2 to 22 ft bgs.

The groundwater flow direction in the water table (overburden zone) and bedrock aquifer was west toward Prairie Creek (October 2012) as shown on Figure 6-8 (water table) and Figure 6-9 (bedrock aquifer). This flow direction is consistent with historic observations.

Hydraulic gradients are summarized in Table A1-9 (vertical) and Table A1-10 (horizontal – overburden zone). The calculated vertical gradients were upward at paired wells MW630/MW631, which is adjacent to Prairie Creek. The horizontal gradient was 0.0238 ft/ft in October 2012. Using an average hydraulic conductivity of 1.6×10^{-3} cm/sec and an assumed porosity of 0.3, the calculated groundwater velocity in the overburden is approximately 0.39 ft/day or 141.8 ft/yr (refer to Table A1-11).

Analytical Results

Groundwater at the site is monitored for explosive compounds and metals. Analytical data is summarized in Table A1-2 (explosive compounds) and Table A1-3 (TAL metals). Explosive compound detections are shown on Figure 6-10. The 2012 Semi-Annual Groundwater Monitoring Report (Toltest 2013b) and the draft final 2012 Annual Groundwater Monitoring Report (Toltest 2013c) identify wells and surface water locations that were sampled in 2012. Analysis for TAL metals was removed from sampling at in-plume/downgradient well MW410 in the fall of 2011. Upgradient well MW3 and compliance well MW632 were removed from the sampling program beginning in the spring of 2012.

For Landfill L3, the monitoring well locations are classified as upgradient or downgradient. Therefore, the same well can represent two separate classifications at Site L3/Landfill L3. A brief discussion of analytical results from October 2012 by well type follows:

In-Plume (downgradient) Wells (MW410 and MW412):

- **MW410** (overburden); explosive compounds were not detected
- **MW412** (bedrock); RDX (120 µg/L) exceeded the RG; there were no RG exceedances for TAL metals

Early Warning (downgradient) Wells (MW630, MW631 and MW633):

- **MW630** (bedrock); explosive compounds and TAL metals did not exceed the RGs
- **MW631** (bedrock); explosive compounds were not detected and TAL metals did not exceed the RGs
- **MW633** (bedrock); RDX (10 µg/L) exceeded the RG; TAL metals did not exceed the RGs

Compliance (downgradient) Point (SW777):

- **SW777** (surface water, probable groundwater discharge point); explosive compounds and TAL metals did not exceed the RGs

Downgradient Points (SW557 and SW558):

- **SW557** (surface water, probable groundwater discharge point); explosive compounds and TAL metals did not exceed the RGs
- **SW558** (surface water) was dry during the October sampling event

Trend Analysis

Trend analysis was performed for RDX using the Mann-Kendall test because this compound exceeded the RG in one or more sampling events during the five-year review period. Results are summarized in Table A1-5 and discussed below. Statistical test outputs are provided in Attachment 1.

- **MW412**; RDX exhibits decreasing trends at the 80 and 90 percent confidence levels
- **MW630**; RDX exhibits no trend, however with a coefficient of variation greater than 1 (not stable)
- **MW633**; RDX exhibits a decreasing trend at the 80 percent confidence level and no trend at the 90 percent confidence level

Trend Plots and Cleanup Time Estimates

Trend plots were prepared for RDX (Graphs 6, 7, and 8) using data beginning after completion of the RA in October 2008 plus the result from the sampling event conducted prior to completion of the RA to provide a baseline. Results and observations are discussed below. Table A1-4 summarizes the results of the analysis.

Upgradient Point (SW004):

- Explosive compounds were not detected and a trend plot was not prepared

In-Plume (downgradient) Wells (MW410 and MW412 {downgradient}):

- **MW410** (overburden well) explosive compounds were not detected and a trend plot was not prepared

- **MW412** (bedrock well) exhibits a decreasing trend for RDX (Graph 6). Based on the equation to the best-fit curve, the estimated year at which RDX will naturally degrade to less than the RG is 2028. This estimate has low confidence based on the available data which exhibits a moderate degree of variability and a low R^2 value (0.53).

Early Warning (downgradient) Wells (MW630, MW631 and MW633):

- **MW630** (bedrock well) exhibits an increasing trend for RDX (Graph 7). Due to the increasing trend for RDX, cleanup time estimates could not be made. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.1975). Decreasing concentrations should eventually be observed as time from the SOU RA (completed in 2008) increases.
- **MW633** (bedrock well) exhibits a decreasing trend for RDX (Graph 8). Based on the equation to the best-fit curve, the estimated year at which RDX will naturally degrade to less than the RG is 2022. This estimate has low confidence based on the available data which exhibits a moderate degree of variability and a low R^2 value (0.2726).

Compliance (downgradient) Point (SW777):

- **SW777** (surface water location); explosive compounds were not detected and a trend plot was not prepared

Downgradient Points (SW557 and SW558):

- **SW557** (surface water location); explosive compounds were detected at low concentrations below the RGs and a trend plot was not prepared
- **SW558** (surface water location); explosive compounds were not detected and a trend plot was not prepared

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The 1998 ROD estimated time for explosive compounds to reach the RG at Site L3 was 50 years or by 2048.

Bioparameters

At monitoring well MW412, 2-A-4,6-DNT and 4-A-2,6-DNT have been routinely detected. These compounds are byproducts of TNT biodegradation and their presence suggests that anaerobic degradation is occurring within the plume.

6.3.7.4 Site L14

Hydrogeology

Groundwater levels measured during the five-year review period are summarized in Table A1-7. The depths to groundwater ranged from approximately 3 to 14 ft bgs.

The groundwater flow direction in the water table (overburden zone) is west-southwest, away from Prairie Creek (October 2012) as illustrated in Figure 6-11. The groundwater flow direction in the bedrock aquifer is generally toward the northwest as shown on Figure 6-12. The overburden and bedrock aquifer flow directions are consistent with historic observations.

Hydraulic gradients are summarized in Table A1-9 (vertical) and Table A1-10 (horizontal –

overburden zone). The calculated vertical gradients are upward at paired wells MW603/MW604 and downward at paired wells MW602/H7. The horizontal gradient was 0.009 ft/ft in October 2012.

Groundwater velocities in the overburden are presented in Table A1-11 and were calculated using an average hydraulic conductivity of 1.6×10^{-3} cm/sec and an assumed porosity of 0.3. The calculated velocity was approximately 0.14 ft/day or 49.7 ft/yr.

Analytical Results

Groundwater at the site is monitored for explosive compounds. Analytical data is summarized in Table A1-2 and detected compounds are shown in Figure 6-13 (October 2011). The 2012 Semi-Annual Groundwater Monitoring Report (Toltest 2013b) and the draft final 2012 Annual Groundwater Monitoring Report (Toltest 2013c) identify wells that were sampled in 2012. Site L14 is no longer sampled in the spring season. In-plume well MW508 and compliance wells MW603 and MW604 were removed from the sampling program beginning in the spring of 2012. A brief discussion of the October 2012analytical results by well type follows.

In-Plume Wells (Overburden wells MW511 and MW512):

- **MW511**; RDX (76 µg/L) exceeded the RG
- **MW512**; RDX (220 µg/L) exceeded the RG

Early Warning Well (Overburden well H7):

- 2,4-DNT (1.5 µg/L) and 2,6-DNT (1.5 µg/L) exceeded the RGs. These compounds were not previous detected. The results are considered suspect because these compounds were also detected (October 2012) at other JOAAP monitoring wells that also did not exhibit prior detections.

Trend Analysis

Trend analysis was performed using the Mann-Kendall Test for compounds that exceeded the RGs in one or more sampling events during the five-year review period. Results are summarized in Table A1-5 and discussed below. Statistical test outputs are provided in Attachment 1.

- **Well H7;** 2,4-DNT and 2,6-DNT exceeded the RGs. Both compounds exhibit no trends at the 80 percent and 90 percent confidence levels. The Stability Test, performed if no trend exists at the 80 percent confidence level, was stable for 2,6-DNT and not stable for 2,4-DNT. There have been no previous detections for these compounds at H7 and the results are considered suspect because they were detected during October 2012 at other JOAAP monitoring wells that also did not exhibit prior detections.
- **Well MW511;** RDX exceeded the RG. Test results indicate an increasing trend at the 80 percent confidence level and no trend at the 90 percent confidence level.
- **Well MW512;** RDX exceeded the RG. Test results indicate increasing trends at the 80 percent and 90 percent confidence levels.

Trend Plots and Cleanup Time Estimates

Trend plots were prepared for RDX (Graphs 9 and 10) using data after completion of the RA in August 2005 plus results from a sampling event conducted prior to completion of the RA to provide a baseline. Only results from the fall sampling events are included to reduce the data variability and increase the accuracy of the projected time to reach the RGs. LTM was reduced

to the fall season because the highest explosives concentrations were consistently observed at this time. Results and observations are discussed below. Table A1-4 summarizes the results of the analysis.

In-Plume Wells (MW511 and MW512):

- **MW511** (overburden well); exhibits a decreasing trend for RDX (Graph 9). Based on the equation to the best-fit curve, the estimated year at which RDX will naturally degrade to less than the RG is 2064. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.1016).
- **MW512** (overburden well) exhibits an increasing trend for RDX (Graph 10). Due to the increasing trend for RDX, cleanup time estimates could not be made. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.00005). Decreasing concentrations should eventually be observed as time from the SOU RA (completed in 2005) increases.

Early Warning Well (H7):

- There have been no exceedances of 2,4-DNT and 2,6-DNT prior to October 2012. The October 2012 exceedances are considered suspect because these compounds were also detected other wells during the same event that did not have previous detections. A trend graph was not prepared.

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The 1998 ROD estimated time for explosive compounds to reach the RG at Site L14 was 80 years or by 2078.

Bioparameters

At overburden well MW512, 2-A-4,6-DNT and 4-A-2,6-DNT have been routinely detected. These compounds are byproducts of TNT biodegradation and their presence suggests that anaerobic degradation is occurring within the plume.

6.3.8 Technical Assessment

6.3.8.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy at GRU1 is functioning as intended by the decision documents based on the following observations. Opportunities for optimization are presented in the semi-annual and annual groundwater monitoring reports that are issued pursuant to the LTM program.

Site L1

TNB, TNT, and RDX were detected in in-plume wells at concentrations exceeding the RGs during the five-year review period. Contaminated groundwater is a residual plume traveling to the southeast toward Prairie Creek.

The trend graph for MW131 indicates an increasing concentration for TNT. However, the Mann-Kendall test indicates a decreasing trend based on the dataset from 2009 through 2012. The TNB RG is estimated to be reached in 2016. Trend analysis for MW173 estimates that the

RDX RG will be reached in 2015 and the TNT RG will be reached in 2016. These estimates have low confidence based on the available data which exhibits a high degree of variability and low R^2 values. There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The estimated time presented in the 1998 ROD for explosive compounds to reach the RG was 340 years or by 2338. There were no increasing trends indicated by Mann-Kendall tests. Upward vertical gradients are typically observed in well pairs MW177/MW171 and MW172/MW173, which are located downgradient from the former source area. This indicates that explosive compounds from the former source area are not expected migrate vertically. These compounds in groundwater will eventually discharge to Prairie Creek.

SOU RA activities were completed in 1999 (PCBs) and 2005 to 2006 (explosives and organic compounds). Contaminated soils were excavated and treated/disposed off site. These actions are expected to minimize contaminant loading to groundwater and allow natural attenuation mechanisms to contain and diminish COC concentrations within the GMZ. The presence of explosive breakdown products 2-A-4,6-DNT and 4-A-2,6-DNT detected at in-plume wells indicates that anaerobic degradation is likely occurring. Natural attenuation mechanisms appear to be limiting the areal extent of the plume within the GMZ boundary.

There have been no RG exceedances for explosive compounds outside the GMZ throughout all sampling conducted at the site. Explosive compounds have not been detected at surface water location SW550.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents.

Site L2

RDX has been detected at concentrations that exceed the RG at an in-plume well during the five-year review period. Contaminated groundwater at the site is a residual plume traveling to the northwest toward Prairie Creek.

Trend analysis for MW404 estimates that the RDX RG will be reached in 2031. However, the Mann-Kendall test indicates an increasing trend based on the dataset from 2009 through 2012. This estimate has low confidence based on the available data which exhibits a high degree of variability and low R^2 value. There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The recent increase in concentrations may be a result of the disturbance during completion of the RA. The estimated time presented in the 1998 ROD for explosive compounds to reach the RG was 20 years or by 2018. Groundwater will likely discharge to the creek prior to reaching the GMZ at the opposite side.

SOU RA activities were completed in 1996 (solvent pits removed) and 2007 (explosives and metals contaminated soils excavated and disposed off site). The completed SOU RA is expected to reduce contaminant loading to groundwater and allow natural attenuation mechanisms to contain and diminish groundwater COC concentrations within the GMZ.

There have been no RG exceedances for explosive compounds outside the GMZ. Explosive compounds have not been detected at surface water location SW550.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents.

Site L3

RDX has been detected at in-plume well/downgradient MW412 and early warning well MW633 at concentrations that exceeded the RG. Explosive compounds were detected at early warning well MW630 at low concentrations below the RGs. Analysis using the Mann-Kendall Test indicates decreasing trends at MW412 and MW633 and no trend at MW630. Trend analysis for RDX indicates decreasing trends at MW412 and MW633 and an increasing trend at MW630. However, the Mann-Kendall test indicates a decreasing trend based on the dataset from 2009 through 2012. Trend analysis for MW412 estimates that the RDX RG will be reached in 2028 and at MW633 by 2022. These estimates have low confidence based on the available data that exhibits a high degree of variability and low R^2 values. There may be a short-term lag effect from the soil RA which is affecting groundwater concentrations. The estimated time presented in the 1998 ROD for explosive compounds to reach the RG was 50 years or by 2048. TAL metals have not exceeded the RGs.

Upward vertical gradients have been observed downgradient of the former source area in well pair MW630/MW631, which indicates that explosive compounds are not expected to migrate vertically and will eventually discharge to Prairie Creek.

The SOU RA was completed in 2008 and consisted of the excavation and off-site disposal of contaminated soil and installation of a RCRA Subtitle C cap on contaminated soil and fill adjacent to Prairie Creek. The RA is expected to minimize contaminant loading to groundwater and allow for natural attenuation mechanisms to contain and diminish COCs in groundwater within the GMZ. The presence of explosive breakdown products 2-A-4,6-DNT and 4-A-2,6-DNT in samples from in-plume/downgradient well MW412 indicates that anaerobic degradation may be occurring within the plume. These compounds are byproducts of the biodegradation of TNT. Natural attenuation mechanisms appear to be limiting the extent of groundwater contamination within the GMZ boundary.

The data indicate that there have been no RG exceedances for explosive compounds outside the GMZ. There have been occasional low level detections of explosive compounds, but no exceedances at surface water locations SW557, SW558, or SW777.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents.

Site L14

RDX has been identified at in-plume wells MW511 and MW512 at concentrations that exceeded the RG. A RDX concentration of 400 µg/L at MW512 in October 2011 was nearly double the highest concentration recorded prior to or since that date. RDX was detected at 220 µg/L in October 2012, which is consistent with all other data. 2,4-DNT and 2,6-DNT were detected at concentrations above the RGs in early warning well H7 during October 2012. These results are considered suspect because both compounds were also detected during October 2012 at other JOAAP wells that did not exhibit prior detections. Groundwater contamination remaining at the site is now a residual plume migrating to the west-southwest.

Trend analysis for MW511 estimates the RDX RG will be reached in 2064. However, the Mann-Kendall test indicates an increasing trend based on the dataset from 2009 through 2012. The recent increase in concentrations may be a result of disturbance during completion of the RA. Trend analysis for MW512 indicates increasing concentrations. These estimates have low confidence based on the available data that exhibits a high degree of variability and low R^2 values. There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The estimated time presented in the 1998 ROD for explosive compounds to reach the RGs was 80 years or by 2078. The Mann-Kendall Test for RDX indicates increasing trends at MW511 and MW512. The estimated cleanup time and Mann-Kendall test results are biased by an anomalously high concentration (400 µg/L) at MW512.

The SOU RA was completed in 2005. Contaminated soils were excavated and treated/disposed off site. The RDX concentration has been reduced to below the RG at in-plume well MW508, which has subsequently been removed from LTM. Although there was an anomalously high detection of RDX in MW512 (October 2011), the SOU RA is expected to minimize contaminant loading to groundwater and allow for natural attenuation mechanisms to contain and diminish groundwater RG exceedances within the GMZ. The presence of breakdown products 2-A-4,6-DNT and 4-A-2,6-DNT at in plume well MW512 indicates that anaerobic degradation of explosive compounds is likely occurring. Natural attenuation mechanisms appear to be limiting the areal extent of groundwater contamination within the GMZ boundary.

There have been no RG exceedances for explosive compounds outside the GMZ throughout all sampling conducted at the site.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the 400 µg/L RDX concentration at MW512 affects the analysis of cleanup time and trend analysis, which suggest that the remedy is not functioning as intended by the decision documents. Continued groundwater monitoring will provide more data to determine whether the predicted cleanup times are accurate.

6.3.8.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Risk-based concentrations were developed for explosives in groundwater and used as the RGs in the 1998 ROD. The exposure assumptions and cleanup levels for the explosive COCs found in GRU 1 are still valid (Attachment 8). Although the toxicity criteria changed for two of the GRU1 COCs (1,3,5-TNB and 2,6-DNT), the risk-based cleanup levels derived for the 1998 ROD remain protective (Table A.8-13, Attachment 8).

Since contaminated groundwater may discharge to surface water and cause localized detections of COCs under certain conditions at some sites within the GOU, surface water in these groundwater discharge areas must comply with Subparts B and D of the Illinois Water Quality Standards. As discussed in Attachment 7, groundwater discharge to surface water occurs at GRU 1 Sites L1, L2, and L3 and GRU 2 Site M1. Changes to those water quality standards were reviewed as part of Attachment 7 for the COCs in groundwater.

The primary groundwater COCs at Site L1 are explosives (1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, and RDX). As shown in Table A.7-3 (Attachment 7), the water quality standards for two

explosives (1,3,5-TNB and 2,4-DNT) changed since the 1998 ROD. However, these changes do not affect the protectiveness of the remedy. The primary groundwater COC at sites L2 and L3 is RDX. As shown in Table A.7-3, the water quality standard for RDX has not changed since the 1998 ROD.

6.3.8.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the GOU remedy for the intended use of the property as described in the 1998 ROD.

6.3.9 Issues

The following issues that do not affect protectiveness of the remedy were identified during the five-year review:

- Residual soil source concentrations have not been evaluated to determine if the groundwater RGs can be met
- Well pad repairs recommended in the Second Five-Year Review Report for the Groundwater Operable Unit may cause damage due to the potential for frost heaving
- October 2012 data for 2,4-DNT and 2,6-DNT at early warning well H7 exceeded the RGs and is considered suspect
- Trend analysis for RDX in plume well MW512 exhibits an increasing trend, which is affected by an October 2011 concentration of 400 µg/L

6.3.10 Recommendations for Follow-up Actions

The following recommendations are provided for GRU1 pursuant to the five-year review:

- Use a soil leaching model to determine what the allowable residual soil source concentrations would be so that the groundwater RGs can be met. Compare the post-remedial action residual soil concentrations to these levels to ensure that no new soil source term is contributing to the groundwater contamination. The leaching modeling should initially use the soil RGs as default concentrations to determine if they would be capable of creating a groundwater exceedance at the site. If so, a site-specific groundwater protection RG should then be calculated for comparison to excavation confirmation samples and RI results associated with soil that was left in place.
- Repair of damaged well pads recommended by the Second Five-Year Review Report should not be performed because placement of new concrete above the frost depth would create a potential for frost heaving that could damage the wells. Any voids at the well surfaces should be plugged with granular bentonite to maintain the surface seals.
- Future LTM analytical results for well H7 (Site L14) should be evaluated to confirm or refute the 2,4-DNT and 2,6-DNT exceedances observed in October 2012.
- Future LTM analytical results for well MW512 (Site L14) should be evaluated to determine whether RDX is increasing in the overburden aquifer.

6.3.11 Protectiveness Statements

The GOU remedy for GRU1 at sites L1, L2, L3, and L14 is protective of human health and the environment based on the following data and observations:

- Contaminated soils have been removed (all sites) or contained (Site L3)
- LTM data indicates that COC concentrations have not exceeded the RGs at the GMZ boundaries and that natural attenuation processes are occurring
- Site inspections and assessment of deed restrictions indicate that land uses are consistent with the IC objectives identified in the RODs and restrictions identified in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005)

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LEGEND

- MW175 (614.45) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW171 (DRY) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW178 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW550 (605.22) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
- 610 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 10, 2011.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. MW171 IS A SHALLOW BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.

north

Approved By & Date:
Revised By & Date: TLP 10/3/14
Approved By & Date: RJR 4/1/13
Drawn By & Date: TLP 3/22/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 4/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – LAP AREA, SITE L1 (OCTOBER 2011)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
10/3/14

FIGURE 6-1

DRAWING NUMBER
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LEGEND

- MW175 (DRY) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW171 (DRY) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW178 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW550 (604.11) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
- 602 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 29, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. MW171 IS A SHALLOW BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.

north

Approved By & Date:
Revised By & Date: TLP 10/3/14
Approved By & Date: RJR 4/1/13
Drawn By & Date: TLP 3/22/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 4/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP - LAP AREA, SITE L1 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 10/3/14

FIGURE 6-2

DRAWING NUMBER
10506045
010101

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Drawn By & Date: TLP 1-10-13 | Approved By & Date: | Revised By & Date: CMH 7/31/13 | Approved By & Date: RJR 2-1-13 | Approved By & Date:

LEGEND

- MW176 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW171 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW178 (606.63) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW550 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 606 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 29, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

north

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 2/1/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - LAP AREA, SITE L1 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 8/27/2012

FIGURE 6-3

DRAWING NUMBER 10506045 010101

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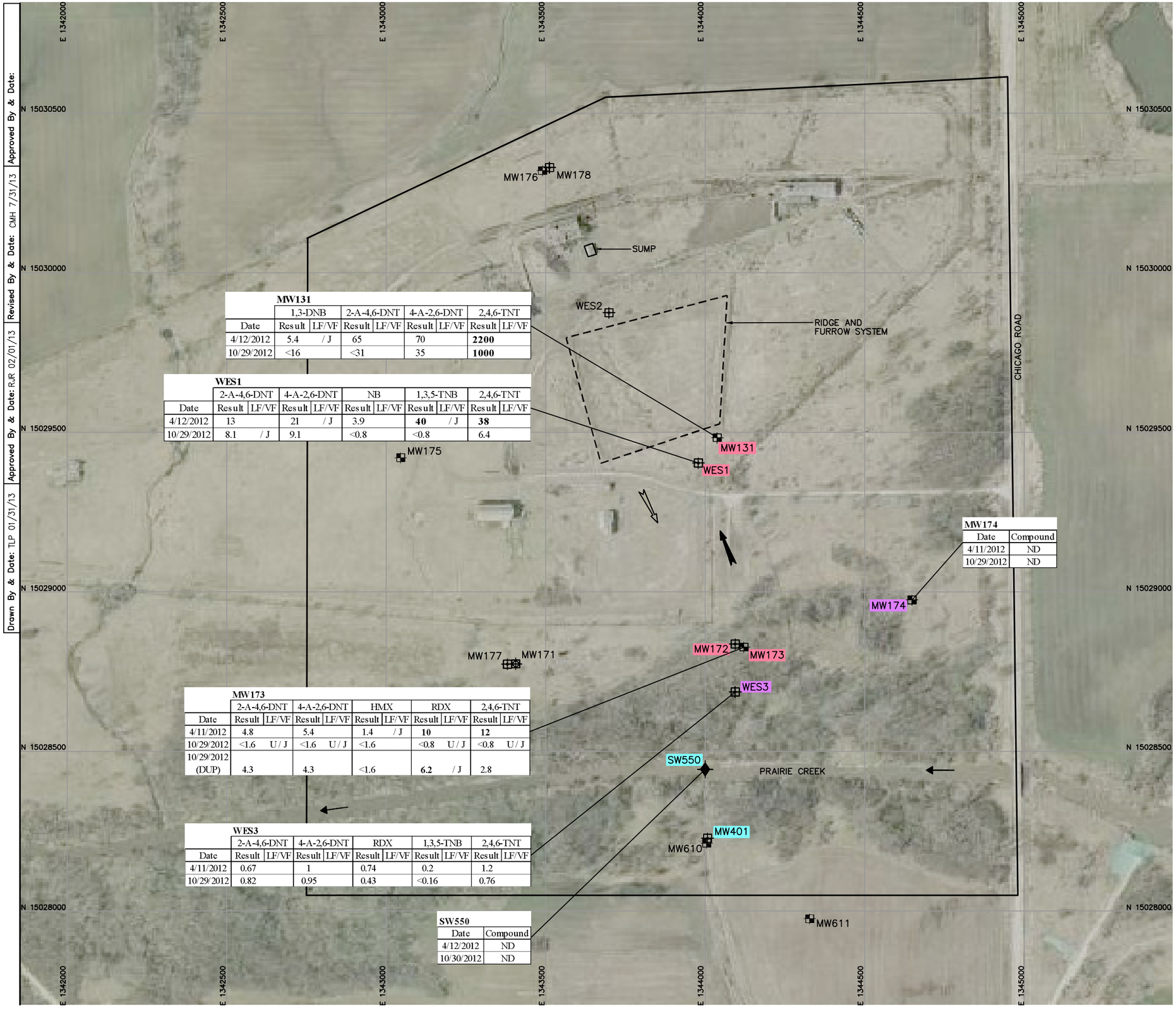
Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/31/13



MW131

	1,3-DNB		2-A-4,6-DNT		4-A-2,6-DNT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/12/2012	5.4	/ J	65		70		**2200**	
10/29/2012	<16		<31		35		**1000**	

WES1

	2-A-4,6-DNT		4-A-2,6-DNT		NB		1,3,5-TNB		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/12/2012	13		21	/ J	3.9		**40**	/ J	**38**	
10/29/2012	8.1	/ J	9.1		<0.8		<0.8		6.4	

MW174

Date	Compound
4/11/2012	ND
10/29/2012	ND

MW173

	2-A-4,6-DNT		4-A-2,6-DNT		HMX		RDX		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/11/2012	4.8		5.4		1.4	/ J	**10**		**12**	
10/29/2012	<1.6	U / J	<1.6	U / J	<1.6		<0.8	U / J	<0.8	U / J
10/29/2012 (DUP)	4.3		4.3		<1.6		**6.2**	/ J	2.8	

WES3

	2-A-4,6-DNT		4-A-2,6-DNT		RDX		1,3,5-TNB		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/11/2012	0.67		1		0.74		0.2		1.2	
10/29/2012	0.82		0.95		0.43		<0.16		0.76	

SW550

Date	Compound
4/12/2012	ND
10/30/2012	ND

LEGEND

- MW173 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW171 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW172 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- SW550 — SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- < RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
- 1,3,5-TNB 1,3,5-TRINITROBENZENE
- 2,4,6-TNT 2,4,6-TRINITROTOLUENE
- 2-A-4,6-DNT 2-AMINO-4,6-DINITROTOLUENE
- 4-A-2,6-DNT 4-AMINO-2,6-DINITROTOLUENE
- HMX HIGH MELTING EXPLOSIVE
- RDX ROYAL DEMOLITION EXPLOSIVE
- F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
- /J ESTIMATED CONCENTRATION
- LF/VF LAB FLAG/VALIDATION FLAG
- ND NOT DETECTED
- NS NO STANDARD
- RG REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
1,3-DNB	10	4
2-A-4,6-DNT	NS	NS
4-A-2,6-DNT	NS	NS
HMX	5100	260
RDX	2.6	500
1,3,5-TNB	5.1	15
2,4,6-TNT	9.5	75

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL AND OCTOBER 2012.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

north

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS – LAP AREA, SITE L1 (APRIL AND OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 2/1/2013

FIGURE 6-4

DRAWING NUMBER 10506045 010101

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Drawn By & Date:	Approved By & Date:	Revised By & Date:	Approved By & Date:
TLP 1-10-13	RJR 2-1-13	CMH 7-31-13	

LEGEND

- MW135 (614.46) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW133 (599.74) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW621 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW555 (600.24) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
- 600 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 29-30, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.

north

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP - L2
SITE L2 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-5

DRAWING NUMBER
10506045
010101

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LEGEND

- MW135 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW133 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW621 (599.85) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW555 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 601 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 29, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. MW406 IS A COMBINATION OVERBURDEN/BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.

north

Approved By & Date:
Revised By & Date: CMH 7-31-13
Approved By & Date: RJR 2-1-13
Approved By & Date:
Drawn By & Date: TLP 1-11-13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - LAP AREA, SITE L2 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-6

DRAWING NUMBER
10506045
010101

USAEC

MWH

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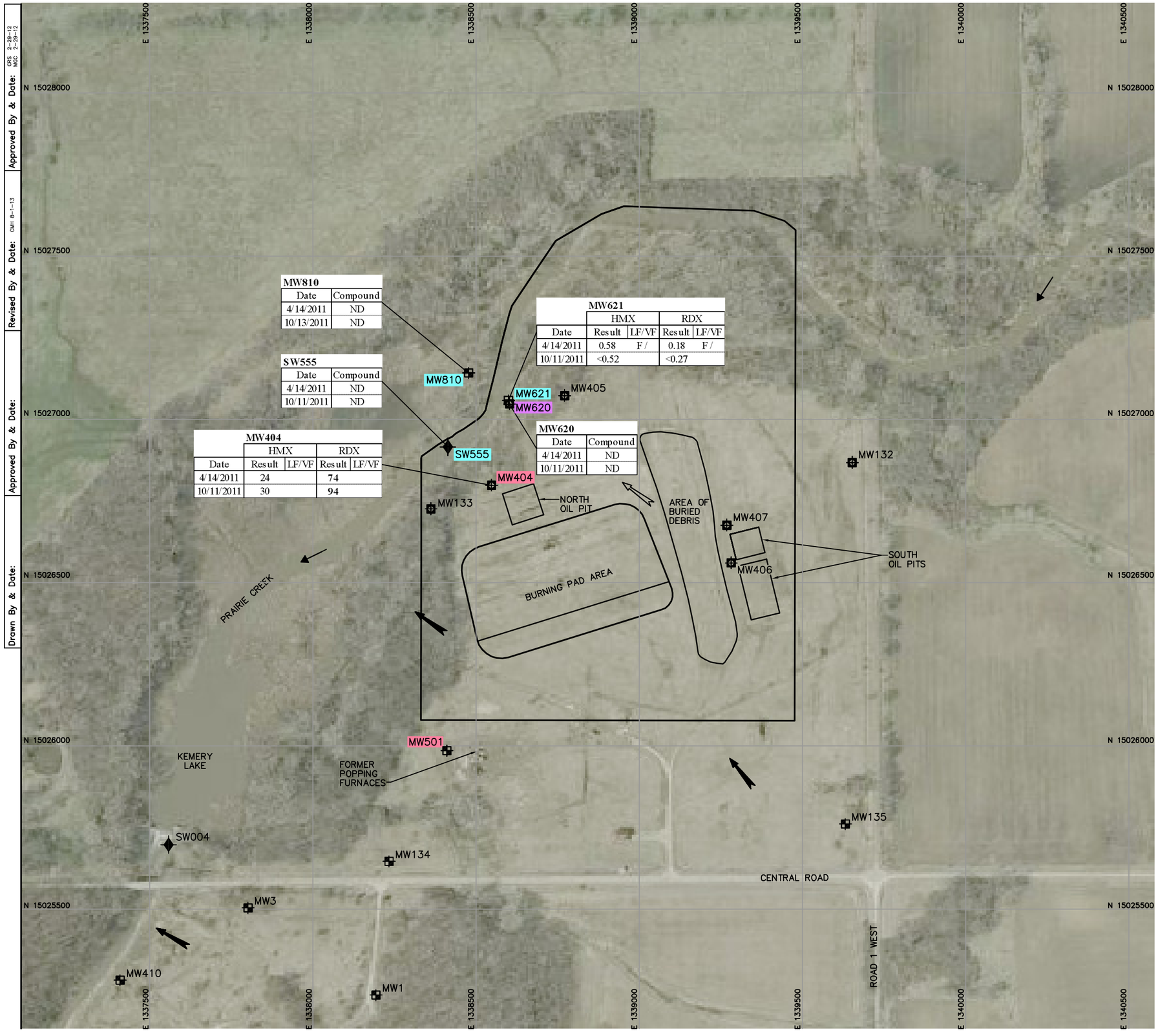
Approved By & Date: CPS 2-29-12 MGC 2-29-12
Revised By & Date: CMH 8-1-13
Approved By & Date:
Drawn By & Date:



MW810

Date	Compound
4/14/2011	ND
10/13/2011	ND

SW555

Date	Compound
4/14/2011	ND
10/11/2011	ND

MW404

	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
4/14/2011	24		**74**	
10/11/2011	30		**94**	

MW621

	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
4/14/2011	0.58	F /	0.18	F /
10/11/2011	<0.52		<0.27	

MW620

Date	Compound
4/14/2011	ND
10/11/2011	ND

LEGEND

- MW810 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW404 — COMBINED MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW621 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- SW555 — SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- < RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
- HMX HIGH MELTING EXPLOSIVE
- RDX ROYAL DEMOLITION EXPLOSIVE
- F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
- LF/VF LAB FLAG/VALIDATION FLAG
- ND NOT DETECTED
- RG REMEDIATION GOAL

Compound	RG[1]	Surface Water RG
HMX	5100	260
RDX	2.6	500

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL AND OCTOBER 2011.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

north

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 8/27/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS – LAP AREA, SITE L2 (APRIL AND OCTOBER 2011)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
8/27/2012

FIGURE 6-7

DRAWING NUMBER
10506045
010101

USAEC

MWH

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LEGEND

- MW134 (602.88) — OVERBURDEN MONITORING WELL LOCATION, NUMBER AND WATER TABLE ELEVATION
- MW136 (592.07) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW630 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW412 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW777 (587.80) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
- 600 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 29–30, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
6. MW136 IS A COMBINATION OVERBURDEN/BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.

north

Drawn By & Date: TLP 1-11-13 | Approved By & Date: RJR 2-1-13 | Revised By & Date: CMH 7-31-13 | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – LAP AREA, SITE L3/LANDFILL L3 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-8

DRAWING NUMBER
10506045
010101

USAEC

MWH

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LEGEND

- MW134 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW136 (592.07) — COMBINED MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW630 (587.58) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW412 (589.36) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW777 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 590 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 30, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
6. MW411 AND MW136 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED FOR HORIZONTAL CONTROL POINTS.

north

Drawn By & Date: TLP 1-11-13 | Approved By & Date: RJR 2-1-13 | Revised By & Date: CMH 7-31-13 | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 2/1/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - LAP AREA, SITE L3/LANDFILL L3 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 2/1/2013

FIGURE 6-9

DRAWING NUMBER 10506045 010101

USAEC

MWH

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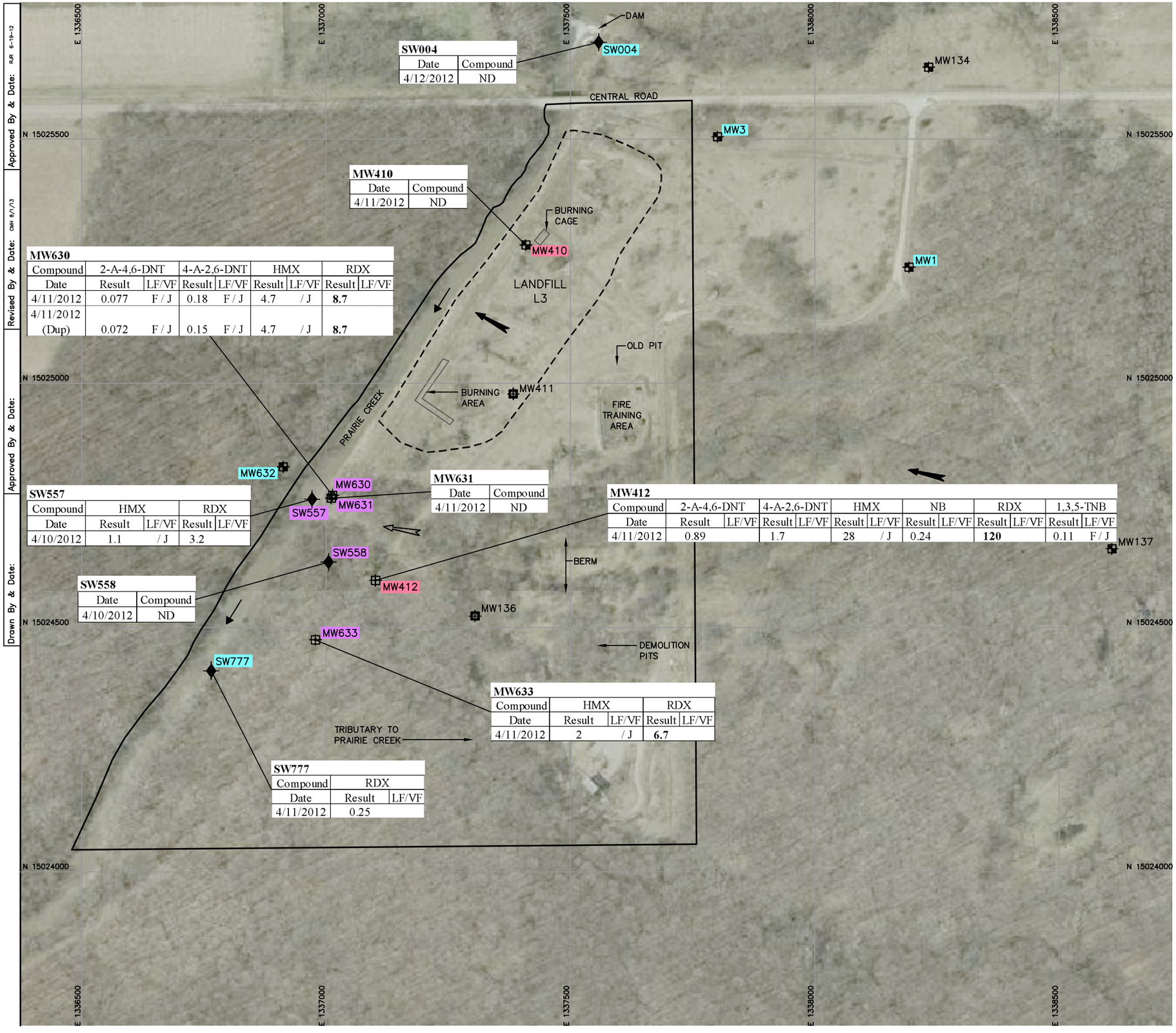
Approved By & Date: RJR 6-19-12
Revised By & Date: CMH 8/1/13
Approved By & Date:
Drawn By & Date:



SW004

Date	Compound
4/12/2012	ND

MW410

Date	Compound
4/11/2012	ND

MW630

Compound	2-A-4,6-DNT		4-A-2,6-DNT		HMX		RDX	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/11/2012	0.077	F / J	0.18	F / J	4.7	/ J	**8.7**	
4/11/2012 (Dup)	0.072	F / J	0.15	F / J	4.7	/ J	**8.7**	

SW557

Compound	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
4/10/2012	1.1	/ J	3.2	

MW631

Date	Compound
4/11/2012	ND

MW412

Compound	2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		RDX		1,3,5-TNB	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/11/2012	0.89		1.7		28	/ J	0.24		**120**		0.11	F / J

SW558

Date	Compound
4/10/2012	ND

MW633

Compound	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
4/11/2012	2	/ J	**6.7**	

SW777

Compound	RDX	
Date	Result	LF/VF
4/11/2012	0.25	

LEGEND

- MW410 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW411 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW630 — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW412 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- SW777 — SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLSOIVES DETECTIONS
- IN-PLUME/DOWNGRADIENT MONITORING POINT
- EARLY WARNING/DOWNGRADIENT MONITORING POINT
- COMPLIANCE/DOWNGRADIENT AND UPGRADIENT MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL
- 1,3,5-TNB — 1,3,5-TRINITROBENZENE
- 2-A-4,6-DNT — 2-AMINO-4,6-DINITROTOLUENE
- 4-A-2,6-DNT — 4-AMINO-2,6-DINITROTOLUENE
- NB — NITROBENZENE
- HMX — HIGH MELTING EXPLOSIVE
- RDX — ROYAL DEMOLITION EXPLOSIVE
- DUP — DUPLICATE
- F/ — CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
- /J — ESTIMATED CONCENTRATION
- LF/VF — LAB FLAG/VALIDATION FLAG
- ND — NOT DETECTED
- NS — NO STANDARD
- RG — REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
2-A-4,6-DNT	NS	NS
4-A-2,6-DNT	NS	NS
HMX	5100	260
RDX	2.6	500
1,3,5-TNB	5.1	15
NB	51	8000

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.

north

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/16/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS - LAP AREA, SITE L3/LANDFILL L3 (APRIL 2012)
THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 12/18/2012

FIGURE 6-10

DRAWING NUMBER 10506045 010101

USAEC

MWH

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LEGEND

- MW512 (576.78) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW140 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW602 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 575 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 26, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/11/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP - LAP AREA,
SITE L14 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-11

DRAWING NUMBER
10506045
010101

MWH

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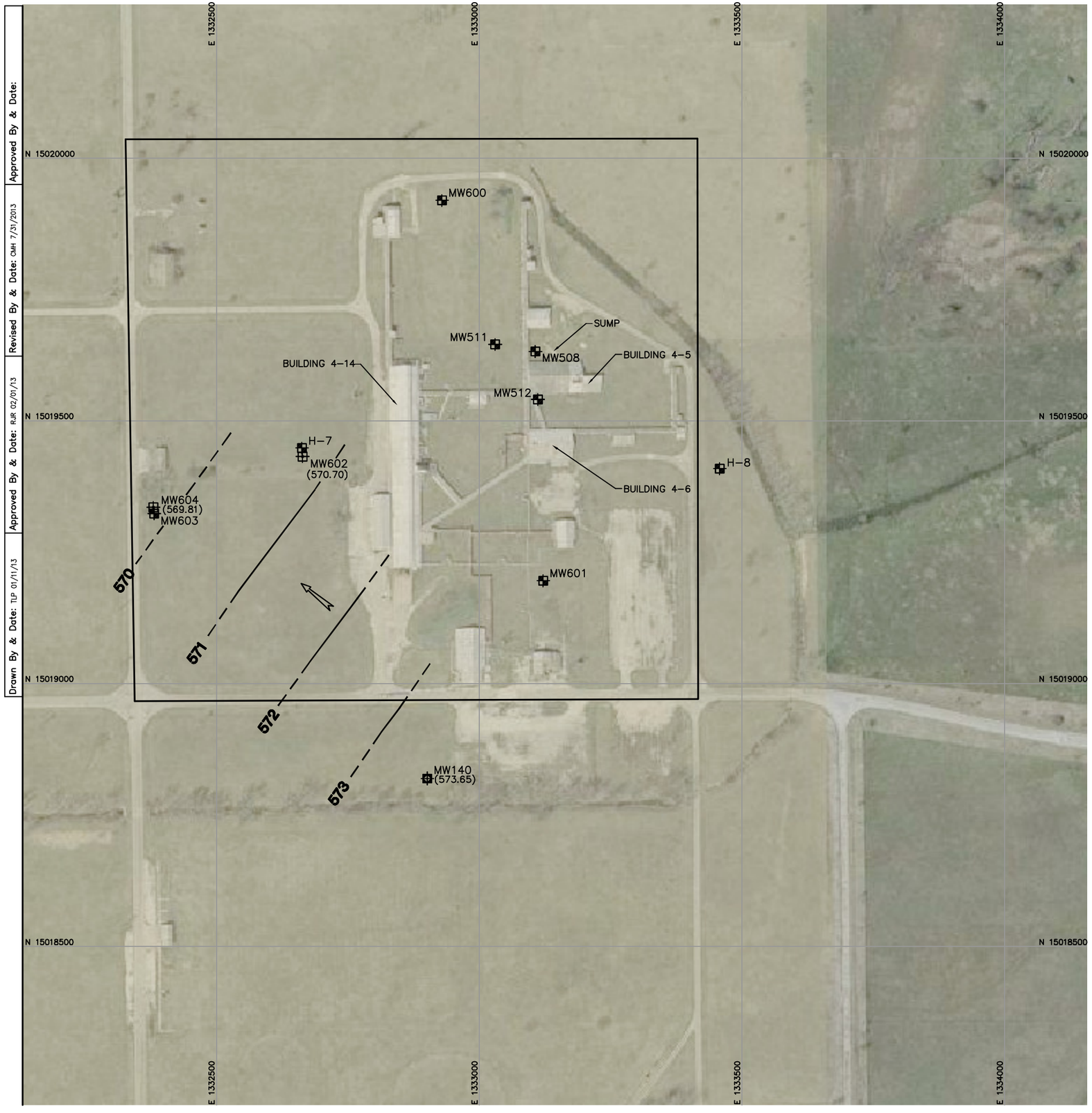

LEGEND

- MW512 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW140 (573.65) — COMBINED MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW602 (570.70) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- 573 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 26, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. MW140 IS A COMBINATION OVERBURDEN/BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.

north

Approved By & Date:
Revised By & Date: CMH 7/31/2013
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/11/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - LAP AREA, SITE L14 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-12

DRAWING NUMBER
10506045
010101

MWH

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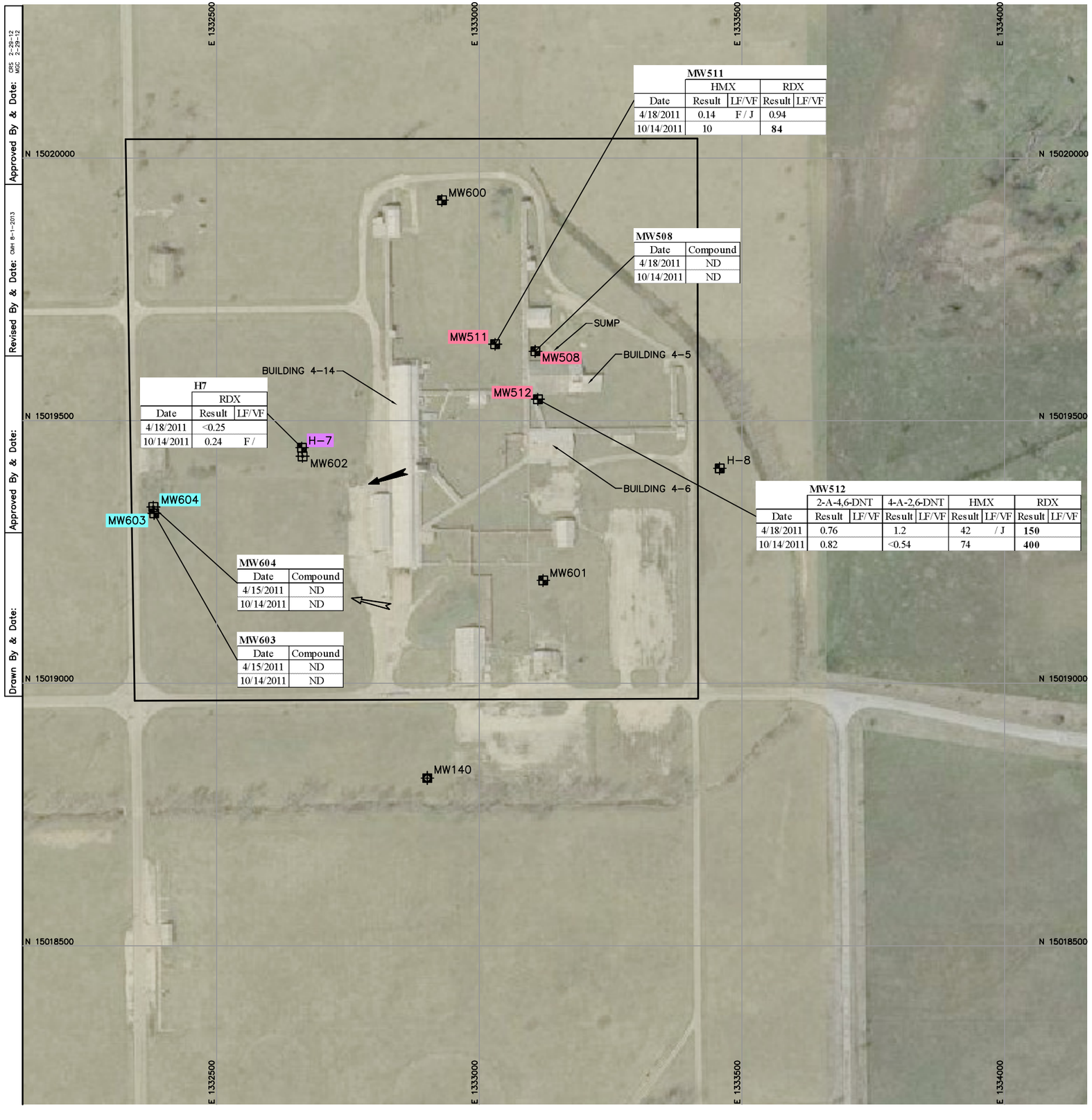

MW511

	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
4/18/2011	0.14	F / J	0.94	
10/14/2011	10		**84**	

MW508

Date	Compound
4/18/2011	ND
10/14/2011	ND

H7

	RDX	
Date	Result	LF/VF
4/18/2011	<0.25	
10/14/2011	0.24	F /

MW512

	2-A-4,6-DNT		4-A-2,6-DNT		HMX		RDX	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/18/2011	0.76		1.2		42	/ J	**150**	
10/14/2011	0.82		<0.54		74		**400**	

MW604

Date	Compound
4/15/2011	ND
10/14/2011	ND

MW603

Date	Compound
4/15/2011	ND
10/14/2011	ND

LEGEND

- MW512 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW140 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW604 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- IN–PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- < — RESULT SHOWS LAB LIMIT FOR NON–DETECTED RESULTS
- 2–A–4,6–DNT — 2–AMINO–4,6–DINITROTOLUENE
- 4–A–2,6–DNT — 4–AMINO–2,6–DINITROTOLUENE
- HMX — HIGH MELTING EXPLOSIVE
- RDX — ROYAL DEMOLITION EXPLOSIVE
- F/ — CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
- /J — ESTIMATED CONCENTRATION
- LF/VF — LAB FLAG/VALIDATION FLAG
- ND — NOT DETECTED
- NS — NO STANDARD
- RG — REMEDIATION GOAL

Compound	RG(1)
2-A-4,6-DNT	NS
4-A-2,6-DNT	NS
HMX	5100
RDX	2.6

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER–USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL AND OCTOBER 2011.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

north

Approved By & Date: CRS 2-29-12 MGC 2-29-12
Revised By & Date: CMH 8-1-2013
Approved By & Date:
Drawn By & Date:

DEVELOPED BY RJR
DRAWN BY DLF
APPROVED BY
DATE 8/27/12

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS – LAP AREA, SITE L14 (APRIL AND OCTOBER 2011)

THIRD 5–YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 8/27/2012

FIGURE 6-13

DRAWING NUMBER 10506045 010101

USAEC

MWH

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6.4 GRU2 - EXPLOSIVES AND OTHER CONTAMINANTS, MFG AREA

GRU2 is located entirely within the MFG Area and addresses explosive compounds and sulfate in groundwater associated with sites M1, M5, M6, M7, M8, and M13. The GMZ boundaries are shown on Figure 3-3, Figure 6-14 (Site M1) and Figure 6-17 (sites M5, M6, M7, M8 and M13; the main MFG Area). Elevated metals concentrations were historically identified in groundwater at several of the sites. Contaminated plumes extend into the overburden zone and upper bedrock aquifer.

The estimated volumes of impacted groundwater in various plumes at each GRU2 site identified in the 1998 ROD are presented in Table 6-3.

Table 6-3 Volume of Impacted Groundwater at GRU2 Sites

Site	Subarea	Volume (Million Gallons)
M1	Southern Ash Pile (explosives and antimony)	62
M5	Tetryl Production Area (explosives)	96
M6	TNT Ditch Complex (explosives and PCE)	96
M7	Red Water Area (explosives and antimony)	96
M8	Acid Manufacturing Area (explosives and PCE)	96
M13	Gravel Pits (explosives, cadmium and antimony)	96
Total		542

6.4.1 Background Information

6.4.1.1 Site M1

A description of Site M1 and historic site activities during operation of JOAAP are summarized in Section 5.17. The GMZ for Site M1 is shown on Figure 6-14. The site is vacant and not located near a heavily populated area.

Unconsolidated deposits at the site generally consist of silt, clay, and silty sand. Sand or gravel seams were not reported in any of the six on-site boring logs. The dolomite bedrock surface ranges from 16 to 27 ft bgs. Fracture trace maps indicate that two major fractures intersect in the north-central portion of the site and trend northwest-southeast and northeast-southwest.

Groundwater beneath and downgradient of a former ash pile historically contained elevated levels of sulfate, 2,6-DNT, and antimony in the overburden and shallow weathered bedrock. Elevated sulfate in groundwater is believed to originate in leachate from the former ash pile. 2,6-DNT and antimony exceeded the RGs on a single sample event and sulfate has exceeded its RG continuously in groundwater and occasionally in surface water. Groundwater monitoring was first conducted in 1981 and has generally been completed on a semi-annual basis since 1998.

The ash pile was removed during 2006 to 2008. Prairie Creek, the surface water body draining the area, appears to transmit groundwater that discharges directly or upwells into the streambed. Dissolved sulfate migrates northwest with the groundwater and flows into Prairie Creek. The contaminant footprint is expected to separate from the former source area over time and migrate in the overburden until it discharges to Prairie Creek. Concentrations should decrease with time and distance due to dispersion/dilution both in the groundwater and in Prairie Creek. While

sulfate can be reduced to sulfides biologically under anaerobic conditions, the process requires organic substrate to sustain the anaerobic conditions. Moreover, nitrates are reduced before sulfates. There is no evidence that sulfate reduction is occurring to any extent at the site. As a consequence, the primary attenuation mechanisms are dispersion/dilution and limited ion exchange on clay mineral surfaces of the soil. Given the nature of the attenuation mechanisms there should be an exponential decay in sulfate concentration with distance traveled from the source.

According to the 1998 ROD, risk assessment studies determined that surface waters at JOAAP posed no risk to human health and the environment and were therefore not addressed as a contaminated medium. However, groundwater discharge to surface water is a major component of the shallow groundwater system and localized detections of COCs may occur in surface water under certain conditions near areas of contaminated groundwater. Therefore, surface water is routinely sampled.

In February 2003, USACE submitted E*xplanation of Significance Difference Site M1 – Southern Ash Pile* (USACE 2003) that requested a modification to expand the northern boundary of the GMZ for Site M1 to encompass concentrations of sulfate in excess of the RG that had migrated beyond the original boundary. The modification was approved, as proposed, in February 2003. In conjunction with the change in the GMZ boundary, the early warning and compliance wells were reassigned. The new boundaries are expected to allow MNA to proceed without additional exceedances of the sulfate RG at or beyond the GMZ boundaries.

6.4.1.2 Site M5

A description of Site M5 and historic site activities during operation of JOAAP are summarized in Section 5.21. The site is located within the larger of the two GMZs included in GRU2 (refer to Figure 3-3 and Figure 6-17). It is located in the Deer Run Industrial Park and has been developed for an intermodal rail system.

Unconsolidated deposits consists of surficial clays and silts with a more permeable deposit at 5 to 7 ft bgs that ranges from sand to clayey sand to gravelly sand. This permeable layer is approximately 3 to 5 ft thick and is located over dolomite bedrock at 10 to 17 ft bgs. Fracture trace maps indicate that two major fractures intersect in the north-central portion of the site and trend northeast-southwest.

The underlying groundwater historically contained elevated levels of TNT and iron in the overburden.

Buildings in the western section of the site were removed in 1988 and the area was backfilled, regraded, and revegetated. Buildings in the eastern section of the site were demolished in 1998 in conjunction with liquidation activities at JOAAP. Unlike the western section, concrete floor slabs and footings within the eastern section remained in place. The SOU RA was completed in 1999 and consisted of the excavation and off-site treatment/disposal of contaminated soils. Various building debris was left on site.

Groundwater sampling was first conducted in 1981 and has generally been completed on a semi-annual basis site since 1998. The contaminated groundwater is a residual plume migrating to the southwest. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation due to removal of source materials.

6.4.1.3 Site M6

A description of Site M6 and historic site activities during operation of JOAAP are summarized in Section 5.22. The site is located within the larger of the two GMZs included in GRU2 (refer to Figure 3-3 and Figure 6-17). It is vacant and located within the Deer Run Industrial Park. A large intermodal rail system is contiguous with the eastern boundary of the site.

Unconsolidated deposits consist of surficial clays and silts with scattered deposits of permeable sand or gravel over dolomite bedrock. These permeable deposits are located predominately on the east side of the site and range in thickness from approximately 3 to 15 ft. The depth to bedrock ranges from 3 to 35 ft bgs. A fracture trace map indicates that a northeast-southwest pair of parallel fractures terminates on the west side of the site and another northwest-southeast trending pair terminates on the east side of the site.

The SOU RA was conducted during 1999 to 2005 and consisted of the excavation and off-site treatment/disposal of contaminated soil.

The underlying groundwater historically contained elevated levels of TNB, TNT, 2,4-DNT, 2,6-DNT, 2-NT, NB, RDX, cadmium, and iron as well as degradation products from these compounds in the overburden and shallow bedrock. The contaminated groundwater is a residual plume migrating to the west.

Groundwater monitoring was first conducted in 1981 and has generally been completed on a semi-annual basis since 1998. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation because source materials were removed.

6.4.1.4 Site M7

A description of Site M7 and historic site activities during operation of JOAAP are summarized in Section 5.23. The site is located within the larger of the two GMZs included in GRU2 (refer to Figure 3-3 and Figure 6-17). The site is vacant and located within the Deer Run Industrial Park. A large intermodal rail system is located east of the site.

Unconsolidated deposits consist primarily of clayey soils. The depth to bedrock ranges from 5 to 13 ft bgs. No significant bedrock fractures were identified on the site from fracture trace maps.

A former Red Water Lagoon was remediated in 1985. The SOU RA was conducted during 2001 to 2002 and consisted of the excavation and off-site treatment/disposal of contaminated soils.

The underlying groundwater historically contained elevated levels of TNT, 2,4-DNT, 2,6-DNT, RDX, and degradation products from these compounds in the overburden and shallow bedrock. The contaminated groundwater is a residual plume migrating to the southwest.

Groundwater monitoring was first conducted in 1981 and has generally been completed on a semi-annual basis since 1998. It is anticipated that the completed SOU RA will result in an accelerated rate of natural attenuation because source materials were removed.

Surface water was present at the site during the site inspection. According to the 1998 ROD, risk assessment studies determined that surface waters at JOAAP posed no risk to human health and the environment, and were therefore not addressed as a contaminated medium.

6.4.1.5 Site M8

A description of Site M8 and historic site activities during operation of JOAAP are summarized in Section 5.24. The site is located within the larger of the two GMZs included in GRU2 (refer to Figure 3-3 and Figure 6-17). It is located in the Deer Run Industrial Park and has been developed for an intermodal rail system.

Unconsolidated deposits consist of silty clays, silty sands and silts with occasional deposits of permeable sand or gravel over dolomite bedrock. The depth to bedrock ranges from 13 to 18 ft bgs. Fracture trace maps indicate that two major bedrock fractures intersect at the central portion of the site and trend northeast-southwest and northwest-southeast. Two additional parallel fractures are located in the northern portion of the site and trend northeast-southwest.

According to the *Finding of Suitability and Transfer* (MWH 2001a), no exceedances of soil RGs were known to be present at the site. Sulfur was removed from surficial soils during liquidation activities.

The underlying groundwater contained elevated levels of sulfate, 2,4-DNT, 2,6-DNT, and iron in the overburden. 2,4-DNT was observed in groundwater above the RG in 1991.

Groundwater sampling was first conducted in 1981 and has generally been completed on a semi-annual basis since 1998.

6.4.1.6 Site M13

A description of Site M3/Landfill M13 and historic site activities during operation of JOAAP are summarized in Section 5.28. The site is located within the larger of the two GMZs included in GRU2 (refer to Figure 3-3 and Figure 6-17). It is located in the Deer Run Industrial Park and has been developed to include vehicle parking lots, a storage area for intermodal containers, and a large warehouse. The landfill is present in the central portion of the site.

Unconsolidated deposits consist of silty clays, silty sands, silts, and sands. Some of the sand deposits are up to 15 ft thick in the southern portion of the site. The depth to bedrock ranges from 19 to 34 ft bgs. A fracture trace map indicates that three small bedrock fractures are located in the southern portion of the site. The fractures generally trend northeast-southwest. Two additional parallel bedrock fractures that trend northeast-southwest are located in the northern portion of the site.

SOU RA activities were conducted between 2006 and 2008 and consisted of installing a RCRA Subtitle D cap over a former disposal area. This area is now referred to as Landfill M13.

Groundwater in the overburden contained elevated levels of TNB, TNT, 2,4-DNT, 2,6-DNT, antimony, and cadmium as well as degradation products from these compounds. It is anticipated that the completed SOU RA will accelerate the rate of natural attenuation by reducing the amount of infiltration through the landfill cap.

Groundwater sampling was first conducted in 1981 and has generally been completed on a semi-annual basis since 1998.

6.4.2 Remedial Action

GOU RA activities are described in the following sections. SOU RA activities are described in Section 5.17 (Site M1), Section 5.21 (Site M5), Section 5.22 (Site M6), Section 5.23 (Site M7), Section 5.24 (Site M8), and Section 5.28 (Site M13).

6.4.2.1 Remedy Selection

A limited action alternative (MNA) was chosen for GRU2 in the 1998 ROD.

6.4.2.2 Remedy Implementation

The GOU RD/RA Work Plan documents remedial design/remedial action activities for the GOU. Since implementation of the work plan, semi-annual groundwater monitoring has generally been conducted at JOAAP as part of the MNA remedy. A sampling schedule presented in the LTM Plan included a list of monitoring wells to be sampled, sampling frequencies, and analytical requirements (Toltest 2010).

Site M1

The LTM Plan for Site M1 includes the following requirements:

- Determine if source control has been established in the vicinity of the former ash pile
- Determine if there are concentrations of sulfate in transit that will expand the plume beyond the GMZ boundary
- Ensure that COC concentrations above the RGs are not migrating beyond the GMZ

Monitoring includes in-plume, early warning, and compliance sampling points that are identified below:

- In-plume
  - MW107
  - MW231
- Early warning
  - MW640
  - MW641
  - MW642
  - MW643
  - MW644
- Compliance
  - SW709 (surface water location in Prairie Creek at western boundary of the site where the creek leaves the GMZ boundary)
  - MW645
  - MW646
  - MW648
  - MW649

Monitoring is performed for sulfate. Sample locations and analytical parameters are summarized in Table A1-12; monitoring well information is summarized in Table A1-21.

Sites M5, M6, M7, and M8

The LTM Plan for sites M5, M6, M7, and M8 includes the following requirements:

- Determine if source control has been established in the vicinity of known historical sources
- Determine if there are concentrations of nitroaromatic compounds in transit that will expand the plume beyond the GMZ boundary
- Ensure that COC concentrations above the RGs are not migrating beyond the GMZ

Monitoring includes in-plume, early warning, and compliance sampling points that are identified below:

- In-plume
  - MW207R (located on Site M5)
  - MW212R (located on Site M6)
  - MW652 (located on Site M6)
  - MW148RR (located on Site M8)
  - MW330 (located on Site M8)
- Early warning
  - MW123R (located on Site M6)
  - MW124R (located on Site M7)
  - MW162R (located on Site M6)
  - MW313 (located on Site M6)
  - MW318 (located on Site M6)
  - MW319 (located on Site M6)
  - MW654 (located on Site M6)
- Compliance
  - MW112 (located on Site M3)
  - MW113 (located on Site M3)
  - MW115 (located on Site M4)
  - MW116 (located on Site M4)
  - MW117 (located on Site M4)
  - MW118 (located on Site M4)
  - MW119 (located on Site M4)

Monitoring is performed for explosives at all wells except MW330, where sulfate is monitored. Well locations and analytical parameters are summarized in Table A1-12; monitoring well information is summarized in Table A1-21.

Monitoring wells from Site M3, which is part of GRU3, have been included as GRU2 GMZ compliance points. Monitoring wells located within Site M4 are compliance monitoring wells for Site M6 and are located west of Site M6 along West Patrol Road. MW123R was sampled for cadmium to address an issue presented in the *Final Five-Year Review for the Groundwater Operable Unit* (MWH, 2004a).

Site M13

Groundwater monitoring at Site M13 consists of post-closure monitoring pursuant to IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 15 years. Monitoring is required on a quarterly basis for five years, followed by ten years of semi-annual monitoring. The following upgradient and downgradient wells are used:

- Upgradient wells
  - MW806 (overburden)
  - MW807 (bedrock)
- Downgradient wells
  - AEHA14R
  - AEHA15
  - MW126R
  - MW362
  - MW808
  - MW809

Corresponding downgradient results should be compared to results from the upgradient wells to determine if landfill impacts are present and to evaluate the effectiveness of the RA.

Well locations and analytical parameters are summarized in Table A1-12; monitoring well information is summarized in Table A1-21.

6.4.3 Operation and Maintenance

Periodic maintenance of the groundwater monitoring network occurs during the groundwater sampling events. There have been no major modifications to the network. As noted in the Second Five-Year Review report, concrete well pads have deteriorated at many locations. The well pads have not been repaired/replaced due to the likelihood that frost-heaving could irreparably damage the wells. Weep holes have been drilled into many protective casings to allow condensation between the protective casing and the well riser to drain. This was performed because freezing of the condensation could damage the wells.

6.4.4 Site Inspections

Representatives from Toltest (Gary Reside) and MWH (Jeff Ramsby) inspected the sites M1, M5, M6, M7, M8, and M13 during April 8 to 16, 2013. The purpose of the inspections was to assess the current site conditions, access controls, and use restrictions. The inspections were conducted in accordance with the Five-Year Review Site Inspection Checklist *(OSWER No. 9355.7-03B-P)*. Completed site inspection checklists are provided in Attachment 4.

Observations indicated that the sites are being maintained in good condition. Groundwater monitoring infrastructure issues were not identified except as noted below. Monitoring wells are routinely maintained during groundwater sampling activities.

- MW116 had been struck by a mower from the MNTP and both the protective casing and PVC well are tilted at a high angle. The well does not appear to be damaged, but attempting to straighten the well may damage it. MW116 is a compliance monitoring point for the MFG GMZ but has been removed from LTM at this time.

Site M1 is not fenced and is publically accessible via the MNTP. Sites M5, M6, M7, and M8 are gated and patrolled by BNSF. The area west of M6 is publically accessible via the MNTP. Landfill M13 is fenced and gated.

6.4.5 Land Use/Institutional Controls

Institutional controls for the sites included in GRU2 are discussed in Section 5.17.2.3 (Site M1), Section 5.21.2.3 (Site M5), Section 5.22.2.3 (Site M6), Section 5.23.2.3 (Site M7), Section 5.24.2.3 (Site M8), and Section 5.28.2.3 (Site M13).

6.4.6 Progress Since Last Five-Year Review

Changes in LTM monitoring for GRU2 sites since inception of the LTM Plan are summarized below.

6.4.6.1 Site M1

The following change was made pursuant to recommendations provided in the 2010 Annual Groundwater Monitoring Report (Toltest 2012a):

- The designation of early warning wells MW640, MW641, and MW642 was changed to in-plume due to the migration of sulfate in groundwater. The change was initiated in the 2011 Annual Groundwater Monitoring Report.

6.4.6.2 Site M5

The following changes were made pursuant to recommendations provided in the 2010 Annual Groundwater Monitoring Report (Toltest 2012a):

- In-plume well MW207R was removed from LTM (fall 2011) because RG exceedances were not identified for four consecutive rounds
- Compliance wells MW112 and MW113 (Site M3) were removed from LTM (spring 2012) because upgradient in-plume well MW207R was removed from LTM and the 2011 Annual Groundwater Monitoring Report provided a recommendation to complete a closure report for Site M5

6.4.6.3 Site M6

The following changes were made pursuant to recommendations provided in the 2010 and 2011 annual groundwater monitoring reports (Toltest 2012a, 2013a):

- Analysis for cadmium from early warning well MW123R was removed (fall 2010)
- Compliance wells MW115 and MW116 were removed from LTM (spring 2012) because there were no RG exceedances in upgradient early warning wells MW123R and MW162R (Site M6) or MW124R (Site M7)
- Well MW163 was abandoned (September 3, 2010). Abandonment activities were summarized in a letter report, *Joliet U.S. Army Ammunition Plant Monitoring Well Abandonments* (MWH 2010b). A table summarizing SOU and GOU sites monitoring wells abandoned during this review period is provided in Attachment 11.

6.4.6.4 Site M8

The following changes were made pursuant to recommendations provided in the 2010 and 2011 annual groundwater monitoring reports (Toltest 2012a, 2013a):

- In-plume well MW148RR was removed from LTM (spring 2012) because there have been no sulfate exceedances since 2009
- LTM was discontinued since the only well sampled as part of LTM (MW148RR) was removed from the program

6.4.6.5 Site M13

The following change was made pursuant to recommendations provided in the 2010 Annual Groundwater Monitoring Report (Toltest 2012a):

- Downgradient wells AEHA14R and AEHA15 were removed from LTM (spring 2012) because the wells were problematic; the wells have not been abandoned

6.4.7 Data Review

The following section present a summary of site characteristics and groundwater quality results based on the LTM. The purpose of these summaries is to evaluate whether the MNA remedy is performing as intended by the 1998 ROD. Statistical test outputs, trend plots, and data tables are provided in Attachment 1.

6.4.7.1 Site M1

Hydrogeology

Groundwater levels measured during the five-year review period are summarized in Table A1-22 and surface water elevations are summarized in Table A1-23. The depths to groundwater varied from approximately 1 to 10 ft bgs.

Groundwater flow in the water table (overburden zone) was northwest toward Prairie Creek as illustrated on Figure 6-14 (October 2012). Based on historic groundwater flow data, Prairie Creek is a likely discharge point for shallow groundwater in the vicinity of Site M1. Groundwater flow in the bedrock aquifer was generally toward the northwest as shown on Figure 6-15 (October 2012). This flow direction is consistent with historic observations.

Hydraulic gradients are summarized in Table A1-24 (horizontal-overburden zone) and Table A1-25 (vertical). The vertical gradients were downward at well pairs MW351/MW640 and MW641/MW642 (October 2012). The horizontal gradient was 0.0306 ft/ft (October 2012).

Groundwater velocities in the overburden are presented in Table A1-26 and were calculated using an average hydraulic conductivity of 6.6×10^{-5} cm/sec and an assumed porosity of 0.3. The calculated groundwater velocity in the overburden is approximately 0.02 ft/day or 6.9 ft/yr.

Analytical Results

Groundwater at the site is monitored for sulfate. Analytical data is summarized in Table A1-17 (indicator parameters – sulfate). Sulfate detections are shown on Figure 6-16. A summary of sulfate RG exceedances follows.

In-Plume Wells (MW107, MW231, MW640, MW641, and MW642):

- **MW107** (combination well); 22,000 mg/L
- **MW231**(overburden well); 36,000 mg/L
- **MW640** (bedrock well); 4,300 mg/L
- **MW641** (overburden well); 1,100 mg/L

Early Warning Wells (MW643 and MW644): no exceedances

Compliance Points (MW645, MW646, MW648, MW649, and SW709): no exceedances

Trend Analysis

Trend analysis for sulfate was performed for all wells that exceeded the RG in one or more sampling events during the five-year review period using the Mann-Kendall Test. Results are summarized in Table A1-19 and discussed below. Test outputs are provided in Attachment 1.

- **MW107** exceeded the RG in one or more sampling events from 2009 through 2012; decreasing trends were observed at the 80 and 90 percent confidence levels
- **MW231** exceeded the RG in one or more sampling events from 2009 through 2012; a decreasing trend was observed at the 80 percent confidence level and no trend was observed at the 90 percent confidence level
- **MW640** exceeded the RG in one or more sampling events from 2009 through 2012; no trends were observed at the 80 and 90 percent confidence levels
- **MW641** exceeded the RG in one or more sampling events from 2009 through 2012; no trends were observed at the 80 and 90 percent confidence levels
- **MW642** exceeded the RG in one or more sampling events from 2009 through 2012; decreasing trends were observed at the 80 and 90 percent confidence levels

Trend Plots and Cleanup Time Estimates

Trend plots were prepared for sulfate at MW107 (Graph 11), MW231 (Graph 12), MW640 (Graph 13), MW641 (Graph 14), and MW642 (Graph 15) using data after completion of the RA in June 2008 and from a sampling event conducted prior to completion of the RA to provide a baseline. Results and observations are discussed below. Table A1-18 summarizes the results of the analysis.

In-Plume Wells (MW107, MW231, MW640, MW641, and MW642):

- **MW107** (combination well) exhibits an increasing trend for sulfate (Graph 11). Due to the increasing trend for sulfate, cleanup time estimates could not be made. This estimate has low confidence based on the available data that exhibits a high degree of variability and a low R^2 value (0.0042). Decreasing concentrations should eventually be observed for sulfate as time from the SOU RA (completed in 2008) increases.
- **MW231** (overburden well) exhibits decreasing trend for sulfate (Graph 12). Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2433. This estimate has low confidence based on the available data that exhibits a high degree of variability and a low R^2 value (0.0222).
- **MW640** (Bedrock well) exhibits an increasing trend for sulfate (Graph 13). The concentration of sulfate has been relatively constant since April 2009 and decreased in October 2012. Due to the increasing trend for sulfate, cleanup time estimates could not be made. This estimate has low confidence based on the available data that exhibits a

high degree of variability and a low R^2 value (0.2221). Decreasing concentrations should eventually be observed for sulfate as time from the SOU RA (completed in 2008) increases.

- **MW641** (overburden well) exhibits a decreasing trend for sulfate (Graph 14). Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2118. This estimate has low confidence based on the available data that exhibits a high degree of variability and a low R^2 value (0.004).
- **MW642** (overburden well) exhibits a decreasing trend for sulfate (Graph 15). Sulfate was below the RG in October 2012 for the first time since April 2008. Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2058. This estimate has low confidence based on the available data that exhibits a high degree of variability and a low R^2 value (0.0054). There was no estimated time presented in the ROD for sulfate to reach the RG.

Early Warning Wells (MW643 and MW644):

- **MW643** (overburden well); sulfate has been detected at low levels below the RG; a trend plot was not prepared
- **MW644** (bedrock well); sulfate has been detected at low fluctuating levels below the RG; a trend plot was not prepared

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. There was no estimated time for sulfate to reach the RG at Site M1 in the 1998 ROD.

The LTM Plan provides maximum allowable target concentrations for sulfate at each early warning well based on a pre-determined attenuation rate that can be used to ascertain whether the results indicate a potential future exceedance at compliance wells MW645/MW646. Although wells MW640, MW641, and MW642 were redesignated as in-plume wells, these target concentrations are evaluated for those wells. Table 6-4 summarizes the well, October 2012 analytical results, and target concentrations.

Table 6-4 Maximum Allowable Target Concentrations for Sulfate

Well	October Result (mg/L)	Target Concentration (mg/L)
MW640	4,300	6,439
MW641	1,100	1,754
MW642	390	1,728
MW643	160	438
MW644	86	427

The table shows the October 2012 sulfate concentrations did not exceed the LTM Plan target concentrations. These wells are not expected to exceed the RG at the compliance points in the future.

The observed concentrations at MW640, MW641, and MW642 are likely the effect of releases that predated the SOU RA. The attenuation rate of sulfate is slow because dilution and dispersion are the primary mechanisms and the downgradient extent of groundwater exceeding the RG will likely continue to increase in the near future.

Compliance Points (MW645, MW646, MW648, MW649, and SW709): Low levels of sulfate were sporadically detected below the RG at these locations and trend graphs were not prepared.

Bioparameters

No byproducts of biodegradation were identified. Sulfate can be reduced to sulfides biologically under anaerobic conditions and the process requires organic substrates to sustain the anaerobic conditions. Nitrates are also reduced before sulfates. There is no evidence that sulfate reduction is occurring at Site M1 and dispersion and dilution are the primary attenuation mechanisms.

6.4.7.2 Site M5

Hydrogeology

Groundwater levels measured during the five-year review period are listed in Table A1-22. The depths to groundwater ranged from approximately 10 to 42 ft bgs.

Groundwater flow direction in the water table (overburden zone) and bedrock aquifer was generally toward the west as illustrated on Figure 6-17 and Figure 6-18 (October 2012). These flow directions are consistent with historic observations.

Vertical gradients were not evaluated because paired wells are not present at the site. The horizontal gradient was 0.0021 ft/ft in October 2011 (Table A1-24). The groundwater velocity in the overburden was not calculated.

Surface water at the site historically drained to Tetryl Ditch, which in turn discharged to Grant Creek. During construction of the Intermodal Center, the Tetryl Ditch was filled to facilitate the installation of an access road along the south boundary of the Intermodal Center. Surface water from the site now flows to a large sedimentation basin north of the access road in the western portion of the site.

Analytical Results

Groundwater at the site has been monitored for explosive compounds, which were not detected during the five-year review period. Groundwater was last sampled for explosive compounds at in-plume well MW207R during April 2011; no compounds were detected. This well was removed from LTM in the fall of 2011. Sampling has been discontinued at the site and compliance monitoring wells MW112 and MW113, located at Site M3, were removed from LTM in the spring of 2012.

In accordance with the LTM Plan, statistical evaluations, trend analysis, and clean-up time calculations were not performed. The 1998 ROD estimated time for explosive compounds to reach the RG for MFG sites was 50 years or by 2048.

Trend Plots and Cleanup Time Estimates

Trend plots were not prepared and cleanup times were not estimated because explosives were not detected in groundwater at the site.

The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Bioparameters

Degradation products of the explosive compounds were not detected during the review period.

6.4.7.3 Site M6

Hydrogeology

Groundwater levels measured during the five-year review period are listed in Table A1-22. The depths to groundwater ranged from less than 1 to approximately 28 ft bgs.

Groundwater flow direction in the water table (overburden zone) and bedrock aquifer was generally toward the west as illustrated on Figure 6-17 and Figure 6-18 (October 2012). These flow directions are consistent with historic observations.

Hydraulic gradients are summarized in Table A1-24 (horizontal – overburden zone) and Table A1-25 (vertical). The vertical gradients were generally downward at well pairs located along a former escarpment where the former TNT load lines were located and upward in a wetland immediately to the west. The horizontal gradient in the northern part of the site was 0.0208 ft/ft and the average horizontal gradient in the southern part of the site was 0.0245 ft/ft (October 2012). Groundwater velocities in the overburden are presented in Table A1-26; they were calculated using an average hydraulic conductivity of 8.6×10^{-4} cm/sec and an assumed porosity of 0.3. The calculated groundwater velocity was approximately 0.18 ft/day or 67.3 ft/yr in October 2012.

Analytical Results

Groundwater at the site is monitored for explosive compounds and data is summarized in Table A1-13. Explosive compound detections are illustrated on Figure 6-19. A summary of RG exceedances by well type follows:

In-Plume Wells (MW212R and MW652,):

- **MW212R** (overburden well); 2,4-DNT (2,500 µg/L), 2,6-DNT (640 µg/L), 2-NT (12,000 µg/L), and 2,4,6-TNT (200 µg/L)
- **MW652** (overburden well); 2,4-DNT (5,100 µg/L), 2,6-DNT (2,000 µg/L), 2-NT (23,000) µg/L), and 2,4,6-TNT (950 µg/L)

Early Warning Wells (MW123R, MW162R, MW313, MW318, MW319, and MW654):

- **MW313** (bedrock well); 2,4-DNT (5 µg/L) and 2,6-DNT (3.3 µg/L) exceeded the RG in October 2012. These compounds were not previously detected and the results are considered suspect because they were also detected at other JOAAP wells during October 2012 where they were not previously observed.
- **MW654** (bedrock well); 2,4-DNT (8.9 µg/L) and 2,6-DNT (4.8 µg/L).

Compliance Wells (MW117 and, MW118 and MW119):

- **MW117** (combination well); 2,4-DNT (2.6 µg/L) exceeded the RG in October 2012. This compound was not previously detected and the results are considered suspect because it was also detected at other JOAAP wells during October 2012 where it was not previously observed.

- **MW118** (bedrock well); 2,4-DNT (2.3 µg/L) exceeded the RG in October 2012. This compound was not previously detected and the results are considered suspect because it was also detected at other JOAAP wells during October 2012 where it was not previously observed.

Trend Analysis

Trend analysis was performed for compounds that exceeded the RG in one or more sampling events during the five-year review period using the Mann-Kendall Test. The explosive compounds meeting these criteria include 2,4-DNT, 2,6-DNT, 2-NT, 2,4,6-TNT, and RDX. Results are summarized in Table A1-20 and discussed below. Statistical test outputs are provided in Attachment 1.

- **MW117;** 2,4-DNT exceeded the RG in one or more sampling events from 2009 to 2012. The results exhibit no trend at the 90 percent confidence level with a coefficient of variation greater than 1 (not stable).
- **MW212R;** - 2,4-DNT, 2,6-DNT, 2-NT, and 2,4,6-TNT exceeded the RG in one or more sampling events from 2009 to 2012. 2,4-DNT, 2,6-DNT, and 2,4,6-TNT exhibit no trend at the 90 percent confidence level. 2,4,6-TNT has a coefficient of variation greater than 1 (not stable). 2-NT exhibits an increasing trend at the 80 percent confidence level and no trend at the 90 percent confidence level.
- **MW313**; 2,4-DNT and 2,6-DNT exceeded the RG in one or more sampling events from 2009 to 2012. These compounds exhibit no trends at the 90 percent confidence level with a coefficient of variation greater than 1 (not stable).
- **MW318;** 2,6-DNT exceeded the RG in one or more sampling events from 2009 to 2012. 2,6-DNT exhibits an increasing trend at the 90 percent confidence level.
- **MW319;** 2,4-DNT and 2,6-DNT exceeded the RG in one or more sampling events from 2009 to 2012. These compounds exhibit no trends at the 90 percent confidence level with a coefficient of variation is greater than 1 (not stable).
- **MW652**; 2,4-DNT, 2,6-DNT, 2-NT, and 2,4,6-TNT exceeded the RG in one or more sampling events from 2009 to 2012. 2,4-DNT, 2-NT, and 2,4,6-TNT exhibit no trends at the 90 percent confidence level. 2,6-DNT exhibits an increasing trend at the 80 percent confidence level and no trend at the 90 percent confidence level.
- **MW654**; 2,4-DNT, 2,6-DNT, and RDX exceeded the RG in one or more sampling events from 2009 to 2012. RDX exhibits no trend at the 90 percent confidence level. 2,4-DNT and 2,6-DNT exhibits an increasing trend at the 80 percent confidence level and no trend at the 90 percent confidence level.
- **MW118;** 2,4-DNT exceeded the RG in one or more sampling events from 2009 through 2012. The compound exhibits no trends at the 80 and 90 percent confidence levels with a coefficient of variation greater than 1 (not stable).

Trend Plots and Cleanup Time Estimates

Trend plots were prepared for TNT at MW212R (Graph 16) and MW652 (Graph 17) and for 2,4-DNT, 2,6-DNT, and 2-NT at MW652 (Graph 18, Graph 19, and Graph 20, respectively) using data after completion of the RA in February 2005 and results from a sampling event conducted prior to completion of the RA to provide a baseline. Results and observations are discussed below. Table A1-18 summarizes the results of the analysis.

In-Plume Wells (MW212R and MW652):

- **MW212R** (overburden well) exhibits a decreasing trend for TNT (Graph 16). Based on the equation to the best-fit curve, the estimated year at which TNT will naturally degrade to less than the RG is 2031. This estimate has low confidence based on available data that exhibits a high degree of variability and a low R^2 value (0.0381).
- **MW652** (overburden well) exhibits a decreasing trend for TNT (Graph 17), an increasing trend for 2,4-DNT (Graph 18), and decreasing trends for 2,6-DNT (Graph 19) and 2-NT (Graph 20). Based on the equations to best-fit curves, the estimated years that explosive compounds will naturally degrade to less than the RG is 2086 for TNT, 2264 for 2,6-DNT, and 2045 for 2-NT. These estimates have low confidence based on the available data that exhibits a high degree of variability and low R^2 values (0.0705, 0.0275, and 0.0396, respectively). Due to the increasing trend for 2,4-DNT, cleanup time estimates could not be made. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.0031). Decreasing concentrations should eventually be observed for sulfate as time from the SOU RA (completed in 2005) increases.

The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Early Warning Wells (MW123R, MW162R, MW313, MW318, MW319, and MW654):

- Explosive compounds were detected at low concentrations below the RGs and trend graphs were not prepared

Compliance Wells (MW117 and, MW118 and MW119):

Excluding the October 2012 results that are considered suspect, explosive compounds were not detected. Trend graphs were not prepared.

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Bioparameters

Analytical results exhibit declining concentrations of explosive compounds. 2-A-4,6-DNT and 4-A-2,6-DNT have been routinely detected at MW212R, MW652, and MW654. These compounds are byproducts of TNT biodegradation and their presence indicates that anaerobic degradation may be occurring within the plume.

6.4.7.4 Site M7

Hydrogeology

Groundwater levels measured during the five-year review period are listed in Table A1-22. The depths to groundwater ranged from approximately 1 to 13 ft bgs.

Groundwater flow direction in the water table (overburden zone) was west/southwest as illustrated on Figure 6-17. Groundwater flow direction in the bedrock aquifer was generally toward the west as illustrated on Figure 6-18 (October 2012). These flow directions are

consistent with historic observations.

Hydraulic gradients are summarized in Table A1-24 (horizontal – overburden zone) and Table A1-25 (vertical). The vertical gradients were upward at well pair MW216/MW217, downward at well pair MW660/MW661, and generally downward at nearby well pair MW321/MW322. The horizontal gradient was 0.0124 ft/ft in October 2012. Groundwater velocities in the overburden are presented in Table A1-26; they were calculated using an average hydraulic conductivity of 6.7×10^{-4} cm/sec and an assumed porosity of 0.3. The calculated groundwater velocity in the overburden was approximately 0.07 ft/day or 26.6 ft/yr.

Analytical Results

Groundwater at the site is monitored for explosive compounds. Analytical data is summarized in Table A1-13. A summary of results during the five-year review period is provided below.

- Explosive compounds were not detected in October 2012
- 2,4-DNT was last detected in April 2011 (0.11 µg/L) and last exceeded the RG in October 2009 (0.65 µg/L)
- RDX was last detected in October 2011 (0.65 µg/L) and last exceeded the RG in April 2007 (5.2 µg/L)
- TNT was last detected in April 2010 (1.6 µg/L) and last exceeded the RG in May 2009 (21 µg/L)

Trend Analysis

Trend analysis was performed for compounds that exceeded the RG in one or more sampling events during the five-year review period using the Mann-Kendall Test. The compounds evaluated include 2,4-DNT and 2,4,6-TNT at MW124R. 2,4-DNT and 2,4,6-TNT exhibit decreasing trends at the 80 and 90 percent confidence levels. Results are summarized in Table A1-20 and test outputs are presented in Attachment 1.

Trend Plots and Cleanup Time Estimates

Trend plots were not prepared and cleanup times were not estimated because explosive compounds were not detected in groundwater at the site.

The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Bioparameters

Analytical results exhibit declining concentrations of explosive compounds. 2-A-4,6-DNT and 4-A-2,6-DNT have been routinely detected through April 2011 at MW124R. These compounds are byproducts of the biodegradation of TNT and their presence indicates that anaerobic degradation is likely occurring within the plume.

6.4.7.5 Site M8

Hydrogeology

Groundwater levels measured during the five-year review period are presented in Table A1-17. The depths to groundwater ranged from approximately 18 to 25 ft bgs.

Groundwater flow direction in the water table (overburden zone) was west-southwest in the

northern portion of the site as illustrated in Figure 6-17 (October 2012). A groundwater high was present in the central portion of the site in the vicinity of wells MW323R and MW325R. The flow direction is consistent with historic observations. There are no bedrock wells on the site and flow direction in the bedrock aquifer was not determined.

Vertical gradients were not calculated because paired wells are not present on the site. The horizontal gradient was 0.0004 ft/ft in October 2012 (Table A1-25). Flow velocities were not calculated.

Analytical Results

Sulfate is monitored in wells MW148RR and MW330 (located on Site M8). Results are summarized in Table A1-17. A brief discussion of results by well type follows:

- **MW148RR**; sulfate has not been detected above the RG since October 2008 and was removed from sampling in the spring of 2012
- **MW330**; sulfate exceeded the RG in one or more sampling events from 2009 to 2012

Trend Analysis

Trend analysis was performed using the Mann-Kendall Test. Results are summarized in Table A1-19 and discussed below. Statistical test outputs are presented in Attachment 1.

- **MW330**; sulfate exhibits no trends at the 80 and 90 percent confidence levels

Trend Plots and Cleanup Time Estimates

A trend plot was prepared for sulfate at MW330 (Graph 21) using data from the previous 10 years, which is considered representative of site conditions and also provides a sufficient dataset since there is no specific time when an RA was completed at the site. Results and observations are discussed below. Table A1-18 summarizes the results of the analysis.

- **MW330** (overburden well) exhibits a decreasing trend for sulfate (Graph 21). Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2027. This estimate has low confidence based on the available data that exhibits a high degree of variability and a low R^2 value (0.1117).

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Bioparameters

While sulfate can be reduced to sulfides biologically under anaerobic conditions, the process requires organic substrate to sustain the anaerobic conditions. Moreover, nitrates are reduced before sulfates. There is no evidence that sulfate reduction is occurring to any extent at Site M8. Therefore, dispersion and dilution are the primary attenuation mechanisms for sulfate at the site. No other byproducts of biodegradation were identified during this review period.

6.4.7.6 Site M13

Groundwater levels measured during the five-year review period are summarized in Table A1-22. The depths to groundwater ranged from approximately 12 to 28 ft bgs.

Groundwater flow direction in the water table (overburden zone) in February, April, and July, 2012 was southeast as illustrated on Figure 6-20, Figure 6-21, and Figure 6-22. The flow direction in October was south as illustrated on Figure 6-23. Groundwater flow direction in the bedrock aquifer was southwest in February, April, July, and October, 2012 as illustrated on Figure 6-24, Figure 6-25, Figure 6-26, and Figure 6-27. These flow directions are consistent with historic observations.

Hydraulic gradients are summarized in Table A1-24 (horizontal – overburden zone) and Table A1-25 (vertical). The vertical gradients were upward in well pair MW362/MW126R, downward in well pairs MW806/MW807 (upgradient) and MW808/MW809 (downgradient), and vary from slightly upward to slightly downward in well pair MW363/MW364. The horizontal gradient was 0.0016 ft/ft in October 2012. Using an average hydraulic conductivity of 8.0×10^{-2} cm/sec and an assumed porosity of 0.3, the calculated velocity in the overburden was approximately 2.34 ft/day or 855.1 ft/yr (refer to Table A1-26).

Analytical Results

Groundwater at Site M13 is monitored for explosives, metals, VOCs, SVOCs, and indicator parameters (nitrate and sulfate). Analytical results are summarized in Table A1-13 (explosives), Table A1-14 (metals), Table A1-15 (VOCs), Table A1-16 (SVOCs), and Table A1-17 (indicator parameters). Explosive compound detections from the February and April monitoring events are shown on Figure 6-28. A brief discussion of RG exceedances in 2012 by well type follows.

Upgradient Wells (MW806 and MW807):

- **MW806** (overburden well); 2,4-DNT (1.4 µg/L) and 2,6-DNT (0.96 µg/L) exceeded the RGs in October. These compounds were not previously detected and the results are considered suspect because they were also detected at other JOAAP wells during October 2012 where they were not previously observed.
- **MW807** (bedrock well); there were no RG exceedances.

Downgradient Wells (AEHA14R, AEHA15, MW126R, MW362, MW808, and MW809):

- **AEHA14R** (overburden well) was sampled in February and has subsequently been removed from the LTM program. There were no RG exceedances.
- **AEHA15** (overburden well) was sampled in February and has subsequently been removed from the LTM program. Iron exceeded the RG at a concentration of 15 mg/L.
- **MW126R** (overburden well); 2,4-DNT (1.1 µg/L) and 2,6-DNT (0.62 µg/L) exceeded the RGs in October. These compounds were not previously detected and the results are considered suspect because they were also detected at other JOAAP wells during October where they were not previously observed.
- **MW362** (bedrock well); 2,4-DNT (6.7 µg/L), 2,6-DNT (1 µg/L), and RDX (13 µg/L) exceeded the RGs in October.
- **MW808** (overburden well); there were no RG exceedances in October.
- **MW809** (bedrock well); there were no RG exceedances in October.

Trend Analysis

Trend analysis was performed for explosive compounds that exceeded the RG in one or more sampling events during the review period using the Mann-Kendall test. The compounds evaluated were 2,4-DNT, 2,6-DNT, and RDX. Results are summarized in Table A1-20 and

discussed below. Statistical test outputs are provided in Attachment 1.

- **MW126R;** 2,4-DNT and 2,6-DNT exhibit increasing trends at the 80 and 90 percent confidence levels.
- **MW806;** 2,4-DNT and 2,6-DNT exhibit no trends at the 80 and 90 percent confidence levels. The trend for 2,4-DNT has a coefficient of variation greater than 1 (not stable).
- **MW362;** 2,6-DNT exhibits no trends at the 80 and 90 percent confidence levels. 2,4-DNT exhibits an increasing trend at the 80 percent confidence level and no trend at the 90 percent confidence level. RDX exhibits increasing trends at the 80 and 90 percent confidence levels.

Trend Plots and Cleanup Time Estimates

A trend plot was prepared for 2,4-DNT at MW362 (Graph 22) using data after completion of the RA in July 2008 and results from a sampling event conducted prior to completion of the RA to provide a baseline. Results and observations are discussed below. Table A1-18 summarizes the results of the analysis.

Upgradient Wells (MW806 and MW807):

- **MW806** (overburden well); 2,4-DNT and 2,6-DNT were not detected during all monitoring events except October 2012, when they exceeded the RGs. Trend plots were not prepared.
- **MW807** (bedrock well); explosive compounds were not detected and trend plots were not prepared.

Downgradient Wells (AEHA14R, AEHA15, MW126R, MW362, MW808, and MW809):

- **AEHA14R** (overburden well); explosive compounds were not recently detected and trend plots were not prepared.
- **AEHA15** (overburden well); explosive compounds were not recently detected and trend plots were not prepared.
- **MW126R** (overburden well); 2,4-DNT and 2,6-DNT were not detected during all monitoring events except October 2012, when they exceeded the RGs. Trend plots were not prepared.
- **MW362** (bedrock well) exhibits an increasing trend for 2,4-DNT (Graph 22) and cleanup time estimates could not be made. The trend plot exhibits a high degree of variability and a low R^2 value (0.3518). Decreasing concentrations should eventually be observed for sulfate as time from the SOU RA (completed in 2008) increases.
- **MW808** (overburden well); explosive compounds were not detected and a trend plot was not prepared.
- **MW809** (bedrock well); explosive compounds were not detected and a trend plot was not prepared.

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. The 1998 ROD did not provide estimated time for explosive compounds to reach the RG at Site M13.

Bioparameters

2-A-4,6-DNT and 4-A-2,6-DNT have been routinely detected at AEHA14R and MW362. These compounds are byproducts of the biodegradation of TNT and their presence indicates that

anaerobic degradation may be occurring within the plume.

6.4.8 Technical Assessment

6.4.8.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedy at GRU2 is functioning as intended by the decision documents based on the observations discussed below. Opportunities for optimization are presented in the semi-annual and annual groundwater monitoring reports that are issued pursuant to the LTM program.

Site M1

Groundwater at Site M1 is monitored for sulfate and recent LTM data indicates that RG exceedances occurred at in-plume wells MW107, MW231, MW640, and MW641. No exceedances were observed at the early warning wells and compliance wells/surface water locations. Trend analysis using the Mann-Kendall Test indicates either decreasing trends or no trends for sulfate at these wells.

Trend plots show decreasing trends MW231, MW641, and MW642, which is generally consistent with the Mann-Kendall analysis. Trend plots show increasing trends at MW107 and MW640, which conflict with the Mann-Kendall Analysis (no trend). However, the Mann-Kendall test indicates decreasing trends based on the dataset from 2009 through 2012. Sulfate is estimated to reach the RG in the year 2433 at in-plume well MW231, in year 2118 at in-plume well MW641, and in year 2058 at in-plume well MW642. These estimates have low confidence based on the available data that exhibits a high degree of variability and low R^2 values. There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. There was no estimated time for sulfate to reach the RG at Site M1 in the 1998 ROD.

Downward vertical gradients are typically observed at downgradient well pairs MW351/MW640 and MW641/MW642, which indicates that sulfate from the former source area will move vertically downward with the groundwater prior to discharging to Prairie Creek.

The SOU RA was conducted in 2006 to 2008 and is expected to minimize contaminant loading to groundwater and allow natural attenuation mechanisms to diminish groundwater RG exceedances within the GMZ. Contaminated groundwater is now a residual plume traveling to the northwest toward Prairie Creek. The observed concentrations at MW640, MW641, and MW642 are likely the effect of releases that predated the SOU RA. The attenuation rate of sulfate is slow because dilution and dispersion are the primary mechanisms.

There have been no RG exceedances for sulfate outside the current GMZ there have been no RG exceedances at surface water location SW709.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents.

Site M5

Site M5 was included in GRU2 because explosive compounds were historically detected in

groundwater. Sampling through April 2011 did not detect explosive compounds and monitoring at the site has been discontinued. The estimated timeframe for explosive compounds to reach the RG for MFG sites in the 1998 ROD was 50 years or the year 2048.

ICs have been implemented.

The technical assessment indicates that the remedy is functioning at Site M5 as intended by the decision documents.

Site M6

Groundwater at Site M6 is monitored for explosive compounds and the data indicate that RG exceedances for 2,4-DNT, 2,6-DNT, 2-NT, and 2,4,6-TNT have occurred at in-plume and early warning wells.

Maximum cleanup time estimates for this five-year review indicate that the RGs will be attained in year 2264 (2,6-DNT) This estimate has low confidence based on the available data which exhibits a high degree of variability and low R^2 value. There may be a short-term lag effect from the soil RA which is affecting groundwater concentrations. The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Analysis using the Mann-Kendall Test indicates no trends for all explosives evaluated. Trend plots show decreasing trends for explosives at MW212R, decreasing trends for TNT, 2,6-DNT, and 2-NT at MW652, and an increasing trend for 2,4-DNT at MW652. The Mann-Kendall test indicates an increasing trend for 2,6-DNT based on the dataset from 2009 through 2012. The recent increase in concentrations may be a result of disturbance during the RA.

All SOU RA activities have been completed and residual plumes extend west of the former source area. The presence of explosive breakdown products indicates that anaerobic degradation is occurring within the plume. Natural attenuation mechanisms appear to be limiting the extent of contaminated groundwater within the GMZ. The data indicate that there have been no RG exceedances outside the GMZ during all monitoring conducted at the site.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents even though there is a high degree of variability in the data.

Site M7

Explosive compounds were not detected in groundwater at Site M7 in 2012 and there have no RG exceedances since 2009.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents.

Site M8

Sulfate is monitored at Site M8 in MW330. Sulfate has been detected in MW330 in one or more sampling events during 2009 to 2012. The Mann-Kendall trend analysis indicates that sulfate exhibits a decreasing trend and the trend plots also show a decreasing trend. The year at which sulfate is predicted to reach the RG is 2027. This estimate has low confidence based on the

available data which exhibits a high degree of variability and low R^2 value. The estimated time presented in the 1998 ROD for MFG sites to reach the RG was 50 years, or by the year 2048.

Groundwater contamination at the site is a residual plume migrating to the west. Sulfate is attenuating slowly primarily due to dilution and dispersion. The data indicate that there have been RG no exceedances for sulfate outside the current GMZ throughout all sampling conducted at the site.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents.

Site M13

Explosive compounds 2,4-DNT, 2,6-DNT, and RDX exceeded the RGs in downgradient well MW362 in 2012. VOCs, SVOCs, and indicator parameters did not exceed the RGs. Iron exceeded the RG at AEHA15 in February 2012.

Analysis using the Mann-Kendall Test for 2,4-DNT, 2,6-DNT, and RDX does not exhibit any trends. The trend plot for 2,4-DNT at MW362 show an increasing trend. These estimates have low confidence based on the available data that exhibits a high degree of variability and low R^2 values. There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. There was no estimated time for explosive compounds to reach the RG at Site M13 in the 1998 ROD.

SOU RA activities have been completed and are expected to minimize contaminant loading to groundwater, which will allow natural attenuation mechanisms to diminish and contain COC concentrations within the GMZ. The presence of 2-A-4,6-DNT and 4-A-2,6-DNT in downgradient wells indicates that anaerobic degradation is likely occurring within the plume. There have been no RG exceedances outside the GMZ throughout all sampling conducted at the site.

ICs have been implemented and are preventing exposure to the contaminated groundwater.

The technical assessment indicates that the remedy is functioning as intended by the decision documents and the remedy is expected to be protective of human health and the environment.

6.4.8.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Risk-based concentrations were developed for explosives in groundwater and used as the RGs in the 1998 ROD. For all explosive COCs except 2-NT, the exposure assumptions and cleanup levels for GRU2 are still valid (Attachment 8). Although the toxicity criteria changed for three of the GRU2 explosive COCs (1,3,5-TNB, 2,6-DNT, and NB), the risk-based cleanup levels derived for the 1998 ROD remain protective for those other explosives (Table A.8-13, Attachment 8).

There is one groundwater COC for which updates to the toxicity criteria could result in a significantly lower risk-based RG for protection of a prairie worker (Table A.8-13). This COC (2-NT) appears in GRU 2 site M6. For 2-NT, the new cancer risk at the 1998 ROD RG would be 4×10^{-3}, as the risk-based RG decreased from 5,100 µg/L to 1.3 µg/L. This is above the

acceptable cancer risk range. 2-NT is a COC only in GRU 2 at Site M6. 2-NT has been consistently detected well above the new risk-based concentration and the 1998 ROD RG in two wells; MW212R and MW652 (refer to Table A1-13). It is being monitored in all wells at this site. 2-NT has been detected in low levels (between 1.1 and 3.3 µg/L) in well MW654 since 2003 (Table A1-13). This is considered an "early warning" well at the site. In samples obtained from MW654 in April and October of 2012, the 2-NT concentrations jumped to 18 and 86 µg/L. Likewise, in early warning well MW313, 2-NT was detected at 1.8 µg/L in 2004, 0.63 µg/L in 2009, and at 44 µg/L in October 2012. Although these levels are well below the risk-based RG from the 1998 ROD, because the toxicity criteria has changed on which the risk-based concentration was based, these detections of 2-NT raise the question of whether or not the groundwater remedy will remain protective for this constituent in GRU 2 in the future.

The ARAR-based RGs for the groundwater COCs (with the exception of explosives) were established as the IEPA Class I (35 IAC 620.410) and Class II (35 IAC 620.420) groundwater standards, as highlighted in Table A.7-1, for potable and industrial uses, respectively. When IEPA standards were not available, for explosives for example, risk-based concentrations were developed and used as the RGs. Changes to ARAR-based groundwater RGs were reviewed as part of Attachment 7. As shown in Table A.7-2, Class I groundwater standards changed for two constituents (arsenic and 1,1-dichloroethane) and Class II groundwater standards changed for three constituents (silver, 1,1-dichloroethane, and trichloroethene) since the 1998 ROD. These changes do not impact the protectiveness of the remedy.

Since contaminated groundwater may discharge to surface water and cause localized detections of COCs under certain conditions at some sites within the GOU, surface water in these groundwater discharge areas must comply with Subparts B and D of the Illinois Water Quality Standards. As discussed in Attachment 7, groundwater discharge to surface water occurs at GRU 1 Sites L1, L2, and L3 and GRU 2 Site M1. Changes to those water quality standards were reviewed as part of Attachment 7 for the COCs in groundwater. As shown in Table A.7-3, water quality standards have not changed for the primary groundwater COC at Site M1 (sulfate) since the 1998 ROD.

6.4.8.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

Site M1

No other information has come to light that would call into the question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

Site M5

No other information has come to light that would call into the question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

Site M6

No other information has come to light that would call into the question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

Site M7

No other information has come to light that would call into the question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

Site M8

No other information has come to light that would call into the question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

Site M13

No other information has come to light that would call into the question the protectiveness of the remedy for the intended use of the property as described in the 1998 ROD.

6.4.9 Issues

The following issue that may affect long-term protectiveness of the remedy was identified during the five-year review:

- New toxicology data for 2-NT indicates that the RG should be revised from 5,100 µg/L to 1.3 µg/L.

The following issues that do not affect protectiveness of the remedy were identified during the five-year review:

- Residual soil source concentrations have not been evaluated to determine if the groundwater RGs can be met.
- Well pad repairs recommended in the Second Five-Year Review Report for the Groundwater Operable Unit may cause damage due to the potential for frost heaving.
- MW116 had been struck by a mower from the MNTP and both the protective casing and PVC well are tilted to a high angle. The well does not appear to be damaged, but attempting to straighten the well may damage it. MW116 is a compliance monitoring point for the MFG Area GMZ (GRU2) but has been removed from LTM at this time. However, in the case the MFG early warning points detect RG exceedances the well would be placed back into LTM.
- The only well sampled from Site M5 (MW207R) was removed from the LTM program and LTM is no longer occurring at the site.
- LTM is no longer being performed at Site M7.
- A Closure Report for Site M8 was previously recommended. However, sulfate concentrations at monitoring well MW330 continue to exceed the RG, which is the only well that continues to be sampled as part of LTM.

6.4.10 Recommendations for Follow-up Actions

The following recommendations are provided for GRU2 pursuant to the five-year review:

6.4.10.1 General

- Use a soil leaching model to determine what the allowable residual soil source concentrations would be so that the groundwater RGs can be met. Compare the post-remedial action residual soil concentrations to these levels, to ensure that no new soil source term is contributing to the groundwater contamination. The leaching modeling should initially use the soil RGs as default concentrations to determine if they would be capable of creating a groundwater exceedance at the site. If so, a site-specific groundwater protection RG should be calculated for comparison to excavation confirmation samples and RI results associated with soil that was left in place.
- Repair of damaged well pads recommended by the Second Five-Year Review Report should not be performed as recommended because placement of new concrete above the frost depth would create a potential for frost heaving that could damage the wells. Any voids at the well surfaces should be plugged with granular bentonite to maintain the surface seals.
- Re-evaluate the groundwater well monitoring results at GRU2 Site M6 with respect to the new risk-based concentration of 2-NT. This compound is now considered to be carcinogenic to humans and the RG for 2-NT may have to be re-evaluated in order to ensure full future protectiveness.
- Prepare a closure report for Site M5 that includes a recommendation for abandoning or maintaining certain wells. The wells to be maintained would be used as control points for groundwater flow monitoring within the MFG Area GMZ. The site should be designated for "No Further Action".
- Prepare a closure report for Site M7 that includes a recommendation for abandoning or maintaining certain wells. The wells to be maintained would be used as control points for groundwater flow monitoring within the MFG Area GMZ. The site should be designated for "No Further Action".
- Completion of the Site M8 closure report should be postponed until sulfate concentrations have dropped to below the RG for a minimum of two consecutive sampling events.

6.4.10.2 Site M5

- A closure report for Site M5 should be prepared since the only well sampled (MW207R) was removed from the LTM program and monitoring is no longer occurring at the site. As part of the Closure Report, certain monitoring wells should be recommended for abandonment and certain monitoring wells should be recommended to be maintained as control points for groundwater flow monitoring within the MFG Area GMZ.
- Site M5 should be designated as a No Further Action Site.

6.4.10.3 Site M6

- Adopt the new RG for 2-NT in groundwater (1.3 µg/L) based on new toxicology data.

6.4.10.4 Site M7

- A Closure Report for Site M7 should be prepared. As part of the Closure Report, certain monitoring wells should be recommended for abandonment and certain monitoring wells should be recommended to be maintained as control points for groundwater flow monitoring within the MFG Area GMZ.
- Site M7 should be recommended to be designated as a No Further Action Site.

6.4.10.5 Site M8

- A Closure Report for Site M8 was previously recommended. However, sulfate concentrations at monitoring well MW330 continue to exceed the RG, which is the only well that continues to be sampled as part of LTM. Therefore, completion of the closure report should be postponed until sulfate concentrations have dropped to below the RG for a minimum of two sampling events.

6.4.10.6 Site M13

- There are no recommendations for Site M13.

6.4.11 Protectiveness Statements

The GOU remedy for GRU2 sites M1, M5, M7, M8, and M13 is protective of human health and the environment based on the following data and observations:

- Contaminated soils have been removed
- LTM data indicates that COC concentrations have not exceeded the RGs at the GMZ boundaries and that natural attenuation processes are occurring
- Site inspections and assessment of deed restrictions indicate that the land uses are consistent with the IC objectives identified in the RODs and restrictions identified in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005).

The GOU remedy for Site M6 currently protects human health and the environment because:

- Contaminated soils have been removed
- Site inspections and assessment of deed restrictions indicate that the land uses are consistent with the IC objectives identified in the RODs and restrictions identified in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005).

However, in order for the remedy to be protective in the long-term, the following actions need to be taken:

- Adopt the new RG for 2-NT in groundwater (1.3 µg/L) based on new toxicology data
- Evaluate whether 2-NT has exceeded the new RG at the GMZ boundaries

LEGEND

- MW104 (537.83) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW105 (543.90) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW201 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW709 (532.64) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER TABLE ELEVATION
- 540 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 25-26, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. MW105 AND MW107 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.

north

Drawn By & Date: TLP 01/11/13 | Approved By & Date: | Revised By & Date: CMH 7/31/13 | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | DATE: 2/1/13 | APPROVED BY:

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, SITE M1 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-14

DRAWING NUMBER
10506045
010101

USAEC

MWH

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Drawn By & Date: TLP 01/11/13
Approved By & Date: RJR 02/01/13
Revised By & Date: CMH 7/31/13
Approved By & Date:

LEGEND

- MW104 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW105 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW640 (539.82) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW709 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 540 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 25-26, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

north

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE: 1" = 300'

REV	DATE	BY	DESCRIPTION

POTENITOMETRIC SURFACE MAP - MANUFACTURING AREA, SITE M1 (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-15

DRAWING NUMBER
10506045
010101

USAEC

MWH

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Approved By & Date: RJR 6-19-12
Revised By & Date: CMH 8/7/13
Drawn By & Date:
Approved By & Date:

E 1318000 E 1318500 E 1319000 E 1319500 E 1320000 E 1320500 E 1321000 E 1321500

N 15022500 N 15022000 N 15021500 N 15021000 N 15020500 N 15020000

MW645

	Sulfate	
Date	Result	LF/VF
4/13/2012	67	

MW644

	Sulfate	
Date	Result	LF/VF
4/13/2012	160	

MW646

	Sulfate	
Date	Result	LF/VF
4/13/2012	110	

MW648

	Sulfate	
Date	Result	LF/VF
4/12/2012	34	

MW643

	Sulfate	
Date	Result	LF/VF
4/13/2012	58	

MW641

	Sulfate	
Date	Result	LF/VF
4/12/2012	**640**	
4/12/2012 (Dup)	**640**	

SW709

	Sulfate	
Date	Result	LF/VF
4/13/2012	60	

MW642

	Sulfate	
Date	Result	LF/VF
4/12/2012	**420**	
4/12/2012 (Dup)	**420**	

MW640

	Sulfate	
Date	Result	LF/VF
4/12/2012	**5200**	

MW107

	Sulfate	
Date	Result	LF/VF
4/12/2012	**26000**	

MW649

	Sulfate	
Date	Result	LF/VF
4/13/2012	64	

MW231

	Sulfate	
Date	Result	LF/VF
4/12/2012	**35000**	

MW647 MW645 MW646 MW644 MW643 MW648 MW641 MW642 SW709 MW649 MW351 MW640 MW107 MW231 MW106 MW347 MW105 MW201 MW104

PRAIRIE CREEK

WEST PATROL ROAD

SOUTH PATROL ROAD

LIMITS OF FORMER ASH PILE

LEGEND

- MW648 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- MW641 — COMBINED MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- MW642 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- SW709 — SURFACE WATER MONITORING LOCATION, NUMBER, AND SULFATE DETECTIONS
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

DUP DUPLICATE
LF/VF LAB FLAG/VALIDATION FLAG
mg/L MILLIGRAMS PER LITER
NS NO STANDARD
RG REMEDIATION GOAL

	Sulfate
Units	mg/L
Project Action Limit[1]	400
Surface Water RG	NS

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
5. CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (mg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

north

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/18/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SULFATE DETECTIONS – MANUFACTURING AREA, SITE M1 (APRIL 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 12/18/2012

FIGURE 6-16

DRAWING NUMBER 10506045 010101

USAEC

MWH

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LEGEND

- MW325R (555.05) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW652 (551.73) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW356 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 2', DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL OCTOBER 22-25, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. MW117, MW127R, AND MW327R ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/17/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 1200'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, MFG – SITES M4, M5, M6, M7, M8, M9, M13, AND OTHER AREAS (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 2/1/2013

FIGURE 6-17

DRAWING NUMBER
10506045
010101

USAEC

MWH

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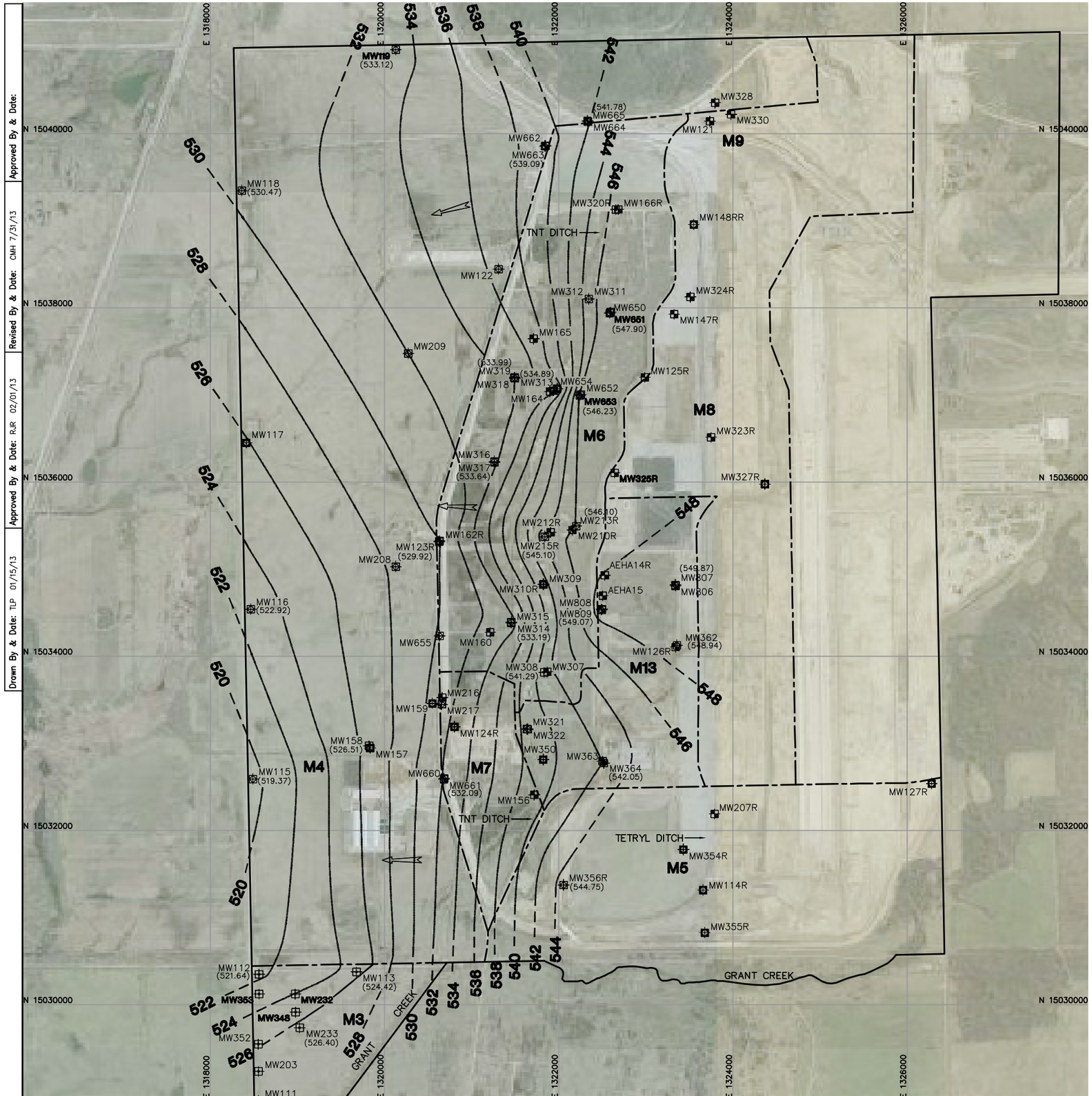

LEGEND

- MW325R — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356R (544.75) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 (541.29) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- 540 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 2 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL OCTOBER 22-25, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/15/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 1200'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - MANUFACTURING AREA, MFG - SITES M4, M5, M6, M7, M8, M9, M13, AND OTHER AREAS (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-18

DRAWING NUMBER
10506045
010101

USAEC

MWH

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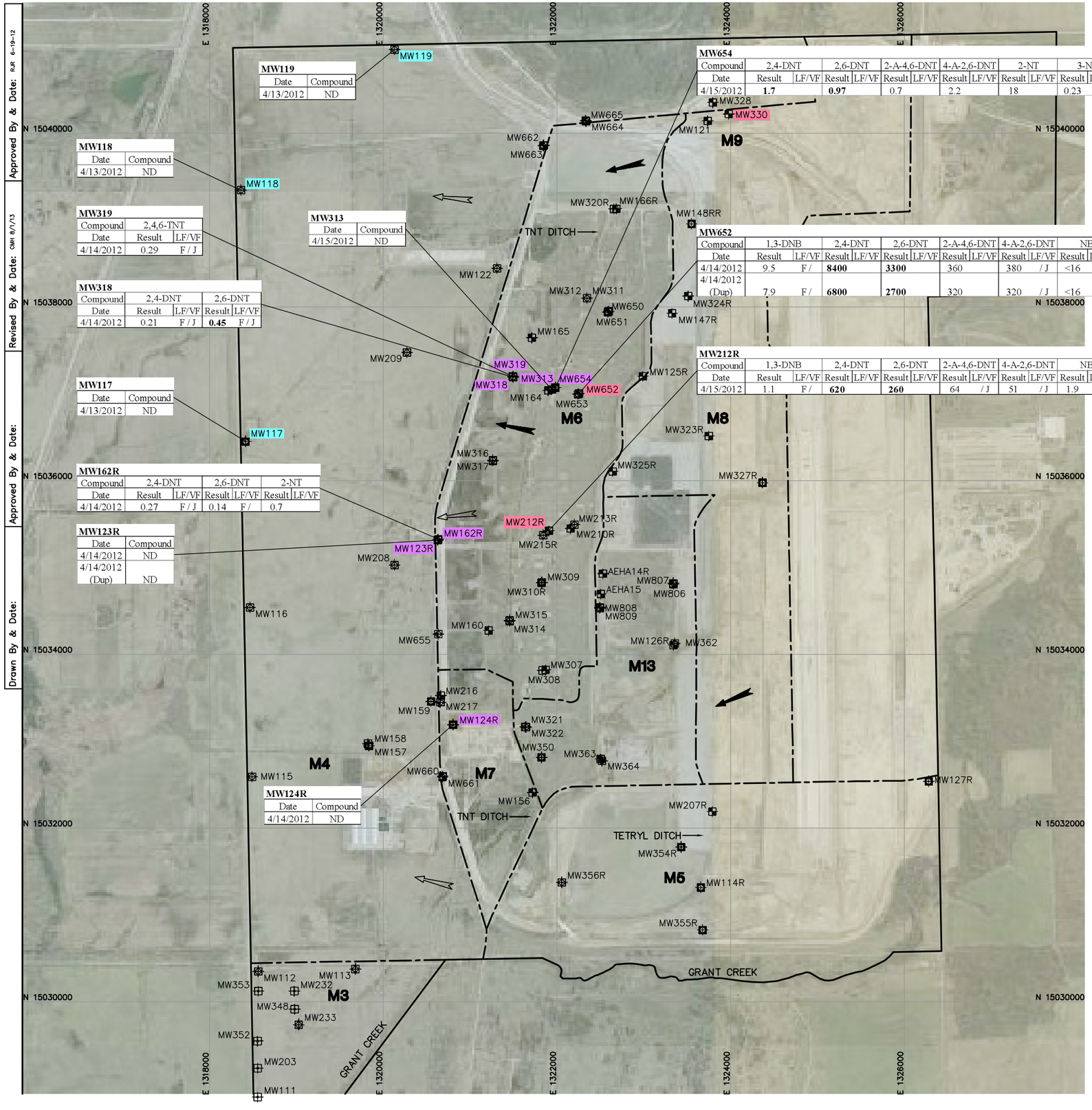
Drawn By & Date:
Approved By & Date:
Revised By & Date: CMH 8/1/13
Approved By & Date: RJR 6-19-12



MW119

Date	Compound
4/13/2012	ND

MW118

Date	Compound
4/13/2012	ND

MW313

Date	Compound
4/15/2012	ND

MW319

Compound	2,4,6-TNT	
Date	Result	LF/VF
4/14/2012	0.29	F / J

MW318

Compound	2,4-DNT		2,6-DNT	
Date	Result	LF/VF	Result	LF/VF
4/14/2012	0.21	F / J	**0.45**	F / J

MW117

Date	Compound
4/13/2012	ND

MW162R

Compound	2,4-DNT		2,6-DNT		2-NT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/14/2012	0.27	F / J	0.14	F /	0.7	

MW123R

Date	Compound
4/14/2012	ND
4/14/2012 (Dup)	ND

MW124R

Date	Compound
4/14/2012	ND

MW654

Compound	2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		2-NT		3-NT		4-NT		RDX		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/15/2012	**1.7**		**0.97**		0.7		2.2		18		0.23	F / J	11		0.31	/ J	0.18	/ J

MW652

Compound	1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		NB		2-NT		4-NT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/14/2012	9.5	F /	**8400**		**3300**		360		380	/ J	<16		**44000**		28000		**1600**	
4/14/2012 (Dup)	7.9	F /	**6800**		**2700**		320		320	/ J	<16		**35000**		22000	/ J	**1300**	

MW212R

Compound	1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		NB		2-NT		4-NT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
4/15/2012	1.1	F /	**620**		**260**		64	/ J	51	/ J	1.9		4100		2100		**39**	

LEGEND

- MW212R — OVERBURDEN MONITORING WELL LOCATION NUMBER, AND EXPLOSIVES DETECTIONS
- MW124R — COMBINED MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW115 — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES
- < — RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS

1,3-DNB	1,3-DINITROBENZENE
2,4,6-TNT	2,4,6-TRINITROTOLUENE
2,4-DNT	2,4-DINITROTOLUENE
2,6-DNT	2,6-DINITROTOLUENE
2-A-4,6-DNT	2-AMINO-4,6-DINITROTOLUENE
2-NT	2-NITROTOLUENE
3-NT	3-NITROTOLUENE
4-A-2,6-DNT	4-AMINO-2,6-DINITROTOLUENE
4-NT	4-NITROTOLUENE
NB	NITROBENZENE
RDX	ROYAL DEMOLITION EXPLOSIVE
DUP	DUPLICATE
F/	CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
/J	ESTIMATED CONCENTRATION
LF/VF	LAB FLAG/VALIDATION FLAG
ND	NOT DETECTED
NS	NO STANDARD
RG	REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
1,3-DNB	10	4
2,4,6-TNT	9.5	75
2,4-DNT	0.42	330
2.6-DNT	0.42	150
2-A-4,6-DNT	NS	NS
2-NT	5100	62
3-NT	NS	NS
4-A-2,6-DNT	NS	NS
4-NT	NS	NS
NB	51	8000
RDX	2.6	500

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

north

DLF — DRAWN BY
RJR — DEVELOPED BY
12/16/12 — DATE
APPROVED BY

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 1200'

REV | DATE | BY | DESCRIPTION

EXPLOSIVES DETECTIONS – MANUFACTURING AREA, MFG – SITES M6, M7, M9, AND OTHER AREAS (APRIL 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 12/19/2012

FIGURE 6-19

DRAWING NUMBER 10506045 010101

USAEC

MWH

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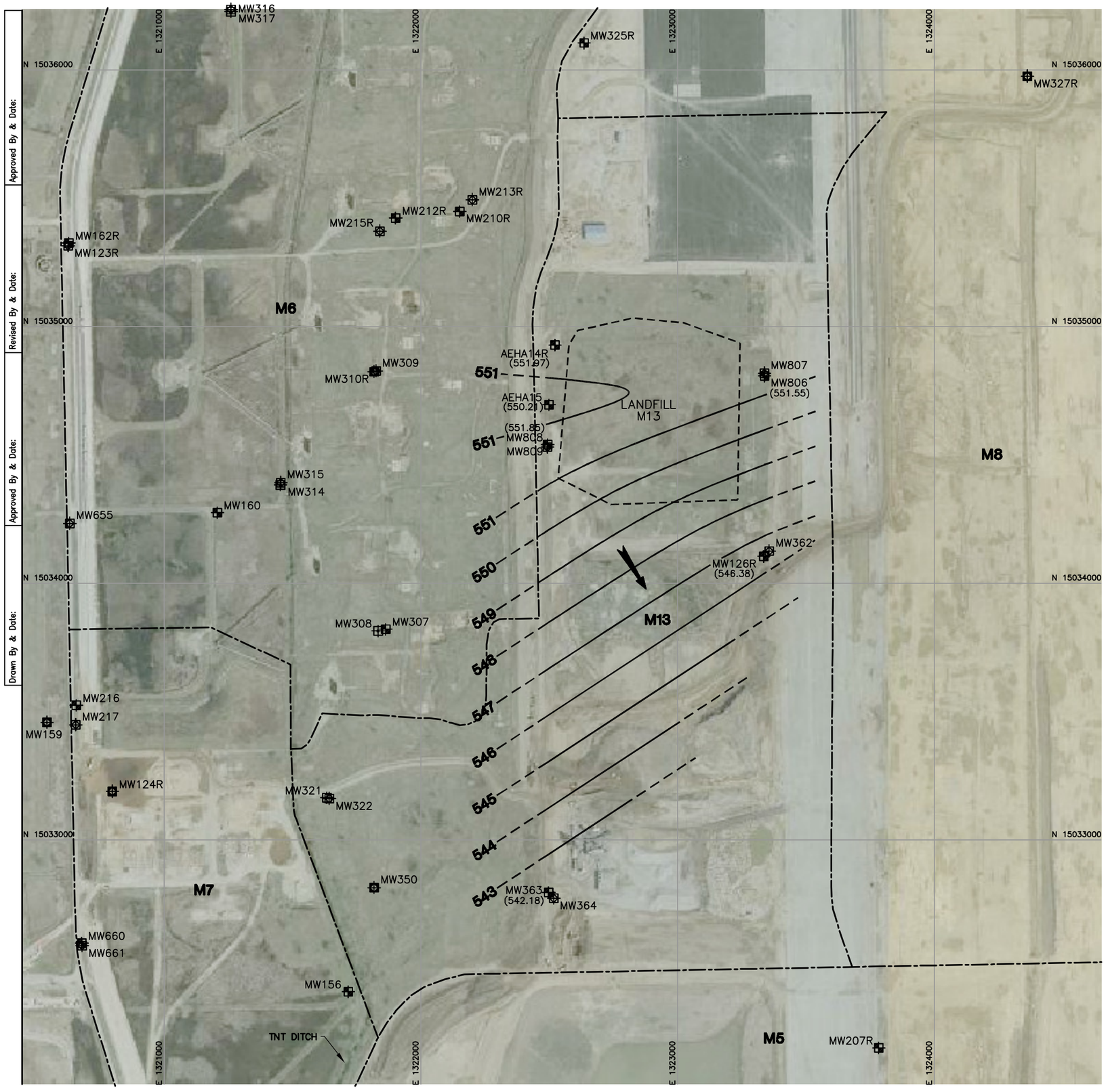

LEGEND

MW126R (546.38)	OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
MW350	COMBINED MONITORING WELL LOCATION AND NUMBER
MW356	SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
MW308	DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
550	WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
	DIRECTION OF WATER TABLE FLOW
	STUDY AREA BOUNDARIES
	APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON FEBRUARY 29, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date:
Revised By & Date:
Approved By & Date:
Drawn By & Date:

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/16/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP - FEBRUARY 2012)
MANUFACTURING AREA, SITE M13 LANDFILL
THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
12/19/2012

FIGURE 6-20

DRAWING NUMBER
10506045
010101

USAEC

MWH

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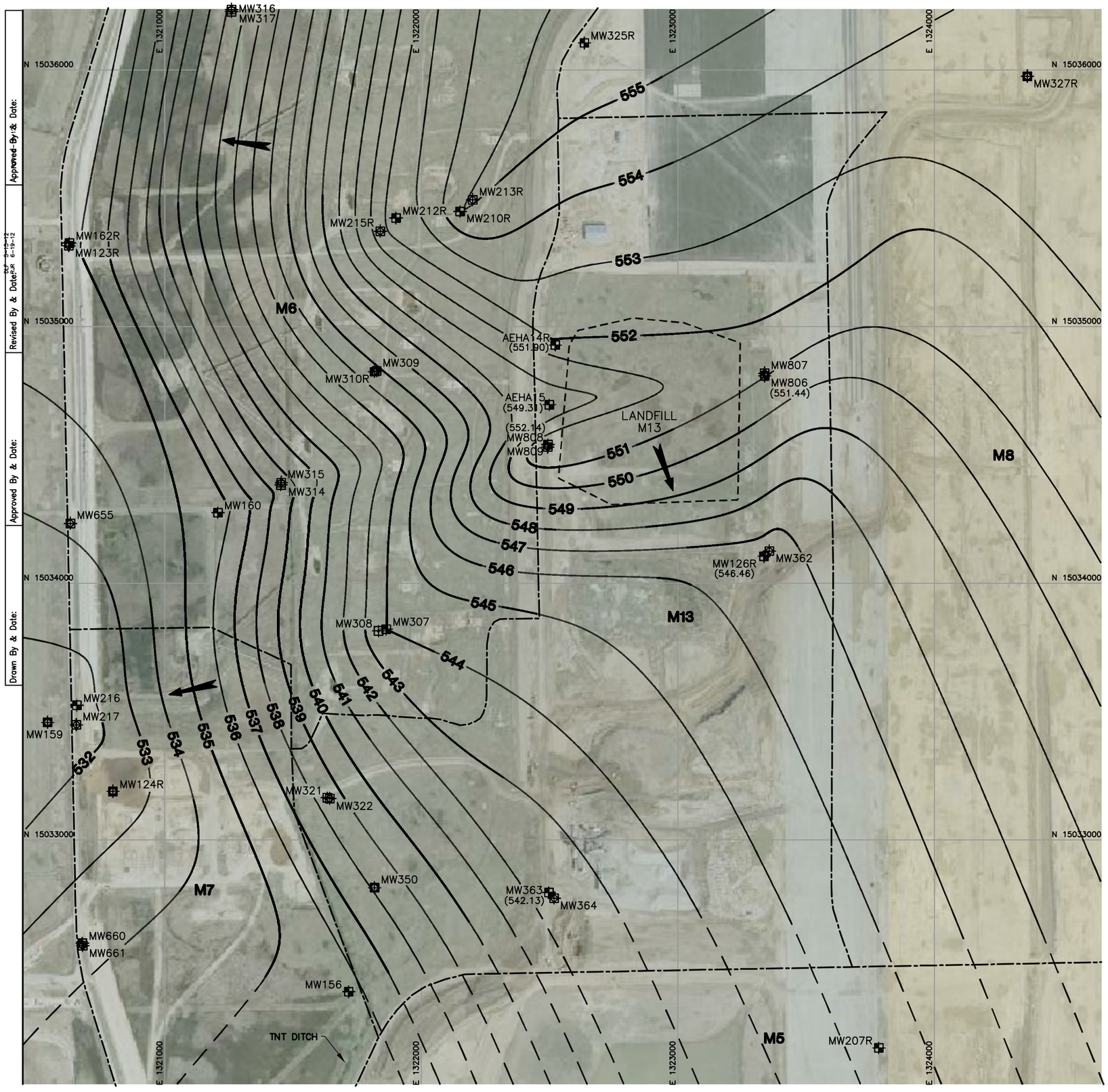

LEGEND

- MW126R (546.46) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — WATER TABLE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 16, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. SEE FIGURE 3-10 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
6. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date:
Revised By & Date: DLF 12-19-12
Approved By & Date:
Drawn By & Date:

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/18/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP - MANUFACTURING AREA, SITE M13 LANDFILL (APRIL 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
12/19/2012

FIGURE 6-21

DRAWING NUMBER
10506045
010101

USAEC

MWH

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LEGEND

- MW126R (546.95) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — WATER TABLE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON JULY 17, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/15/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, SITE M13 LANDFILL (JULY 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-22

DRAWING NUMBER
10506045
010101

USAEC

MWH

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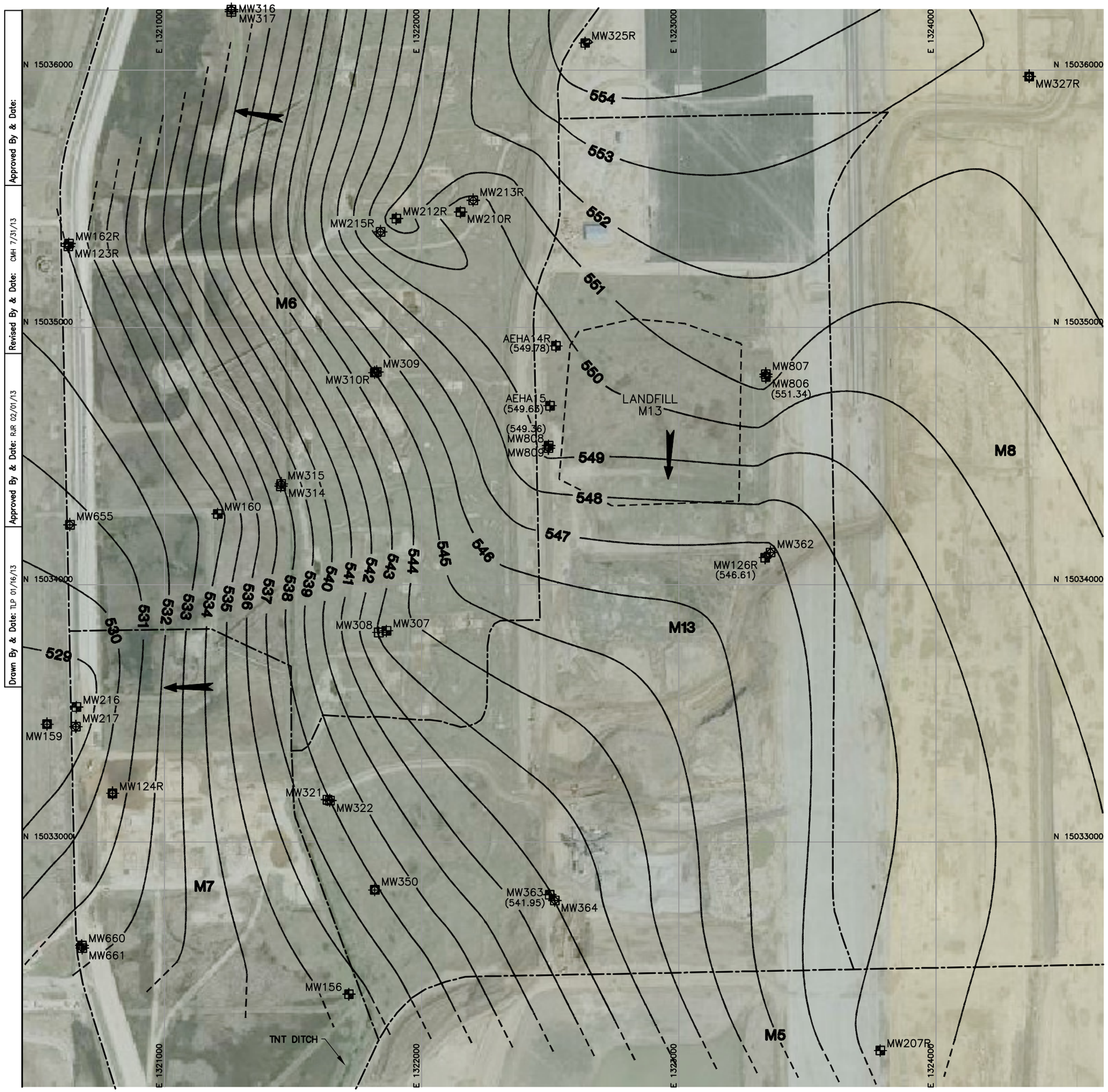

LEGEND

- MW126R (546.61) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — WATER TABLE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. SEE FIGURE 3-16 FOR WATER TABLE CONFIGURATION OF AREA SURROUNDING LANDFILL M13.
4. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 24-25, 2012.
5. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
6. SEE FIGURE 3-16 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/16/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, SITE M13 LANDFILL (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-23

DRAWING NUMBER
10506045
010101

USAEC

MWH

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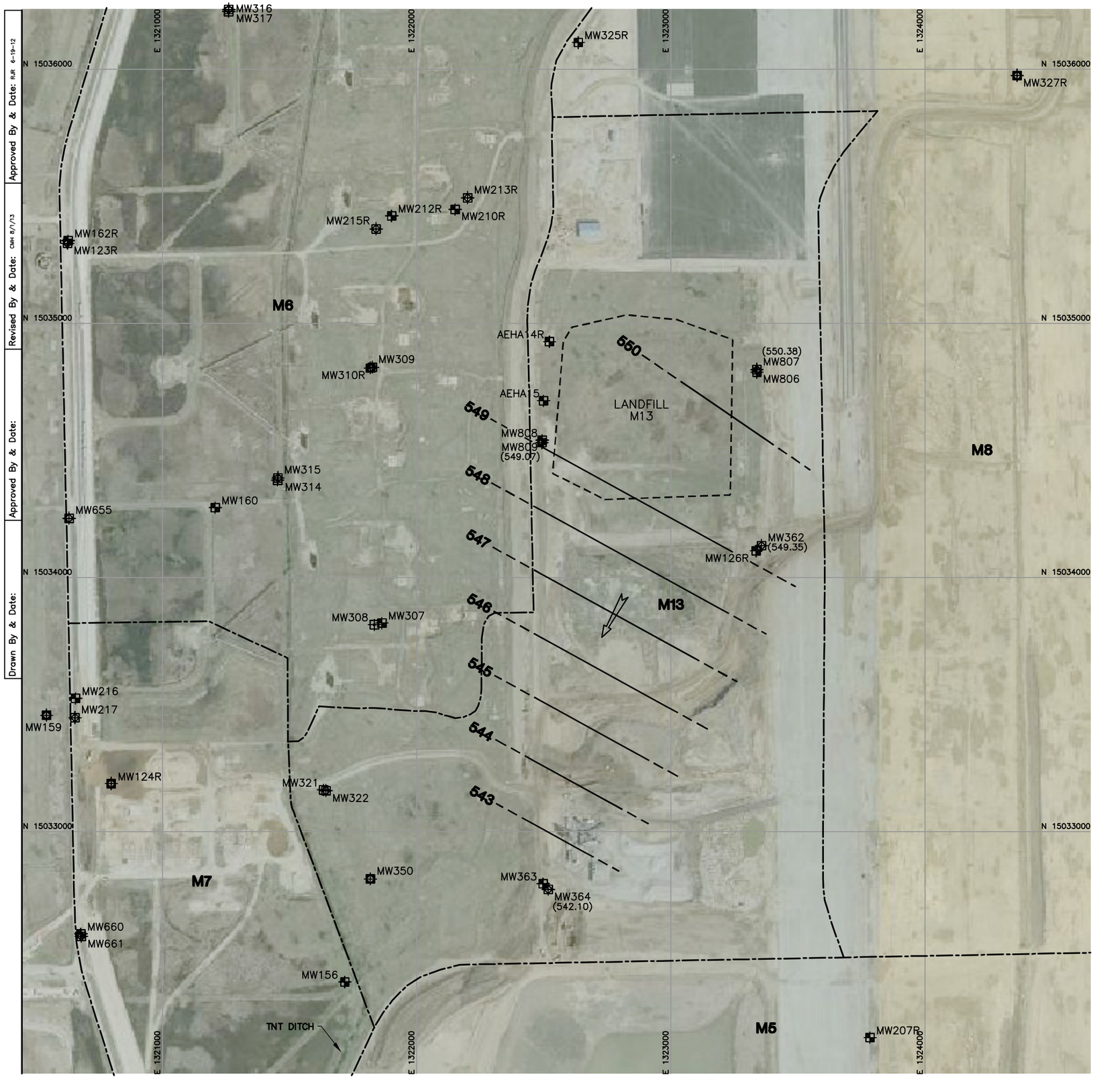

LEGEND

- MW126R — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW362 (549.35) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON FEBRUARY 29, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date: RJR 6-19-12
Revised By & Date: CMM 8/1/13
Approved By & Date:
Approved By & Date:
Drawn By & Date:

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/16/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - FEBRUARY 2012)
MANUFACTURING AREA, SITE M13 LANDFILL

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
12/19/2012

FIGURE 6-24

DRAWING NUMBER
10506045
010101

USAEC

MWH

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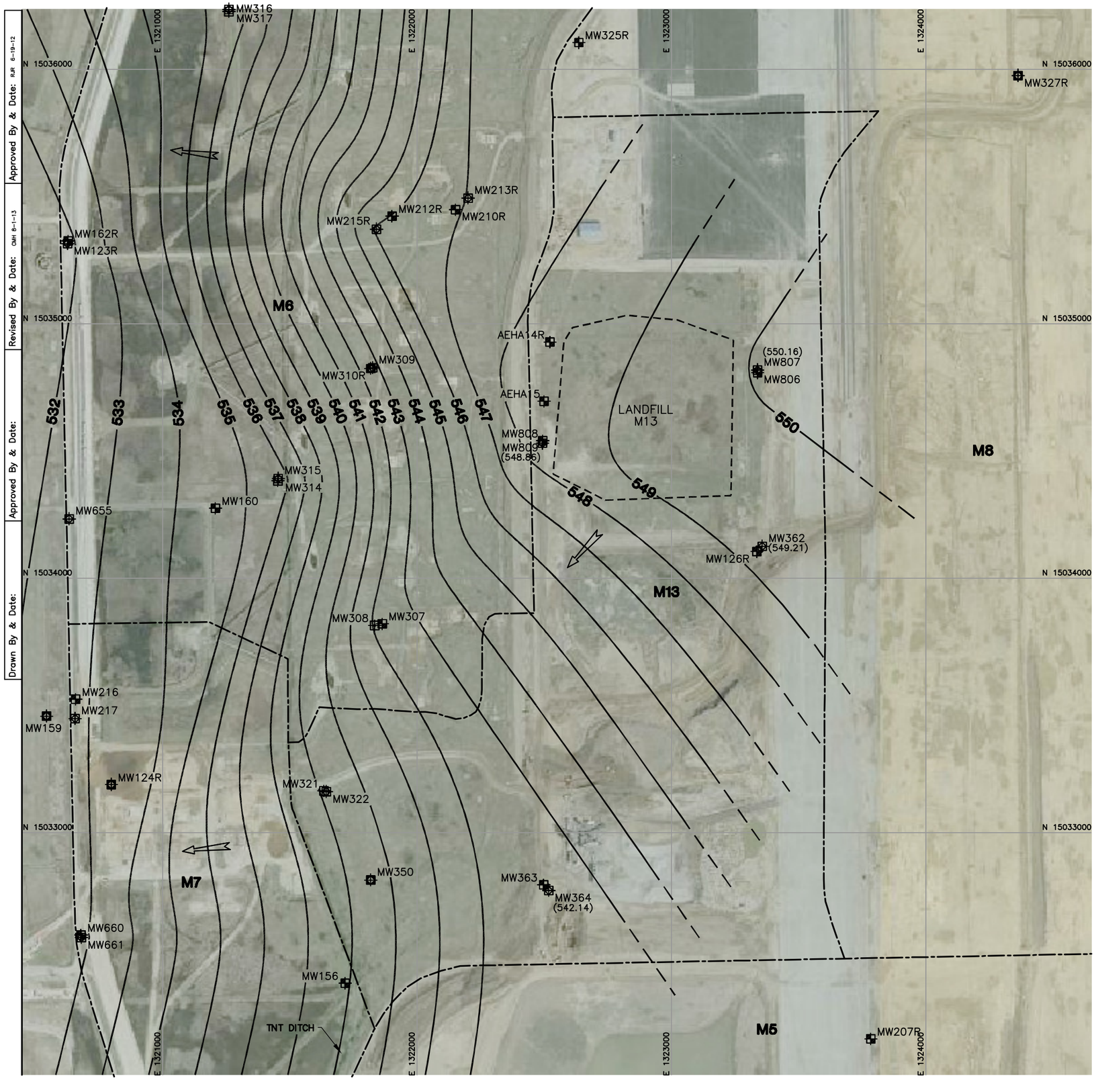

LEGEND

- MW126R — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW362 (549.21) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 545 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 16, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. SEE FIGURE 3-11 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
6. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date: RJR 6-19-12
Revised By & Date: GMI 8-1-13
Approved By & Date:
Drawn By & Date:

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/16/12

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP – MANUFACTURING AREA, SITE M13 LANDFILL (APRIL 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

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12/19/2012

FIGURE 6-25

DRAWING NUMBER
10506045
010101

USAEC

MWH

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LEGEND

- MW126R — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW362 (549.14) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON JULY 17, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Drawn By & Date: TLP 01/16/13
Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Approved By & Date:

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - JULY 2012)
MANUFACTURING AREA, SITE M13 LANDFILL (JULY 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

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2/1/2013

FIGURE 6-26

DRAWING NUMBER
10506045
010101

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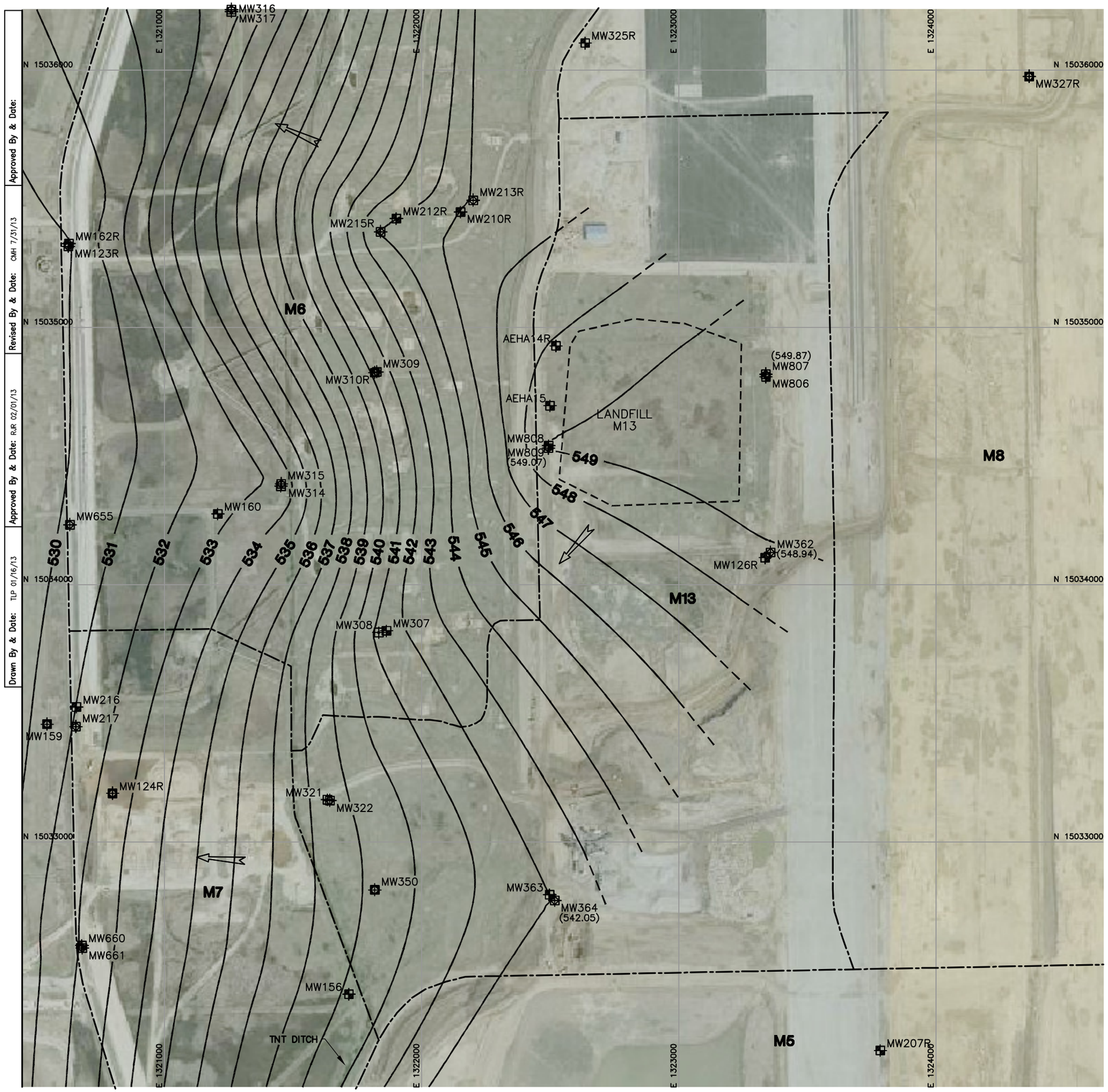

LEGEND

- MW126R — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW362 (548.94) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 545 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. SEE FIGURE 3-18 FOR POTENTIOMETRIC SURFACE CONFIGURATION OF AREA SURROUNDING LANDFILL M13.
4. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 24-25, 2012.
5. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
6. SEE FIGURE 3-18 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/16/13

DEVELOPED BY: RJR
DRAWN BY: TLP
DATE: 2/1/13
APPROVED BY:

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - MANUFACTURING AREA, SITE M13 LANDFILL (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-27

DRAWING NUMBER
10506045
010101

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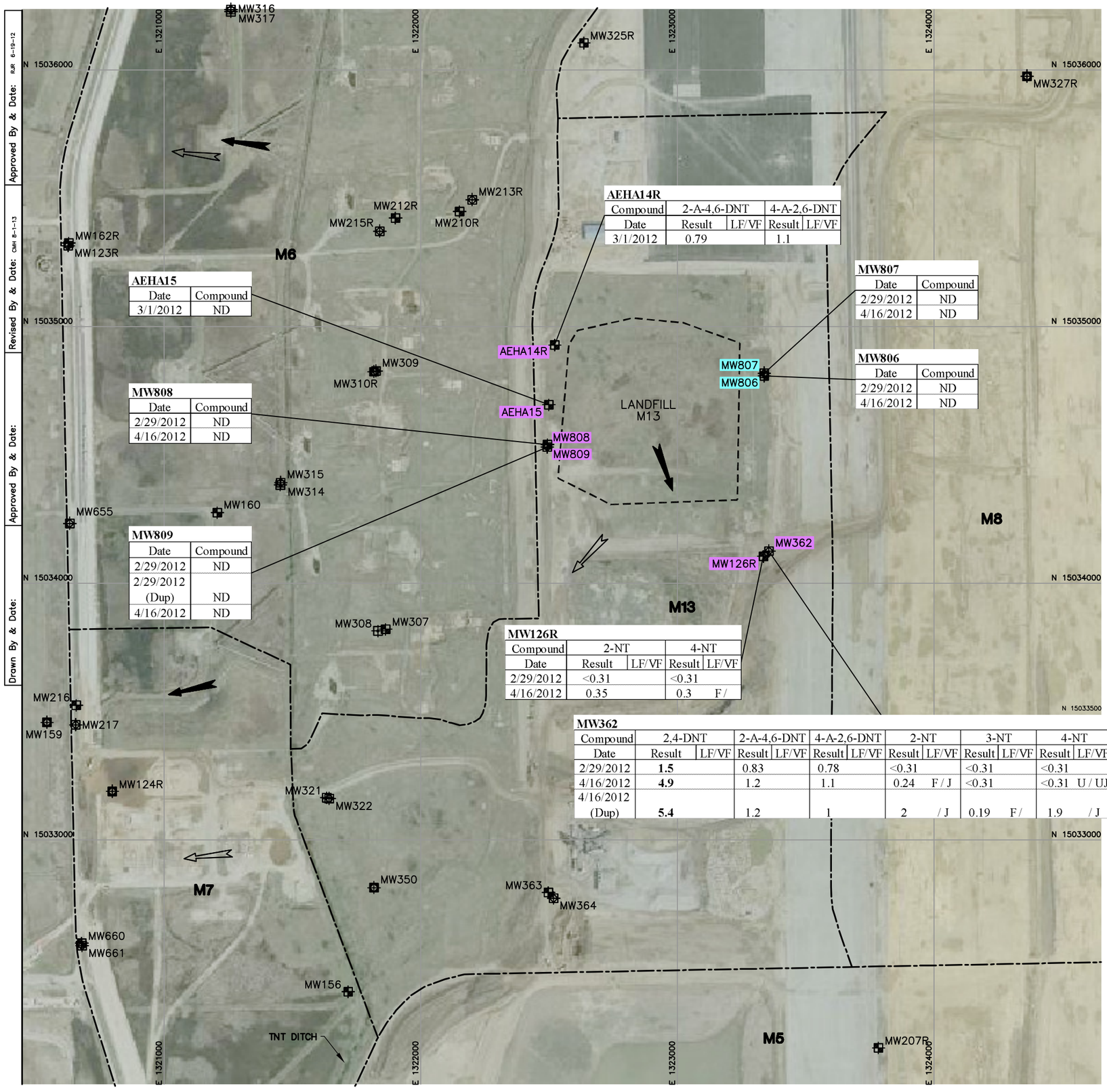
Approved By & Date: RJR 6-19-12
Revised By & Date: CMM 8-1-13
Approved By & Date:
Drawn By & Date:



AEHA14R

Compound	2-A-4,6-DNT		4-A-2,6-DNT	
Date	Result	LF/VF	Result	LF/VF
3/1/2012	0.79		1.1	

AEHA15

Date	Compound
3/1/2012	ND

MW807

Date	Compound
2/29/2012	ND
4/16/2012	ND

MW806

Date	Compound
2/29/2012	ND
4/16/2012	ND

MW808

Date	Compound
2/29/2012	ND
4/16/2012	ND

MW809

Date	Compound
2/29/2012	ND
2/29/2012 (Dup)	ND
4/16/2012	ND

MW126R

Compound	2-NT		4-NT	
Date	Result	LF/VF	Result	LF/VF
2/29/2012	<0.31		<0.31	
4/16/2012	0.35		0.3	F/

MW362

Compound	2,4-DNT		2-A-4,6-DNT		4-A-2,6-DNT		2-NT		3-NT		4-NT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
2/29/2012	**1.5**		0.83		0.78		<0.31		<0.31		<0.31		<0.16	
4/16/2012	**4.9**		1.2		1.1		0.24	F/J	<0.31		<0.31	U/UJ	0.073	F/
4/16/2012 (Dup)	**5.4**		1.2		1		2	/J	0.19	F/	1.9	/J	0.097	F/

LEGEND

MW126R	OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
MW327R	COMBINED MONITORING WELL LOCATION AND NUMBER
MW362	SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
MW308	DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
	DOWNGRADIENT MONITORING POINT
	UPGRADIENT MONITORING POINT
	DIRECTION OF WATER TABLE FLOW
	DIRECTION OF BEDROCK FLOW
	STUDY AREA BOUNDARIES
	APPROXIMATE LIMITS OF LANDFILL
<	RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
2,4-DNT	2,4-DINITROTOLUENE
2,4,6-TNT	2,4,6-TRINITROTOLUENE
2-A-4,6-DNT	2-AMINO-4,6-DINITROTOLUENE
2-NT	2-NITROTOLUENE
3-NT	3-NITROTOLUENE
4-A-2,6-DNT	4-AMINO-2,6-DINITROTOLUENE
4-NT	4-NITROTOLUENE
DUP	DUPLICATE
F/	CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
/J	ESTIMATED CONCENTRATION
U/	NOT DETECTED
/UJ	ESTIMATED DETECTION LIMIT
LF/VF	LAB FLAG/VALIDATION FLAG
ND	NOT DETECTED
NS	NO STANDARD
RG	REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
2,4-DNT	0.42	330
2,4,6-TNT	9.5	75
2-A-4,6-DNT	NS	NS
2-NT	5100	62
3-NT	NS	NS
4-A-2,6-DNT	NS	NS
4-NT	NS	NS

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN FEBRUARY, MARCH, AND APRIL 2012.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

DEVELOPED BY: RJR
DRAWN BY: DLF
APPROVED BY:
DATE: 12/16/12

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS - MANUFACTURING AREA, SITE M13 LANDFILL (2012)
THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 12/19/2012

FIGURE 6-28

DRAWING NUMBER 10506045 010101

USAEC U.S. ARMY ENVIRONMENTAL COMMAND

MWH

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6.5 GRU3 - VOLATILE ORGANIC COMPOUNDS

GRU3 is located entirely within the MFG Area and consisted of separate toluene plumes emanating from sources in the western and central sections of Site M10 (Toluene Tank Farms), and a benzene plume at Site M3 (Flashing Grounds). The GMZ boundaries for the main MFG Area are shown on Figure 3-3 and Figure 6-17. VOCs were the only contaminants identified in these plumes that could pose a risk to human health or the environment. Toluene plumes at Site M10 were located within the overburden (glacial drift) aquifer of both the western and central tank farm sections of the site and in the upper bedrock aquifer of the western tank farm section of the site. A benzene plume at Site M3 was is located within the upper bedrock aquifer.

The maximum RG exceedances for groundwater in GRU3 were 15.8 µg/L of benzene detected at Site M3 in August 1991, and 19,600 µg/L of toluene detected at Site M10 in October 1991. These compounds have not been detected at these sites since 1992. The estimated volume of the toluene plumes was 3 million gallons as determined in the 1998 ROD. A volume estimate was not made for Site M3 because it was determined that benzene had degraded to concentrations below the RG.

6.5.1 Background Information

6.5.1.1 Site M3

A description of Site M3 and a summary of historic site activities during JOAAP operations are presented in Section 5.19. The site is included in GRU3 to manage risk arising from groundwater contamination and to monitor the performance of the SOU RA. The site is included in the MFG GMZ shown on Figure 3-3 and Figure 6-17 (southwest portion of the figure). The site is vacant and is not located near a heavily populated area.

Unconsolidated deposits at the site consist of clay and silt with some thin sand and sand/gravel deposits. Depth to bedrock ranges from 2 ft to 10 ft bgs. A fracture trace map indicates the presence of one bedrock fracture trending northwest-southeast that is located beneath the southeast portion of the site.

The SOU RA was conducted between 2006 and 2007. Contaminated soils were excavated and treated offsite. Treat soil from the BTF was used as backfill.

Site M3 was included in GRU3 because benzene was detected in samples from MW233 (August 1991) in excess of the State of Illinois Class 1 Groundwater standard (5 µg/L). Subsequent monitoring of MW233, including four consecutive rounds from July 1998 to October 1999, did not confirm the presence of benzene. LTM was initiated at to determine if VOCs were mobilized during soil removal activities conducted during 2006 and 2007. Groundwater monitoring has generally been completed on a semi-annual basis since 1998.

6.5.1.2 Site M10

Site M10 contained three toluene tank farms that were in use through 1976. Each tank farm contained four above ground storage tanks, each with a capacity exceeding 1 million gallons. Xylenes were also stored in two of the tank farms during World War II. Spills were documented in 1968 and 1971.

Toluene was detected in two samples from the Central Toluene Tank Farm in MW224 at 20,000 µg/L and 6,000 µg/L. In the Western Toluene Tank Farm, toluene was detected in two samples from MW220 at 10,000 µg/L and 19,600 µg/L. Toluene was not detected in the soil.

COCs were not detected in excess of the RGs since 1998. Groundwater at the site was granted closure according to the RAOs set in the 1998 ROD by regulatory acceptance of the *Final Site M10 Closure Report* (MWH 2003b). Therefore, Site M10 is not evaluated in this five-year review.

6.5.2 Remedial Action

GOU RA activities are described in the following sections. SOU RA activities for Site M3 are described in Section 5.19.

6.5.2.1 Remedy Selection

A limited action alternative (MNA) was chosen for GRU3 in the 1998 ROD.

6.5.2.2 Remedy Implementation

The GOU RD/RA Workplan (MWH 2005) documents remedial design/remedial action activities for the GOU. Since implementation of the Work Plan, semi-annual groundwater monitoring has generally been conducted at JOAAP as part of the MNA remedy. A sampling schedule presented in the LTM Plan included a list of monitoring wells that were to be sampled, sampling frequencies, and analytical requirements (Toltest 2010).

Monitoring at Site M3 includes in-plume and compliance sampling points that are identified below:

- In-plume
  - MW233
- Early warning
  - None
- Compliance
  - MW352

Monitoring has been performed for VOCs. Sample locations and analytical parameters are summarized in Table A1-27; monitoring well information is summarized in Table A1-29.

6.5.3 Operation and Maintenance

Periodic maintenance of the groundwater monitoring network occurs during the groundwater sampling events. There have been no major modifications to the monitoring network. As noted in the Second Five-Year Review, concrete well pads have deteriorated at many locations. These well pads have not been repaired/replaced due to the likelihood that frost-heaving could irreparably damage the wells. During routine monitoring activities many protective casings have had weep holes drilled to allow condensation between the protective casing and the well riser to drain since freezing of the condensation could damage the monitoring wells.

6.5.4 Site Inspections

Representatives from Toltest (Gary Reside) and MWH (Jeff Ramsby) inspected the site during April 8 to 16, 2013. The purpose of the inspection was to assess the current conditions, access controls, and use restrictions. The site inspection was conducted in accordance with the Five-Year Review Site Inspection Checklist *(OSWER No. 9355.7-03B-P)*.

A groundwater site inspection checklist for the site is provided in Attachment 4. Results of the inspection indicated that the site is being maintained in good condition. Groundwater monitoring infrastructure issues were not identified. Monitoring wells are routinely maintained during groundwater sampling activities. Site M3 is publically accessible via the MNTP.

6.5.5 Land-Use/Institutional Controls

Land use/institutional controls for Site M3 are discussed in Section 5.19. The site inspection did not identify land uses inconsistent with these requirements. A separate evaluation verified that land uses were consistent with these restrictions (refer to Attachment 12).

6.5.6 Progress Since Last Five-Year Review

The following change was made pursuant to a recommendation provided in the 2009 Annual Groundwater Monitoring Report (Toltest 2011b):

- In-plume well MW233 and compliance well MW352 were removed from LTM (fall 2011) because RG exceedances were not observed for four consecutive sampling rounds. A closure report is being prepared in accordance with the LTM Plan.

6.5.7 Data Review

The following sections present a summary of site characteristics and groundwater quality results based on the LTM. The purpose of these summaries is to evaluate whether the MNA remedy is performing as intended by the 1998 ROD.

Hydrogeology

Groundwater levels measured during the five-year review period are provided in Table A1-30. The depths to groundwater varied from approximately 2 to 12 ft bgs.

Groundwater flow direction in the bedrock aquifer in the vicinity of Site M3 is to the northwest as illustrated in Figure 6-18. There are no water table wells located at the site.

Analytical Results

Groundwater at Site M3 was last monitored for VOCs during April 2011; no compounds were detected. Wells MW112 and MW113 were last monitored for explosive compounds as compliance wells for Site M7 during the fall of 2011; no compounds were detected. All Site M3 wells have been removed from the LTM program. VOC results are summarized in Table A1-28.

6.5.8 Technical Assessment

6.5.8.1 Question A: Is the remedy functioning as intended by the decision documents?

The technical assessment indicates that the remedy is functioning at Site M3 as intended by the decision documents. Opportunities for optimization are presented in the semi-annual and annual groundwater monitoring reports that are issued pursuant to the LTM program. Site M10 has been closed for GRU3.

Site M3 was included in GRU3 because benzene was historically detected at MW233 in excess of the Class I Groundwater standard. Sampling through April 2011 did not detect the presence of VOCs and LTM has been discontinued at the site. ICs have been implemented.

6.5.8.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The ARAR-based VOC RGs for groundwater were established using the IEPA Class I (35 IAC 620.410) and Class II (35 IAC 620.420) groundwater standards, as highlighted in Table A.7-1, for potable and industrial uses, respectively. Changes to those groundwater standards were reviewed as part of Attachment 7. As shown in Table A.7-2, Class I and II groundwater standards have not changed for benzene and toluene since the 1998 ROD.

6.5.8.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the GOU remedy for the intended use of the property as described in the 1998 ROD.

6.5.9 Issues

The following issues were identified during the five-year review:

- Well pad repairs recommended in the Second Five-Year Review Report for the Groundwater Operable Unit may cause damage due to the potential for frost heaving.
- Monitoring is no longer performed at Site M3 for GRU3.
- Site M10 has been closed.

6.5.10 Recommendations for Follow-up Actions

The following recommendations are provided for GRU3 pursuant to this five-year review:

- Repair of damaged well pads recommended by the Second Five-Year Review Report should not be performed as recommended because placement of new concrete above the frost depth would create a potential for frost heaving that could damage the wells. Any voids at the well surfaces should be plugged with granular bentonite to maintain the surface seals.

- Prepare a closure report for Site M3, certain wells should be recommended for abandonment and certain wells should be maintained as a control points for groundwater flow monitoring for the MFG Area GMZ. Designate the site for "No Further Action".
- Site M10 should be designated for "No Further Action".

6.5.11 Protectiveness Statements

The GOU remedy for GRU3 Site M3 is protective of human health and the environment. This assessment is based on the following data and observations:

- Contaminated soils have been removed.
- LTM data indicates that COCs have not been detected.
- Site inspections and assessments of deed restrictions indicate that the land use is consistent with the IC objectives identified in the RODs and restrictions identified in the *Final Remedial Design/Remedial Action Work Plan* (MWH 2005).

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6.6 LANDFILL M11

6.6.1 Background Information

A description of Site M11 and historic JOAAP operations are summarized in Section 5.26. The boundary of the site is shown on Figure 6-29.

Geology for Site M11 is extracted from the *Phase 2 Remedial Investigation, Manufacturing (MFG) Area, Joliet Army Ammunition Plant, Joliet, Illinois* (Dames and Moore 1993a) for Area 2 - Explosive Burning Grounds, which is adjacent to the west of Site M11, as follows:

> *"The unconsolidated deposits at the site generally consist of organic topsoil at and near the surface. Below approximately 1 to 5 ft, the soil type grades into clay and silt, evidently representing glacial or alluvial deposits. Silt and sand lenses are also present in this unit as seen in MW336. However, these units do not appear to be continuous and are unlikely to provide zones of preferential groundwater flow because of their limited areal extent. Near bedrock, the unconsolidated material consists of broken dolomitic gravel and sand with clay and silt. This material probably represents – in part - residuum developed from weathering of the bedrock. The thickness of the overburden varies from approximately 4 to 9.5 ft at the site."*

Additionally, the report states: *"…, an esker is present immediately east of the Explosive Burning Grounds"*, which would be the area including Site M11.

The SOU RA was conducted from 2006 to 2008 and consisted of waste consolidation and placement of a RCRA Subtitle C cap over the consolidated material, which is now referred to as Landfill M11. The landfill is unlined. Historically, waste materials were disposed in former gravel pits at the site, which include the area of Landfill M11. It is unknown if the gravel pits extended to the water table and the separation distance between the waste and the water table is also unknown.

The RCRA cap is expected to reduce or eliminate infiltration through the waste materials. It is anticipated that COCs in groundwater at the site will separate from the former source areas and migrate as residual plumes to the west. Concentrations should decrease with time and distance due to biological degradation and dilution in the groundwater. Water quality in the downgradient direction is expected to approach that of the upgradient wells in an exponential manner. Because the landfill has discrete boundaries and upgradient wells have been identified (MW802 for the overburden zone and MW803 for the bedrock aquifer), monitoring results should be plotted as the ratio of the result in each downgradient well to that of the upgradient well (i.e., downgradient concentration/upgradient concentration). It is expected that this ratio will approach unity. With respect to the downgradient wells, the operative decision rule is if the downgradient concentration is greater than the upgradient concentration and the best fit trend line for the data displays no decrease for greater that three years, then additional landfill measures may need to be evaluated. Groundwater quality may be erratic for the first few years due to disturbance of the soil during cover installation.

Landfill M11 is not associated with a GRU and is not included within a GMZ. However, there is a general study boundary shown on Figure 6-29.

6.6.2 Remedial Action

Groundwater monitoring activities are described in the following sections. SOU RA activities are described in Section 5.26.

6.6.2.1 Remedy Selection

The SOU RA consisted of waste consolidation and placement of a RCRA Subtitle C cap over the consolidated fill as described in Section 5.26.

6.6.2.2 Post-Closure Monitoring

Post-closure monitoring requirements for the landfill are mandated by IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Monitoring is performed at upgradient and downgradient that are identified below. Monitoring locations and parameters are summarized on Table A1-31.

- Upgradient Locations
  - MW802
  - MW803
- Downgradient Locations
  - MW333
  - MW334
  - MW335
  - MW336
  - MW804
  - MW805

MW802 is the designated upgradient well for the overburden zone and MW803 is the designated upgradient well for the bedrock aquifer. Downgradient sample results should be compared to the results from these wells to determine landfill impacts and the effectiveness of corrective actions.

6.6.3 Operation and Maintenance

Periodic maintenance of the groundwater monitoring network occurs at JOAAP during groundwater sampling events. There have been no major modifications to the monitoring network. As noted in the Second Five-Year Review report, concrete well pads have deteriorated at many locations. These well pads have not been repaired/replaced due to the likelihood that frost-heaving could irreparably damage the wells. During routine monitoring activities weep holes were drilled into many of the protective casings to allow condensation between the protective casing and the well riser to drain. This was done to prevent freezing of the condensation that could damage the wells.

6.6.4 Site Inspection

Representatives from Toltest (Gary Reside) and MWH (Jeff Ramsby) conducted site inspections on 08 April through 16 April 2013. The purpose of the inspections was to assess the current conditions, access controls, and use restrictions at the site. The site inspection was conducted in

accordance with the Five-Year Review Site Inspection Checklist *(OSWER No. 9355.7-03B-P)*. A completed checklist is provided in Attachment 4.

Results of the site inspection indicated that the site is being maintained in good condition. Groundwater monitoring infrastructure issues were not identified. Monitoring wells are routinely maintained during groundwater sampling activities.

6.6.5 Land Use/Institutional Controls

ICs for Site M11/Landfill M11 are discussed in Section 5.26.2.3. The intended future land use for this site is development into the USDA/FS MNTP.

6.6.6 Progress Since Last Five-Year Review

The following change was made pursuant to recommendations provided in the 2011 Annual Groundwater Monitoring Report (Toltest 2013a):

- The sampling frequency has been reduced to occur exclusively in the fall season in accordance with the LTM Plan to provide stable and predictable analytical results. The change was partially implemented in the spring of 2012 (MW333, MW334, MW803, and MW804 were not sampled) and was fully initiated in the spring of 2013.

6.6.7 Data Review

Hydrogeology

Groundwater levels measured during the five-year review are provided in Table A1-40. The depths to groundwater varied from approximately 2 to 14 ft bgs.

Groundwater flow (October 2012) in the water table (overburden zone) and bedrock aquifer is generally toward the west as illustrated on Figure 6-29 and Figure 6-30. These flow directions are consistent with historic observations.

Hydraulic gradients are summarized in Table A1-41 (vertical) and Table A1-42 (horizontal – overburden zone). The calculated vertical gradients were upward at upgradient well pair MW802/MW803 and variable at downgradient well pair MW804/MW805. The average horizontal gradient was 0.0073 ft/ft in 2012. Groundwater velocities in the overburden are presented in Table A1-43 and were calculated using a reported hydraulic conductivity of 6.7 x 10^{-4} cm/sec from nearby Site M7 and an assumed porosity of 0.3. The calculated flow velocity was approximately 0.0399 ft/day or 14.6 ft/yr in October 2012.

Analytical Results

Groundwater at the site is monitored for explosive compounds, TAL metals, VOCs, SVOCs, and indicator parameters (nitrate and sulfate). Analytical results are summarized in Table A1-32 (explosives), Table A1-33 (metals), Table A1-34 (VOCs), Table A1-35 (SVOCs), and Table A1-36(indicator parameters). A discussion of the recent (2012) results follows.

Upgradient Wells (MW802 and MW803):

- **MW802** (combination well); explosives, VOCs, and SVOCs were not detected, TAL metals, nitrate, and sulfate were detected at concentrations below the RGs.
- **MW803** (bedrock well); explosives, VOCs, and SVOCs were not detected, TAL metals, nitrate, and sulfate were detected at concentrations below the RGs.

Downgradient Wells (MW333, MW334, MW335, MW336, MW804, and MW805):

- **MW333** (bedrock well); explosives, VOCs, and SVOCs were not detected; TAL metals, nitrate, and sulfate were detected at concentrations below the RGs.
- **MW334** (bedrock well); explosives, VOCs, SVOCs, and nitrate were not detected; TAL metals and sulfate were detected at concentrations below the RGs.
- **MW335** (bedrock well); explosives, VOCs, SVOCs, and nitrate were not detected; TAL metals were detected at concentrations below the RGs; sulfate (580 mg/L) exceeded the RG.
- **MW336** (bedrock well); explosives and SVOCs were not detected; acetone (a VOC), TAL metals, and nitrate were detected at concentrations below the RGs; sulfate (510 mg/L) exceeded the RG.
- **MW804** (combination well); explosives, VOCs, and SVOCs were not detected; TAL metals and nitrate were detected at concentrations below the RGs; sulfate (490 mg/L) exceeded the RG.
- **MW805** (bedrock well); explosives and SVOCs were not detected; acetone (a VOC), TAL metals, and nitrate were detected at concentrations below the RGs; sulfate (450 mg/L) exceeded the RG.

Explosive compounds and sulfate detections are shown on Figure 6-31.

There have been no RG exceedances for explosive compounds, TAL metals, VOCs, and SVOCs. Therefore, trends were not established and trend evaluations have not been conducted for those parameters.

Trend Analysis

Trend analysis was performed for sulfate in monitoring wells that exceeded the RG in one or more sampling events during the five-year review period sampled using the Mann-Kendall test. Results are summarized in Table A1-38 and discussed below. Statistical test outputs are provided in Attachment 1.

- **MW334;** exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. A decreasing trend is exhibited at the 80 percent and 90 percent confidence levels.
- **MW335;** exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. A decreasing trend is exhibited at the 80 and 90 percent confidence levels.
- **MW336;** exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. No trend is exhibited at the 80 and 90 percent confidence levels.
- **MW804;** exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. An increasing trend is exhibited at the 80 percent and 90 percent confidence levels.

- **MW805;** exceeded the RG in one or more sampling events from 2009 through 2012 and was evaluated using the Mann-Kendall Test. A decreasing trend is exhibited at the 80 and 90 percent confidence levels.

Trend Plots and Cleanup Time Estimates

Trend plots were prepared for sulfate at MW335 (Graph 23), MW336 (Graph 24), and MW805 (Graph 25) using data after completion of the RA in August 2008 and results from a sampling event conducted prior to completion of the RA to provide a baseline. Results and observations are discussed below. Table A1-37 summarizes the results of the analysis.

Upgradient Wells (MW802 and MW803):

- **MW802** (combination well); sulfate was detected at concentrations below the RG and a trend plot was not prepared.
- **MW803** (bedrock well); sulfate was detected at concentrations below the RG and a trend plot was not prepared.

Downgradient Wells (MW333, MW334, MW335, MW336, MW804, and MW805):

- **MW333** (bedrock well); sulfate was detected at concentrations below the RG and a trend plot was not prepared.
- **MW334** (bedrock well); sulfate was detected at concentrations below the RG and a trend plot was not prepared.
- **MW804** (combination well); sulfate has sporadically exceeded the RG and a trend plot was not prepared.
- **MW335** (bedrock well) exhibits a decreasing trend for sulfate (Graph 23). Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2019. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.1145).
- **MW336** (bedrock well) exhibits a decreasing trend for sulfate (Graph 24). Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2041. This estimate has low confidence based on the available data which exhibits a high degree of variability and a low R^2 value (0.0078).
- **MW805** (bedrock well) exhibits a decreasing trend for sulfate (Graph 25). Based on the equation to the best-fit curve, the estimated year at which sulfate will naturally degrade to less than the RG is 2019. This estimate has low confidence based on the available data which exhibits a moderate degree of variability and a low R^2 value (0.5771).

There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. There was no estimated time for explosive compounds to reach the RG at Site M11 in the 1998 ROD.

Bioparameters

No byproducts of biodegradation were identified. Sulfate can be reduced to sulfides biologically under anaerobic conditions and the process requires organic substrates to sustain the anaerobic conditions. Nitrates are also reduced before sulfates. There is no evidence that sulfate reduction is occurring at Site M1. Dispersion and dilution are the primary attenuation mechanisms.

6.6.8 Technical Assessment

6.6.8.1 Question A: Is the remedy functioning as intended by the decision documents?

The technical assessment indicates that the remedy is functioning as intended by the decision documents. Opportunities for optimization are presented in the semi-annual and annual groundwater monitoring reports that are issued pursuant to the LTM program.

Groundwater at Site M11/Landfill M11 is monitored for explosive compounds, TAL metals, VOCs, SVOCs, and indicator parameters (nitrate and sulfate). Recent LTM data indicates that sulfate exceeded the RG in four wells downgradient of the landfill (MW335, MW336, MW804, and MW805). The RGs were not exceeded for all other analytes. Trend analysis for sulfate using the Mann-Kendall tests indicates a decreasing trend or no trend for three of these wells (MW335, MW336, and MW805). An increasing trend for sulfate was indicated for MW804. Trend plots show decreasing trends for wells MW335, MW336, and MW805. These estimates have low confidence based on the available data that exhibits a high degree of variability and low R^2 values. There may be a short-term lag effect from the soil RA that is affecting groundwater concentrations. There was no estimated time for explosive compounds to reach the RG at Site M11 in the 1998 ROD.

There is no evidence to suggest that there is significant migration of sulfate in groundwater in the vicinity of Landfill M11. The detected concentrations are not of the magnitude to indicate that RG exceedances would migrate a significant distance from Landfill M11. There is no GMZ for Site M13.

ICs have been implemented and are preventing exposure to contaminated groundwater.

6.6.8.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions and cleanup levels for explosive compounds detected during the five-year review period are still valid.

Groundwater RGs for metals, VOCs, SVOCs, nitrate, and sulfate were established using ARARs. Risk-based concentrations were developed for explosives in groundwater and used as the RGs in the 1998 ROD. The exposure assumptions and cleanup levels for the explosive COCs found at M11 are still valid (Attachment 8). Although the toxicity criteria changed for two of the M11 COCs (1,3,5-TNB and 2,6-DNT), the risk-based cleanup levels derived for the 1998 ROD remain protective (Table A.8-13).

Changes in those standards were reviewed as part of Attachment 7 (ARAR Evaluation), which indicates that the RGs for detected analytes have not changed.

6.6.8.3 Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the SOU remedy for the intended use of the property as described in the 1998 ROD.

6.6.9 Issues

The following issue was identified during the five-year review:

- Well pad repairs recommended in the Second Five-Year Review Report for the Groundwater Operable Unit may cause damage due to the potential for frost heaving.

6.6.10 Recommendations for Follow-up Actions

The following recommendation is provided for Landfill M11pursuant to the five-year review:

- Repair of damaged well pads recommended by the Second Five-Year Review Report should not be performed as recommended because placement of new concrete above the frost depth would create a potential for frost heaving that could damage the wells. Any voids at the well surfaces should be plugged with granular bentonite to maintain the surface seals.

6.6.11 Protectiveness Statements

A protectiveness statement for Site M11 (SOU RA) is provided in Section 5.26.8.

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LEGEND

- MW647 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW802 (531.47) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW334 (530.45) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- 530 — WATER TABLE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- STUDY AREA BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 24, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M11 NEW WELL LOCATIONS", PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED JANUARY 2008.
6. MW334 AND MW335 ARE SHALLOW BEDROCK WELLS, AND MW802 AND MW804 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.

north

Approved By & Date:
Revised By & Date: CMH 7/31/13
Approved By & Date: RJR 02/01/13
Drawn By & Date: TLP 01/15/13

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 2/1/13

CONTRACT NO. W912LK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 500'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, SITE M11 LANDFILL (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-29

DRAWING NUMBER
10506045
010101

USAEC

MWH

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LEGEND

MW647	OVERBURDEN MONITORING WELL LOCATION AND NUMBER
MW802	COMBINED MONITORING WELL LOCATION AND NUMBER
MW803 (537.98)	SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
535	POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
	DIRECTION OF BEDROCK FLOW
	DIRECTION OF FLOW IN PRAIRIE CREEK
	STUDY AREA BOUNDARY
	APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON OCTOBER 24, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M11 NEW WELL LOCATIONS", PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED JANUARY 2008.

north

Drawn By & Date: TLP 01/15/13
Approved By & Date: RJR 02/01/13
Revised By & Date: CMH 7/31/13
Approved By & Date:

RJR
DEVELOPED BY
TLP
DRAWN BY
APPROVED BY
2/1/13
DATE

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 500'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP – MANUFACTURING AREA, SITE M11 LANDFILL (OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
2/1/2013

FIGURE 6-30

DRAWING NUMBER
10506045
010101

MWH

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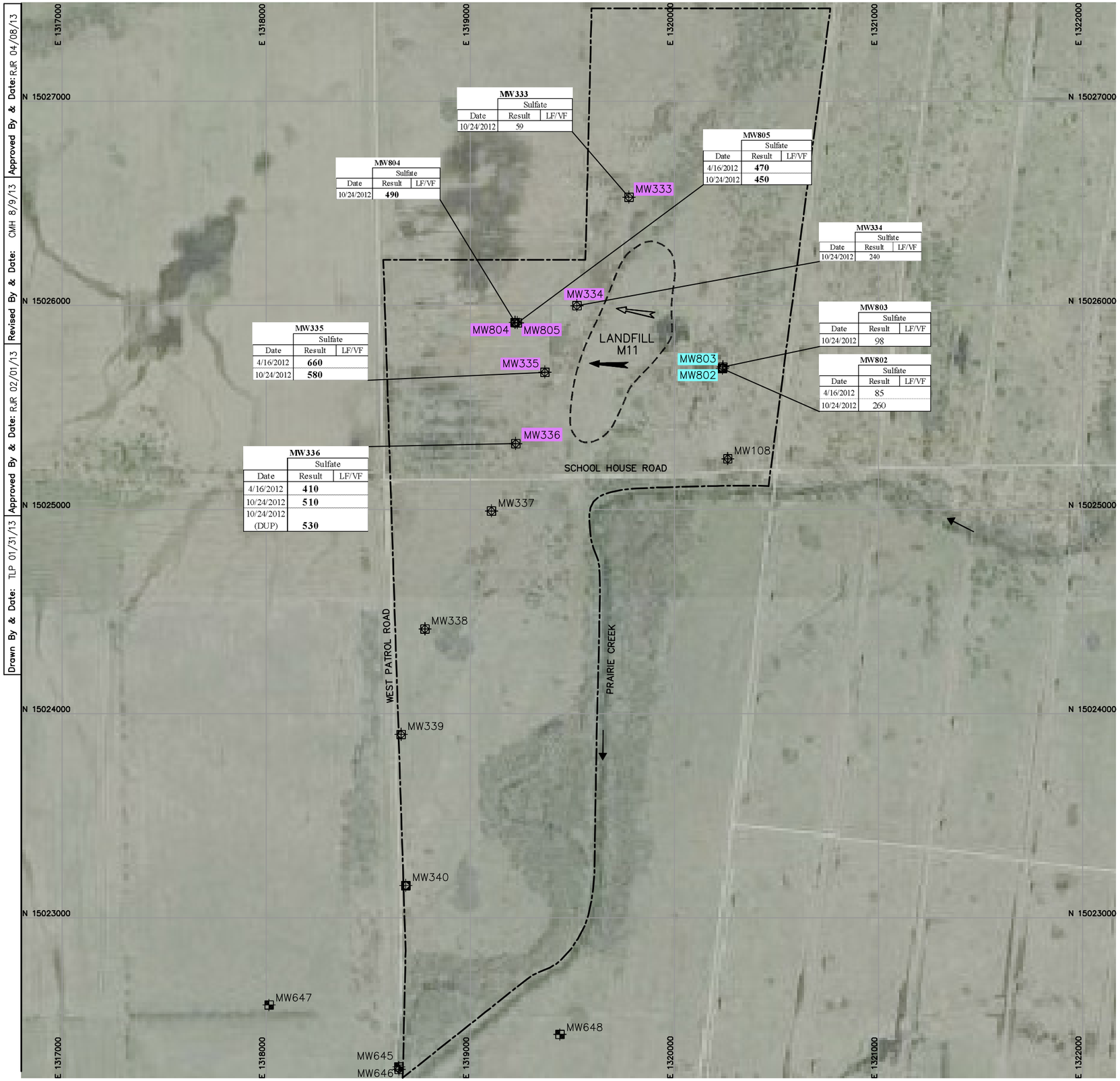

Drawn By & Date: TLP 01/31/13 | Approved By & Date: RJR 02/01/13 | Revised By & Date: CMH 8/9/13 | Approved By & Date: RJR 04/08/13

LEGEND

- MW647 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW802 — COMBINED MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW803 — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- DOWNGRADIENT MONITORING POINT
- UPGRADIENT MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- STUDY AREA BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL
- DUP — DUPLICATE
- LF/VF — LAB FLAG/VALIDATION FLAG
- NS — NO STANDARD
- RG — REMEDIATION GOAL

	Sulfate
Units	mg/L
Project Action Limit[1]	400
Surface Water RG	NS

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL AND OCTOBER 2012.
5. CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (mg/L).
6. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M11 NEW WELL LOCATIONS", PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED JANUARY 2008.

north

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 4/8/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 500'

REV	DATE	BY	DESCRIPTION

SULFATE DETECTIONS – MANUFACTURING AREA, SITE M11 LANDFILL (APRIL AND OCTOBER 2012)

THIRD 5-YEAR REVIEW
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 4/8/2013

FIGURE 6-31

DRAWING NUMBER
10506045
010101

USAEC

MWH

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7.0 SUMMARY

7.1 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

7.1.1 Soil Operable Unit

Table 7-1 provides recommendations to address current issues that affect protectiveness of the remedy at JOAAP SOU sites subject to this five-year review.

Table 7-1 Recommendations to Address Current Issues That Affect Protectiveness of the Remedy at JOAAP SOU Sites

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
1	Site L3; repair eroded or displaced rip-rap on the west side of the landfill	Installation (JOAAP)	USEPA	October 2015	No	Yes
2	Site L5; locate closure documentation associated with metals in soil from the north-central portion of the former Junk Pile as documented in the Closure Report (MWH 2009b). Perform closure sampling for metals in soil at the north central portion of the former Junk Pile Area if not already done.	Installation (JOAAP)	USEPA	October 2015	No	Yes
3	Site M6; re-evaluate the lead in soil cleanup level if the USEPA adopts the CDC's recommendation for a lower acceptable lead in blood level. If this occurs, conduct additional soil sampling and analysis to $\leq$1 mg/kg to evaluate whether there are Pb exceedances.	Installation (JOAAP)	USEPA	Within one year after new lead in blood level is accepted	No	Yes

Recommendations to address current issues that do not affect protectiveness of the remedy at JOAAP SOU sites subject to this five-year review are listed below.

- Evaluate excavation sampling data to determine if UU/UE conditions were attained for the following sites: L1, L2, L7, L8, L9, L10, L11, L14, L16, L17, L23A, M7, and M12
- Site M5 - place a copy of the Final Closure Report for Site M5 in the Administrative Record and Public Repositories.
- Site L11 - verify (in the Second Annual Site-Wide Deed Restriction report) whether deed restrictions were conveyed to the Wilmington Fire Department
- Retain GIS records and update them as part of the monitoring of ICs at JOAAP
- Revise the wording on the Questionnaire and Statement of Compliance form used to assess whether ICs are being implemented to avoid confusion
- Revise wording on the Questionnaire and Statement of Compliance form for USDA/FS properties to indicate that there is no IC that prohibits camping and the ICs originated from Environmental Condition of Property statements and ROD documents, not as deed restrictions
- Make annual requests for Statement of Compliance questionnaires from the property owners
- Verify that future USDA/FS Annual Prairie Management Plans include an appendix that addresses issues associated with transferred land that has restrictions

7.1.2 Groundwater Operable Unit

Table 7-2 provides recommendations to address current issues that affect protectiveness at JOAAP GOU sites subject to this five-year review.

Table 7-2 Recommendations to Address Current Issues That Affect Protectiveness of the Remedy at JOAAP GOU Sites

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
6	GRU2 (Site M6); re-evaluate the groundwater well monitoring results at Site M6 with respect to the new risk-based concentration of 2-NT. Because 2-NT is now considered a probable human carcinogen, the RG for 2-NT may have to be re-evaluated in order to ensure full future protectiveness	Installation (JOAAP)	USEPA	October 2015	No	Yes

Recommendations to address current issues that do not affect protectiveness of the remedy at JOAAP GOU sites subject to this five-year review are listed below.

- GRU1 and GRU2; use a soil leaching model to determine what the allowable residual soil source concentrations would be so that the groundwater RGs can be met. Compare the post-remedial action residual soil concentrations to these levels, to ensure that no new soil source term is contributing to the groundwater contamination. The leach modeling should initially use the soil RGs as default concentrations to determine if they would be capable of creating a groundwater exceedance at the site. If so, a site-specific groundwater protection RG should be calculated for comparison to excavation confirmation samples and RI results associated with soil that was not excavated.
- GRU1, GRU2, and GRU3; repair of damaged well pads recommended by the Second Five-Year Review Report should consist of placing granular bentonite in the openings at the well surfaces to maintain the surface seals.
- GRU1 (Site L14); future LTM analytical results for well H7 should be evaluated to confirm or refute the 2,4-DNT and 2,6-DNT exceedances observed in October 2012.
- GRU1 (Site L14); future LTM analytical results for well MW512 should be evaluated to determine whether RDX is increasing in the overburden aquifer.
- GRU2 (sites M5 and M7) and GRU3 (Site M3); prepare a closure report that includes a recommendation for abandoning or maintaining certain wells. The wells to be maintained would be used as control points for groundwater flow monitoring within the MFG Area GMZ. Designate each site for "No Further Action".
- GRU2 (Site M8); postpone the preparation of a closure report (previously recommended) because sulfate concentrations in well MW330 have exceeded the RG.
- GRU3 (Site M10); designate the site for "No Further Action"

7.2 PROTECTIVENESS STATEMENTS

7.2.1 Soil Operable Unit

The completed RAs for sites L1, L2, L4, L7, L8, L9, L10, L11, L14, L16, L17, L23A, M1, M2, M3, M4, M5, M7, M8, M9, M11, M12, M13, and M16 are protective of human health and the environment. This assessment is based on the following information and observations:

- Contaminated soils exceeding the RGs have been remediated in accordance with the RODs.
- Land uses are consistent with the IC objectives identified in the RODs and any subsequent land use restrictions.
- The exposure assumptions, toxicity data, cleanup levels, and RA objectives used at the time of the remedy are still valid.
- No other information has come into light that could call into question the protectiveness of the remedies.

The completed RA for Site L3 currently protects human health and the environment because:

- Contaminated soils exceeding the RGs have been remediated in accordance with the RODS.
- Land uses are consistent with the IC objectives identified in the RODs and subsequent land use restrictions. .

However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness:

- Site L3 – repair eroded or displaced riprap on the west side of the landfill.
- Site L5 - obtain site closure documentation for metals in soil from the former Junk Pile Area and confirm that lead concentrations are below the RG.
- Site L6 – perform additional sampling and analysis to evaluate lead in soil concentrations down to approximately 1 mg/kg if the USEPA accepts CDC's recommended lead in blood level (5µg/dL).

7.2.2 Groundwater Operable Unit

The remedy at GRU1 sites L1, L2, L3, and L14, GRU2 sites M1, M5, M7, M8, and M13, and GRU3 site M3 is protective of human health and the environment because:

- Contaminated soils have been removed (all sites) or contained (sites L3 and M13).
- LTM data indicates that COC concentrations have not exceeded the RGs at the GMZ boundaries and that natural attenuation processes are occurring.
- Site inspections and assessment of deed restrictions indicate that the land uses are consistent with the IC objectives identified in the RODs and subsequent land use restrictions identified in the *Final Remedial design/Remedial Action Work Plan*.

The remedy at GRU2 site M6 is currently protective of human health and the environment in the short term based on information and observations noted above. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness:

- A new remediation goal for 2-NT should be adopted based on new toxicological information that has come to light since the 1998 ROD.
- Groundwater monitoring data should be evaluated to determine whether 2-NT has exceeded the new RG at the GMZ boundaries.

7.3 NEXT REVIEW

The next five-year review for JOAAP SOU and GOU sites will be conducted by May 2019.

ATTACHMENT 1

LONG-TERM MONITORING DATA

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GRU 1 Tables

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Table A1-1

Groundwater Sample Parameters
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Parameter Sampled	Sampling Frequency[1]
L1	***In-plume***		
	MW131	E	
	MW173[2]	E	
	WES1	E	
	Early Warning		
	MW172	E[3]	Removed from sampling Spring 2012
	MW174	E	
	WES3	E	
	Compliance		
	MW401	E[3]	Removed from sampling Spring 2012
	SW550	E	
L2	***In-plume***		
	MW404	E	Fall only, semiannual sampling discontinued Spring 2012
	MW501	M[3]	Removed from sampling Fall 2011
	Early Warning		
	MW620	E	Fall only, semiannual sampling discontinued Spring 2012
	Compliance		
	MW621	E	Fall only, semiannual sampling discontinued Spring 2012
	MW810	E[3]	Removed from sampling Fall 2012
	SW555	E	Fall only, semiannual sampling discontinued Spring 2012
L3/ Landfill L3	***Upgradient***		
	MW3	E, M[3]	Removed from sampling Spring 2012
	SW004	E, M	Spring only, Fall sampling discontinued 2012
	In-plume		
	MW410	E	Metals sampling discontinued Fall 2011
	In-plume/Downgradient		
	MW412	E, M	
L3/ Landfill L3	***Early Warning/Downgradient***		
	MW630	E, M	
	MW631	E, M	
	MW633	E, M	
	Compliance/Downgradient		
	MW632	E, M[3]	Removed from sampling Spring 2012
	SW777	E, M	
	Downgradient		
	SW557	E, M	
	SW558	E, M	
L14	***In-plume***		
	MW508	E[3]	Removed from sampling Spring 2012
	MW511	E	Fall only, semiannual sampling discontinued Spring 2012
	MW512	E	Fall only, semiannual sampling discontinued Spring 2012
	Early Warning		
	H7	E	Fall only, semiannual sampling discontinued Spring 2012
	Compliance		
	MW603	E[3]	Removed from sampling Spring 2012
	MW604	E[3]	Removed from sampling Spring 2012

Notes:
E - Explosives
M - Metals

Footnotes:
(1) Sampling frequency is semi-annually in spring and fall unless otherwise indicated.
(2) Designation changed from Early Warning to In-Plume in Fall 2011
(3) Parameters sampled prior to removal from LTM Program.

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L1	*In-Plume*																													
	MW131	5/20/2003	<39		<39 (4.2)		<78 (21)		<78		<78		<78		<39		<78		<78		<78		<39		<78		<39		**1400**	
	MW131	10/23/2003	<4.2		<4.2 (0.46)		<8.5 (2.2)		29		27		<8.5		<4.2		<8.5		<8.5		<8.5		<4.2		<8.5		**1100**		**840**	
	MW131	5/26/2004	<6.4		<6.4 (0.69)		<13 (3.4)		130		87		<13		<6.4		<13		<13		<13		<6.4		<13		**4400**		**8300**	
	MW131	10/26/2004	<39		<39 (12)		<78 (14)		<78		<78		<78		<39		<78		<78		<78		<39		<78		**2000**		**980**	
	MW131	7/27/2005	<3.9		<3.9		<7.8		36		26		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**1600**		**890**	
	MW131	10/25/2005	<3.9		<3.9		**9.6**		48		33		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**1800**		**1300**	
	MW131	5/5/2006	<3.9		<3.9		<7.8		75		62		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**3200**		**4400**	
	MW131	10/19/2006	<3.9		<3.9		<7.8		29		26		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**180**		**150**	
	MW131	5/1/2007	<44		<44		<88		<88		<88		<88		<44		<88		<88		<88		<44		<88		**4200**		**9900**	
	MW131(DUP)	5/1/2007	<50		<50		<100		<100		<100		<100		<50		<100		<100		<100		<50		<100		**4500**		**10000**	
	MW131	10/16/2007	<39		<39		<78		<78		<78		<78		<39		<78		<78		<78		<39		<78		**1700**		**1100**	
	MW131	5/14/2008	<4.5		<4.5		<9		100		63		<9		<4.5		<9		<9		<9		<4.5		<9		**3100**		**4900**	
	MW131	10/28/2008	<3.9		<3.9		<7.8		27		30		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**1100**		**870**	
	MW131	5/1/2009	<1.6		<3.1		<3.1		21		36		<3.1		<1.6		<3.1		<3.1		<3.1		<1.6		<3.9		**460**		**1400**	
	MW131	10/27/2009	<4.1		<7.9		<7.9		89		110		<7.9		17		<7.9		<7.9		<7.9		<4.1		<9.9		**4000**		**11000**	
	MW131	4/12/2010	<4.0		<7.8		<7.8		55		66		<7.8		<4.0		<7.8		<7.8		<7.8		<4.0		<9.8		**3200**		**4100**	
	MW131	10/27/2010	0.49	/ J	<0.54		**6.8**	/ J	40		37		<0.54		<0.28		1.3	/ J	<0.54		<0.54		<0.28		<0.68		**1700**		**1000**	
	MW131	4/15/2011	<30		<57		<57		54	F /	91		<57		<30		<57		<57		<57		<30		<72		**3400**		**5800**	
	MW131	10/11/2011	<1.9		<1.9		<1.9		40		57	/ J	6		<1.9		<3.7		<3.7		<3.7		1.3	F /	<4.6		<1.9		**1100**	
	MW131	4/12/2012	5.4	/ J	<3.1		<3.1		65		70		<3.1		<1.6		<3.1		<3.1		<3.1		<1.6		<3.9		<1.6		**2200**	
	MW131	10/29/2012	<16		<31		<31		<31		35		<31		<16		<31		<31		<31		<16		<39		<16		**1000**	
	MW173	5/20/2003	<0.62		<0.62 (0.067)		<1.2 (0.33)		5.2		5.4		1.6		<0.62		<1.2		<1.2		<1.2		**13**		<1.2		<0.62		**16**	
	MW173(DUP)	5/20/2003	<0.67		<0.67 (0.072)		<1.3 (0.36)		5.1		5.3		1.5		<0.67		<1.3		<1.3		<1.3		**13**		<1.3		<0.67		**16**	
	MW173	10/23/2003	<0.49		<0.49 (0.052)		<0.98 (0.26)		6.3		6.7		1.9		<0.49		<0.98		<0.98		<0.98		**17**		<0.98		3.2		**23**	
	MW173(DUP)	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		6.1		6.5		1.8		<0.39		<0.78		<0.78		<0.78		**15**		<0.78		3		**21**	
	MW173	5/26/2004	<0.42		<0.42 (0.046)		<0.85 (0.22)		5.4		5.7		1.8		<0.42		<0.85		<0.85		<0.85		**14**		<0.85		3.7		**28**	
	MW173	10/26/2004	<0.7		<0.7 (0.22)		<1.4 (0.26)		6.1		6.5		1.9		<0.7		<1.4		<1.4		<1.4		**17**		<1.4		3.6		**26**	
	MW173(DUP)	10/26/2004	<0.42		<0.42 (0.13)		<0.83 (0.15)		6.3		6.6		2		<0.42		<0.83		<0.83		<0.83		**16**		<0.83		3.7		**24**	
	MW173	7/26/2005	<0.39		<0.39		<0.78		4.9		5.6		1.4		<0.39		<0.78		<0.78		<0.78		**13**		<0.78		2.3		**21**	
	MW173	10/25/2005	<0.4		**0.43**		<0.79		6.4		6.9		1.8		<0.4		<0.79		<0.79		<0.79		**13**		<0.79		2.2		**18**	
	MW173	5/5/2006	<0.46		<0.46		<0.91		4.6		5		1.4		<0.46		<0.91		2.8		<0.91		**11**		<0.91		2.5		**15**	
	MW173	10/19/2006	<0.57		<0.57		<1.1		5.5		6.4		<1.1		<0.57		<1.1		<1.1		<1.1		**11**		<1.1		<0.57		**9.6**	
	MW173	5/1/2007	<0.39		<0.39		<0.78		5.6		5.9		2.3		<0.39		<0.78		<0.78		<0.78		**15**		<0.78		3		**33**	
	MW173	10/16/2007	<0.39		<0.39		<0.78		5		7.2		1.6		<0.39		<0.78		<0.78		<0.78		**11**		<0.78		<0.39		7.2	
	MW173	5/14/2008	<0.39		<0.39		<0.78		4.3		4.7		1.1		<0.39		<0.78		<0.78		<0.78		**9.3**		<0.78		1.4		**14**	
	MW173	10/27/2008	<0.39		<0.39		<0.78		5		5.5		1.1		<0.39		<0.78		<0.78		<0.78		**9.5**		<0.78		1.5		**15**	
	MW173	5/1/2009	<0.17		<0.32		<0.32		4.4		5.1		1.3		<0.17		<0.32		<0.32		<0.32		**12**		<0.4		2.6		**20**	
	MW173	10/27/2009	<0.22		<0.43		<0.43		1.8		3.7		1.6	/ J	<0.22		<0.43		<0.43		0.19	F /	**9.6**		<0.54		<0.22		1.7	
	MW173	4/13/2010	<0.17		<0.32		<0.32		4.1		4.8		1.2		<0.17		<0.32		<0.32		<0.32		**8.6**		<0.40		0.94		**10**	
	MW173	10/27/2010	<0.20		<0.38		<0.38		0.84		1		<0.38		<0.20		<0.38		<0.38		<0.38		**3.4**		<0.48		<0.20		0.95	
	MW173	4/14/2011	<0.31		<0.6		<0.6		4.7		5.9		1.3		<0.31		<0.6		<0.6		<0.6		**9.6**		<0.76		0.63		**10**	
	MW173	10/11/2011	<0.33		<0.33		<0.33		3.4	/ J	2.2	/ J	1.4		<0.33		<0.65		<0.65		<0.65		**10**		<0.81		<0.33		8.2	/ J
	MW173	4/11/2012	<0.16		<0.31		<0.31		4.8		5.4		1.4	/ J	<0.16		<0.31		<0.31		<0.31		**10**		<0.39		<0.16		**12**	
	MW173	10/29/2012	<0.8		<1.6		<1.6		<1.6	U / J	<1.6	U / J	<1.6		<0.8	U / J	<1.6		<1.6	U / J	<1.6	U / J	<0.8	U / J	<2	U / J	<0.8		<0.8	U / J
	MW173(DUP)	10/29/2012	<0.8		<1.6		<1.6		4.3		4.3		<1.6		<0.8		<1.6		<1.6		<1.6		**6.2**	/ J	<2		<0.8		2.8	
	WES1	5/20/2003	<0.43		<0.43 (0.046)		<0.86 (0.23)		3.3		3.2		<0.86		<0.43		<0.86		<0.86		<0.86		<0.43		<0.86		<0.43		2.9	
	WES1	10/23/2003	<3.9		<3.9 (0.42)		<7.8 (2.1)		18		17		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**12**		**27**	
	WES1	5/26/2004	<0.75		<0.75 (0.081)		<1.5 (0.4)		12		13		<1.5		<0.75		<1.5		<1.5		<1.5		<0.75		<1.5		**27**		**39**	
	WES1	10/26/2004	<3.9		<3.9 (1.2)		<7.8 (1.4)		13		15		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**34**		**33**	
	WES1	7/27/2005	<0.44		**2.9**		<0.87		15		16		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		**41**		**50**	
	WES1	10/25/2005	<0.39		<0.39		<0.78		2.7		2.9		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		2		2.6	
	WES1	5/5/2006	<0.39		<0.39		<0.78		8		8.3		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		**14**		**14**	
	WES1	10/19/2006	<0.39		<0.39		<0.78		4		4.8		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		4.5		3.7	
	WES1	5/1/2007	<3.9		<3.9		<7.8		16		22		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**71**		**67**	
	WES1	10/16/2007	<5.9		<5.9		<12		16		20		<12		<5.9		<12		<12		<12		<5.9		<12		**20**		**35**	
	WES1	5/14/2008	<3.9		<3.9		<7.8		12		17		<7.8		<3.9		<7.8		<7.8		<7.8		<3.9		<7.8		**34**		**40**	
	WES1	10/28/2008	<0.39		<0.39		<0.78		11		15		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		**8.2**		**17**	
	WES1(DUP)	10/28/2008	<0.53		<0.53		<1.1		11		15		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		**8.5**		**19**	
	WES1	10/27/2009	<0.22		<0.43		<0.43		2.1		3.4		<0.43		<0.22		<0.43		<0.43		<0.43		0.36		<0.54		0.78		1.7	
	WES1	4/12/2010	<0.17		<0.32		<0.32		4.2		6.4		<0.32		<0.17		<0.32		<0.32		<0.32		<0.17		<0.40		3.7		7.4	
	WES1	10/27/2010	0.096	F /	**1.6**		<0.31		15		18		<0.31		<0.16		<0.31		<0.31		<0.31		0.73		<0.39		**21**		**34**	
	WES1(DUP)	10/27/2010	<0.21		**1.8**		<0.41		17		20		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		**23**		**38**	
	WES1	4/15/2011	<0.29		<0.56		<0.56		14		26		<0.56		<0.29		<0.56		<0.56		<0.56		<0.29		<0.71		**39**		**48**	
	WES1	10/11/2011	<0.25		<0.25		<0.25		11		15		<0.49		<0.25		<0.49		<0.49		<0.49		0.26		<0.61		<0.25		**31**	/ J
	WES1	4/12/2012	<1.6		<3.1		<3.1		13		21	/ J	<3.1		3.9		<3.1		<3.1		<3.1		<1.6		<3.9		**40**	/ J	**38**	
	WES1	10/29/2012	<0.8		<1.6		<1.6		8.1	/ J	9.1		<1.6		<0.8		<1.6		<1.6		<1.6		<0.8		<2		<0.8		6.4	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L1	***Early Warning***																													
	MW172	5/20/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		1		1.3		<0.78		<0.39		<0.78		<0.78		<0.78		1.5		<0.78		<0.39		2.2	
	MW172	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		1.3		1.7		<0.78		<0.39		<0.78		<0.78		<0.78		1.8		<0.78		0.52		3	
	MW172	5/26/2004	<0.65		<0.65 (0.07)		<1.3 (0.35)		<1.3		1.8		<1.3		<0.65		<1.3		<1.3		<1.3		2.6		<1.3		0.92		5.1	
	MW172	10/26/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		1		1.4		<0.78		<0.39		<0.78		<0.78		<0.78		1.1		<0.78		0.49		2.4	
	MW172	7/26/2005	<0.39		<0.39		<0.78		<0.78		0.96		<0.78		<0.39		<0.78		<0.78		<0.78		0.51		<0.78		<0.39		1.2	
	MW172(DUP)	7/26/2005	<0.39		<0.39		<0.78		<0.78		0.97		<0.78		<0.39		<0.78		<0.78		<0.78		0.52		<0.78		<0.39		1.3	
	MW172	10/25/2005	<0.51		<0.51		<1		<1		1.4		<1		<0.51		<1		<1		<1		0.73		<1		<0.51		1.9	
	MW172(DUP)	10/25/2005	<0.49		<0.49		<0.98		<0.98		1.3		<0.98		<0.49		<0.98		<0.98		<0.98		0.71		<0.98		<0.49		1.6	
	MW172	5/5/2006	<0.39		<0.39		<0.78		0.86		1.1		<0.78		<0.39		<0.78		<0.78		<0.78		1.1		<0.78		0.47		2.3	
	MW172(DUP)	5/5/2006	<0.39		<0.39		<0.78		0.97		1.3		<0.78		<0.39		<0.78		<0.78		<0.78		1.2		<0.78		0.49		2.5	
	MW172	10/19/2006	<0.52		<0.52		<1		1.5		2		<1		<0.52		<1		<1		<1		2.4		<1		<0.52		3.4	
	MW172	5/1/2007	<0.44		<0.44		<0.88		1.3		2		<0.88		<0.44		<0.88		<0.88		<0.88		**3.3**		<0.88		0.62		5.1	
	MW172	10/16/2007	<0.39		<0.39		<0.78		<0.78		1.2		<0.78		<0.39		<0.78		<0.78		<0.78		0.92		<0.78		<0.39		1.5	
	MW172(DUP)	10/16/2007	<0.45		<0.45		<0.9		1		1.5		<0.9		<0.45		<0.9		<0.9		<0.9		1.2		<0.9		<0.45		1.9	
	MW172	5/14/2008	<0.42		<0.42		<0.83		1		1.6		<0.83		<0.42		<0.83		<0.83		<0.83		1.9		<0.83		<0.42		3	
	MW172(DUP)	5/14/2008	<0.39		<0.39		<0.78		0.98		1.5		<0.78		<0.39		<0.78		<0.78		<0.78		1.8		<0.78		<0.39		2.8	
	MW172	10/27/2008	<0.61		<0.61		<1.2		<1.2		1.2		<1.2		<0.61		<1.2		<1.2		<1.2		0.76		<1.2		<0.61		<0.61	
	MW172	5/1/2009	<0.16		<0.31		<0.31		0.83		1.3		<0.31		<0.16		<0.31		<0.31		<0.31		1.7		<0.39		<0.16		2.6	
	MW172	10/27/2009	<0.23		<0.45		<0.45		1.5		2.3		0.52	/ J	<0.23		<0.45		<0.45		<0.45		2.1	/ J	<0.57		<0.23		4.6	/ J
	MW172(DUP)	10/27/2009	<0.18		<0.35		<0.35		1.2		1.8		0.46	/ J	<0.18		<0.35		<0.35		<0.35		1.4	/ J	<0.44		0.29		2.7	/ J
	MW172	4/13/2010	<0.16		<0.31		<0.31		0.86		1.3		<0.31		<0.16		<0.31		<0.31		<0.31		1.4		<0.39		<0.16		2.6	
	MW172	10/27/2010	<0.17		<0.32		<0.32		1.1		1.7		<0.32		<0.17		<0.32		<0.32		<0.32		1.3		<0.40		0.26		2.4	
	MW172	4/14/2011	<0.3		<0.57		<0.57		0.98		1.7		0.17	F /	<0.3		<0.57		<0.57		<0.57		1.3		<0.72		0.24	F /	2.3	
	MW172	10/11/2011	<0.22		<0.22		<0.22		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.55		<0.22		<0.22	
	MW174	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW174	10/26/2004	<0.66		<0.66 (0.21)		<1.3 (0.24)		<1.3		<1.3		<1.3		<0.66		<1.3		<1.3		<1.3		<0.66		<1.3		<0.66		<0.66	
	MW174	10/25/2005	<0.77		<0.77		<1.5		<1.5		<1.5		<1.5		<0.77		<1.5		<1.5		<1.5		<0.77		<1.5		<0.77		<0.77	
	MW174	10/19/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW174	10/16/2007	<0.43		<0.43		<0.86		<0.86		<0.86		<0.86		<0.43		<0.86		<0.86		<0.86		<0.43		<0.86		<0.43		<0.43	
	MW174	10/27/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW174	5/4/2009	<0.17		<0.34		<0.34		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW174	10/27/2009	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW174	4/12/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW174	10/27/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW174	4/15/2011	<0.33		<0.63		<0.63		<0.63		<0.63		<0.63		<0.33		<0.63		<0.63		<0.63		<0.33		<0.79		<0.33		0.62	
	MW174	10/11/2011	<0.21		<0.21		<0.21		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52		<0.21		<0.21	
	MW174	4/11/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW174	10/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	WES3	5/20/2003	<0.68		<0.68 (0.074)		<1.4 (0.36)		<1.4		<1.4		<1.4		<0.68		<1.4		<1.4		<1.4		<0.68		<1.4		<0.68		1.1	
	WES3	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		1.4		1.8		<0.78		<0.39		<0.78		<0.78		<0.78		1.3		<0.78		1		2.6	
	WES3	5/26/2004	<0.68		<0.68 (0.073)		<1.4 (0.36)		<1.4		<1.4		<1.4		<0.68		<1.4		<1.4		<1.4		1.1		<1.4		1.2		3.1	
	WES3	10/26/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		1.4		1.8		<0.78		<0.39		<0.78		<0.78		<0.78		1.6		<0.78		1.5		3.5	
	WES3	7/26/2005	<0.39		<0.39		<0.78		<0.78		1		<0.78		<0.39		<0.78		<0.78		<0.78		0.75		<0.78		0.69		1.7	
	WES3	10/25/2005	<0.62		<0.62		<1.2		<1.2		1.4		<1.2		<0.62		<1.2		<1.2		<1.2		0.76		<1.2		0.86		2	
	WES3	5/5/2006	<0.39		<0.39		<0.78		<0.78		0.8		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		0.47		0.9	
	WES3	10/19/2006	<0.41		<0.41		<0.82		1.2		1.6		<0.82		<0.41		<0.82		<0.82		<0.82		1.9		<0.82		0.43		2.6	
	WES3	5/1/2007	<0.39		<0.39		<0.78		<0.78		1		<0.78		<0.39		<0.78		<0.78		<0.78		0.93		<0.78		1		3.2	
	WES3	10/16/2007	<0.39		<0.39		<0.78		0.91		1.4		<0.78		<0.39		<0.78		<0.78		<0.78		1		<0.78		<0.39		1.6	
	WES3	5/14/2008	<0.39		<0.39		<0.78		<0.78		0.82		<0.78		<0.39		<0.78		<0.78		<0.78		0.61		<0.78		<0.39		1.3	
	WES3	10/27/2008	<0.39		<0.39		<0.78		<0.78		0.81		<0.78		<0.39		<0.78		<0.78		<0.78		0.72		<0.78		<0.39		0.44	
	WES3	5/4/2009	<0.17		<0.32		<0.32		<0.32		0.89		<0.32		<0.17		<0.32		<0.32		<0.32		0.69		<0.4		<0.17		1.3	
	WES3(DUP)	5/4/2009	<0.18		<0.35		<0.35		<0.35		0.9		<0.35		<0.18		<0.35		<0.35		<0.35		0.7		<0.44		<0.18		1.3	
	WES3	10/27/2009	<0.19		<0.37		<0.37		0.59		0.85		0.21	F / J	<0.19		<0.37		<0.37		<0.37		0.34		<0.47		<0.19		0.65	
	WES3	4/13/2010	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		0.58		<0.49		<0.20		1.2	
	WES3	10/27/2010	<0.19		<0.38		<0.38		0.8		1.1		<0.38		<0.19		<0.38		<0.38		<0.38		0.53		<0.47		0.23		0.99	
	WES3	4/15/2011	<0.41		<0.79		<0.79		0.69	F /	1.2		<0.79		<0.41		<0.79		<0.79		<0.79		0.57		<0.99		0.38	F /	2.3	
	WES3	10/11/2011	<0.20		<0.20		<0.20		<0.39		<0.39		0.12	F /	<0.20		<0.39		<0.39		<0.39		0.41		<0.49		<0.20		0.9	
	WES3	4/11/2012	<0.16		<0.31		<0.31		0.67		1		<0.31		<0.16		<0.31		<0.31		<0.31		0.74		<0.39		0.2		1.2	
	WES3	10/29/2012	<0.16		<0.31		<0.31		0.82		0.95		<0.31		<0.16		<0.31		<0.31		<0.31		0.43		<0.39		<0.16		0.76	
	Compliance																													
	MW401	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW401	10/26/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW401	10/25/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW401	10/19/2006	<0.46		<0.46		<0.91		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	MW401	10/16/2007	<0.92		<0.92		<0.79		<1.8		<0.79		<0.79		<0.92		<0.79		<1.8		<1.8		<0.92		<1.8		<0.92		<0.92	
	MW401	5/14/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW401	10/28/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW401	5/4/2009	<0.17		<0.32		<0.32		<0.32		<0.32		<0.32		<0.17		<0.32		<0.32		<0.32		<0.17		<0.4		<0.17		<0.17	
	MW401	10/27/2009	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW401	4/12/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L1	*Compliance*																													
	MW401	10/27/2010	<0.29		<0.56		<0.56		<0.56		<0.56		<0.56		<0.29		<0.56		<0.56		<0.56		<0.29		<0.71		<0.29		<0.29	
	MW401	4/14/2011	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52		<0.21		<0.21	
	MW401	10/11/2011	<0.24		<0.24		<0.24		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	SW550	5/8/2003	<0.55		<0.55 (0.060)		<1.1 (0.29)		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	SW550	10/9/2003	<0.46		<0.46 (0.049)		<0.91 (0.24)		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	SW550	5/11/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550	10/14/2004	<0.58		<0.58 (0.18)		<1.2 (0.21)		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	SW550	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550	10/24/2005	<0.48		<0.48		<0.96		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	SW550	5/5/2006	<0.42		<0.42		<0.83		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	SW550	10/17/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550(DUP)	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550	5/19/2008	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	SW550	10/23/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW550	5/1/2009	<0.16		<0.32		<0.32		<0.32		<0.32		<0.32		<0.16		<0.32		<0.32		<0.32		<0.16		<0.4		<0.16		<0.16	
	SW550	10/27/2009	<0.16		<0.32		<0.32		<0.32		<0.32		<0.32		<0.16		<0.32		<0.32		<0.32		<0.16		<0.4		<0.16		<0.16	
	SW550	4/14/2010	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	SW550	10/27/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	SW550	4/14/2011	<0.26		<0.5		<0.5		<0.5		<0.5		<0.5		<0.26		<0.5		<0.5		<0.5		<0.26		<0.62		<0.26		<0.26	
	SW550	10/11/2011	<0.36		<0.36		<0.36		<0.69		<0.69		<0.69		<0.36		<0.69		<0.69		<0.69		<0.36		<0.87		<0.36		<0.36	
	SW550	4/12/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	SW550	10/30/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
L2	*In-Plume*																													
	MW404	5/21/2003	<0.56		<0.56 (0.060)		<1.1 (0.3)		<1.1		<1.1		25		<0.56		<1.1		<1.1		<1.1		**120**		<1.1		<0.56		<0.56	
	MW404	10/24/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		79		<0.39		<0.78		<0.78		<0.78		**320**		<0.78		<0.39		<0.39	
	MW404	5/25/2004	<0.6		<0.6 (0.064)		<1.2 (0.32)		<1.2		<1.2		7.4		<0.6		<1.2		<1.2		<1.2		**15**		<1.2		<0.6		<0.6	
	MW404	10/26/2004	<0.51		<0.51 (0.16)		<1 (0.19)		<1		<1		100		<0.51		<1		<1		<1		**350**		<1		<0.51		<0.51	
	MW404	7/26/2005	<0.4		<0.4		<0.79		<0.79		<0.79		99		<0.4		<0.79		<0.79		<0.79		**330**		<0.79		<0.4		<0.4	
	MW404	10/25/2005	<0.6		<0.6		<1.2		<1.2		<1.2		57		<0.6		<1.2		<1.2		<1.2		**270**		<1.2		<0.6		<0.6	
	MW404	5/9/2006	<0.44		<0.44		<0.88		<0.88		<0.88		33		<0.44		<0.88		<0.88		<0.88		**100**		<0.88		<0.44		<0.44	
	MW404	10/13/2006	<0.64		<0.64		<1.3		<1.3		<1.3		78		<0.64		<1.3		<1.3		<1.3		**270**		<1.3		<0.64		<0.64	
	MW404	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		21		<0.39		<0.78		<0.78		<0.78		**45**		<0.78		<0.39		<0.39	
	MW404	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		52		<0.39		<0.78		<0.78		<0.78		**250**		<0.78		<0.39		<0.39	
	MW404	5/19/2008	<0.39		<0.39		<0.78		<0.78		<0.78		32		<0.39		<0.78		<0.78		<0.78		**110**		<0.78		<0.39		<0.39	
	MW404	10/23/2008	<0.49		<0.49		<0.99		<0.99		<0.99		32		<0.49		<0.99		<0.99		<0.99		**120**		<0.99		<0.49		<0.49	
	MW404	5/1/2009	<0.21		<0.41		<0.41		<0.41		<0.41		11		<0.21		<0.41		<0.41		<0.41		**16**		<0.51		<0.21		<0.21	
	MW404	10/26/2009	<0.3		<0.58		<0.58		<0.58		<0.58		15		<0.3		<0.58		<0.58		<0.58		**27**		<0.73		<0.3		<0.3	
	MW404	4/12/2010	<0.16		<0.31		<0.31		<0.31		<0.31		15		<0.16		<0.31		0.086	F /	<0.31		**27**		<0.39		<0.16		<0.16	
	MW404	10/27/2010	<0.18		<0.35		<0.35		<0.35		<0.35		28		<0.18		<0.35		<0.35		<0.35		**46**		<0.44		<0.18		<0.18	
	MW404	4/14/2011	<0.21		<0.4		<0.4		<0.4		<0.4		24		<0.21		<0.4		<0.4		<0.4		**74**		<0.5		<0.21		<0.21	
	MW404	10/11/2011	<0.22		<0.22		<0.22		<0.42		<0.42		30		<0.22		<0.42		<0.42		<0.42		**94**		<0.53	U / UJ	<0.22	U / UJ	<0.22	U / UJ
	MW404	10/26/2012	<0.16		0.21	F /	<0.31		<0.31		<0.31		33		<0.16		0.54	/ J	<0.31		0.65	/ J	**130**		<0.39		<0.16		<0.16	
	MW620	5/20/2003	<0.56		<0.56 (0.060)		<1.1 (0.3)		<1.1		<1.1		<1.1		<0.56		<1.1		<1.1		<1.1		<0.56		<1.1		<0.56		<0.56	
	MW620	10/27/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620(DUP)	10/27/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620	5/26/2004	<0.57		<0.57 (0.062)		<1.1 (0.3)		<1.1		<1.1		1.7		<0.57		1.5		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW620(DUP)	5/26/2004	<0.81		<0.81 (0.087)		<1.6 (0.43)		<1.6		<1.6		1.8		<0.81		<1.6		<1.6		<1.6		<0.81		<1.6		<0.81		<0.81	
	MW620	10/26/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620(DUP)	10/26/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620	7/26/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620	10/25/2005	<0.8		<0.8		<1.6		<1.6		<1.6		<1.6		<0.8		<1.6		<1.6		<1.6		<0.8		<1.6		<0.8		<0.8	
	MW620	5/9/2006	<0.5		<0.5		<1		<1		<1		<1		<0.5		<1		<1		<1		<0.5		<1		<0.5		<0.5	
	MW620	10/13/2006	<0.48		<0.48		<0.96		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW620	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620	10/17/2007	<0.55		<0.55		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	MW620	5/19/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW620	10/23/2008	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW620	5/1/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW620	10/26/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW620	4/8/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW620	10/27/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.55		<0.22		<0.22	
	MW620	4/14/2011	<0.43		<0.84		<0.84		<0.84		<0.84		<0.84		<0.43		<0.84		<0.84		<0.84		<0.43		<1.1		<0.43		<0.43	
	MW620	10/11/2011	<0.32		<0.32		<0.32		<0.61		<0.61		<0.61		<0.32		<0.61		<0.61		<0.61		<0.32		<0.77		<0.32		<0.32	U / UJ
	MW620	10/26/2012	<0.16		0.29	F /	0.13	F /	<0.31		<0.31		<0.31		<0.16		0.28	F /	<0.31		1.5	/ J	<0.16		<0.39		<0.16		<0.16	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L2	*Compliance*																													
	MW621	5/20/2003	<0.42		<0.42 (0.045)		<0.83 (0.22)		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	MW621	10/24/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW621	5/26/2004	<0.46		<0.46 (0.049)		<0.91 (0.24)		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	MW621	10/26/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW621	7/26/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW621(DUP)	7/26/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW621	10/25/2005	<0.44		<0.44		<0.88		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW621(DUP)	10/25/2005	<0.46		<0.46		<0.92		<0.92		<0.92		<0.92		<0.46		<0.92		<0.92		<0.92		<0.46		<0.92		<0.46		<0.46	
	MW621	5/9/2006	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	MW621(DUP)	5/9/2006	<0.56		<0.56		<1.1		<1.1		<1.1		<1.1		<0.56		<1.1		<1.1		<1.1		<0.56		<1.1		<0.56		<0.56	
	MW621	10/13/2006	<0.57		<0.57		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW621(DUP)	10/13/2006	<0.46		<0.46		<0.91		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	MW621	4/27/2007	<0.48		<0.48		<0.96		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW621	10/17/2007	<0.74		<0.74		<1.5		<1.5		<1.5		<1.5		<0.74		<1.5		<1.5		<1.5		<0.74		<1.5		<0.74		<0.74	
	MW621(DUP)	10/17/2007	<0.69		<0.69		<1.4		<1.4		<1.4		<1.4		<0.69		<1.4		<1.4		<1.4		<0.69		<1.4		<0.69		<0.69	
	MW621	5/19/2008	<0.59		<0.59		<1.2		<1.2		<1.2		<1.2		<0.59		<1.2		<1.2		<1.2		<0.59		<1.2		<0.59		<0.59	
	MW621	10/23/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW621	5/1/2009	<0.16		<0.31		<0.31		<0.31		<0.31		2.5		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW621	10/26/2009	<0.2		<0.38		<0.38		<0.38		<0.38		<0.38		<0.2		<0.38		<0.38		<0.38		<0.2		<0.48		<0.2		<0.2	
	MW621	4/8/2010	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.51		<0.21		<0.21	
	MW621	10/27/2010	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.46		<0.19		<0.19	
	MW621	4/14/2011	<0.32		<0.61		<0.61		<0.61		<0.61		0.58	F /	<0.32		<0.61		<0.61		<0.61		0.18	F /	<0.77		<0.32		<0.32	
	MW621	10/11/2011	<0.27		<0.27		<0.27		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.65		<0.27		<0.27	U / UJ
	MW621	10/26/2012	<0.16		0.42		<0.31		<0.31		<0.31		<0.31		<0.16		0.24	F /	<0.31		0.4		<0.16		<0.39		<0.16		<0.16	
	MW810	10/22/2009	<0.26		<0.51		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW810	4/14/2010	<0.33		<0.63		<0.63		<0.63		<0.63		<0.63		<0.33		<0.63		<0.63		<0.63		<0.33		<0.79		<0.33		<0.33	
	MW810	10/27/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW810	4/14/2011	<0.26		<0.5		<0.5		<0.5		<0.5		<0.5		<0.26		<0.5		<0.5		<0.5		<0.26		<0.62		<0.26		<0.26	
	MW810	10/13/2011	<0.17		<0.17		<0.17		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.41		<0.17		<0.17	
	SW555	5/9/2003	<0.53		<0.53 (0.057)		<1.1 (0.28)		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		<0.53		<0.53	
	SW555(DUP)	5/9/2003	<0.53		<0.53 (0.057)		<1.1 (0.28)		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		<0.53		<0.53	
	SW555	10/10/2003	<0.46		<0.46 (0.049)		<0.91 (0.24)		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	SW555	5/11/2004	<0.45		<0.45 (0.048)		<0.9 (0.24)		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	SW555	10/14/2004	<0.73		<0.73 (0.23)		<1.5 (0.27)		<1.5		<1.5		<1.5		<0.73		<1.5		<1.5		<1.5		<0.73		<1.5		<0.73		<0.73	
	SW555	7/26/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW555	10/26/2005	<0.51		<0.51		<1		<1		<1		<1		<0.51		<1		<1		<1		<0.51		<1		<0.51		<0.51	
	SW555	5/9/2006	<0.55		<0.55		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	SW555	10/13/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW555	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW555	10/17/2007	<0.49		<0.49		<0.98		<0.98		<0.98		<0.98		<0.49		<0.98		<0.98		<0.98		<0.49		<0.98		<0.49		<0.49	
	SW555(DUP)	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW555	5/19/2008	<0.71		<0.71		<1.4		<1.4		<1.4		<1.4		<0.71		<1.4		<1.4		<1.4		<0.71		<1.4		<0.71		<0.71	
	SW555	10/23/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW555(DUP)	10/23/2008	<0.4		<0.4		<0.79		<0.79		<0.79		<0.79		<0.4		<0.79		<0.79		<0.79		<0.4		<0.79		<0.4		<0.4	
	SW555	5/1/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	SW555	10/26/2009	<0.2		<0.38		<0.38		<0.38		<0.38		<0.38		<0.2		0.3	F /	<0.38		<0.38		<0.2		<0.48		<0.2		<0.2	
	SW555	4/8/2010	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.50		<0.21		<0.21	
	SW555	10/27/2010	<0.19		<0.36		<0.36		<0.36		<0.36		<0.36		<0.19		<0.36		<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	SW555	4/14/2011	<0.17		<0.32		<0.32		<0.32		<0.32		<0.32		<0.17		<0.32		<0.32		<0.32		<0.17		<0.4		<0.17		<0.17	
	SW555	10/11/2011	<0.25		<0.25		<0.25		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	U / UJ
	SW555	10/26/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
L3	*Upgradient*																													
	MW03	5/6/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW03	10/22/2009	<0.3		<0.57		<0.57		<0.57		<0.57		<0.57		<0.3		<0.57		<0.57		<0.57		<0.3		<0.72		<0.3		<0.3	
	MW03	4/9/2010	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW03	10/26/2010	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW03	4/14/2011	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW03	10/13/2011	<0.18		<0.18		<0.18		<0.36		<0.36		<0.36		<0.18		<0.36		<0.36		<0.36		<0.18		<0.45		<0.18		<0.18	
	SW004	5/6/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	SW004	10/23/2009	<0.43		<0.84		<0.84		<0.84		<0.84		<0.84		<0.43		<0.84		<0.84		<0.84		<0.43		<1.1		<0.43		<0.43	
	SW004	4/8/2010	<0.34		<0.65		<0.65		<0.65		<0.65		<0.65		<0.34		<0.65		<0.65		<0.65		<0.34		<0.82		<0.34		<0.34	
	SW004	10/26/2010	<0.49		<0.96		<0.96		<0.96		<0.96		<0.96		<0.49		<0.96		<0.96		<0.96		<0.49		<1.2		<0.49		<0.49	
	SW004(DUP)	10/26/2010	<0.48		<0.93		<0.93		<0.93		<0.93		<0.93		<0.48		<0.93		<0.93		<0.93		<0.48		<1.2		<0.48		<0.48	
	SW004	4/14/2011	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.54		<0.22		<0.22	
	SW004(DUP)	4/14/2011	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	SW004	10/14/2011	<0.41		<0.41		<0.41		<0.79		<0.79		<0.79		<0.41		<0.79		<0.79		<0.79		<0.41		<0.99		<0.41		<0.41	
	SW004	4/12/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L3	***In-Plume/Downgradient***																													
	MW410	5/21/2003	<0.47		<0.47 (0.050)		<0.94 (0.25)		<0.94		<0.94		<0.94		<0.47		<0.94		<0.94		<0.94		<0.47		<0.94		<0.47		<0.47	
	MW410	10/27/2003	<0.4		<0.4 (0.043)		<0.81 (0.21)		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		0.57		<0.81		<0.4		<0.4	
	MW410(DUP)	10/27/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		0.63		<0.78		<0.39		<0.39	
	MW410	5/26/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW410(DUP)	5/26/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW410	10/26/2004	<0.41		<0.41 (0.13)		<0.82 (0.15)		<0.82		<0.82		<0.82		<0.41		<0.82		<0.82		<0.82		<0.41		<0.82		<0.41		<0.41	
	MW410	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		2		<0.39		<0.78		<0.78		<0.78		**4.7**		<0.78		<0.39		<0.39	
	MW410	10/21/2005	<1.5		<1.5		<2.9		<2.9		<2.9		<2.9		<1.5		<2.9		<2.9		<2.9		<1.5		<2.9		<1.5		<1.5	
	MW410	5/5/2006	<0.68		<0.68		<1.4		<1.4		<1.4		<1.4		<0.68		<1.4		<1.4		<1.4		<0.68		<1.4		<0.68		<0.68	
	MW410	10/18/2006	<0.39		<0.39		<0.78		<0.78		<0.78		0.93		<0.39		<0.78		<0.78		<0.78		2.3		<0.78		<0.39		0.47	
	MW410	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		1.7		<0.39		<0.78		<0.78		<0.78		**5**		<0.78		<0.39		<0.39	
	MW410	5/21/2008	<0.41		<0.41		<0.82		<0.82		<0.82		<0.82		<0.41		<0.82		<0.82		<0.82		**3.3**		<0.82		<0.41		<0.41	
	MW410	10/29/2008	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		<0.95		<0.95		<0.47		<0.95		<0.47		<0.47	
	MW410	5/7/2009	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW410	4/8/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW410	10/26/2010	<0.23		<0.44		<0.44		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.55		<0.23		<0.23	
	MW410	4/14/2011	<0.31		<0.61		<0.61		<0.61		<0.61		<0.61		<0.31		<0.61		<0.61		<0.61		<0.31		<0.77		<0.31		<0.31	
	MW410	10/14/2011	<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.19		<0.38		<0.38		<0.38		<0.19		<0.47		<0.19		<0.19	
	MW410	4/11/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW410	10/30/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	In-Plume/Downgradient																													
	MW412	5/21/2003	<0.64		<0.64 (0.069)		<1.3 (0.34)		<1.3		<1.3		15		<0.64		<1.3		<1.3		<1.3		**98**		<1.3		<0.64		<0.64	
	MW412	10/28/2003	<0.42		<0.42 (0.046)		<0.85 (0.22)		<0.85		<0.85		11		<0.42		<0.85		<0.85		<0.85		**58**		<0.85		<0.42		<0.42	
	MW412	5/26/2004	<0.61		<0.61 (0.066)		<1.2 (0.32)		<1.2		1.8		40		<0.61		<1.2		<1.2		<1.2		**390**		<1.2		<0.61		<0.61	
	MW412	10/27/2004	<0.66		<0.66 (0.21)		<1.3 (0.24)		<1.3		<1.3		11		<0.66		<1.3		<1.3		<1.3		**68**		<1.3		<0.66		<0.66	
	MW412(DUP)	10/27/2004	<0.55		<0.55 (0.17)		<1.1 (0.2)		<1.1		<1.1		11		<0.55		<1.1		<1.1		<1.1		**63**		<1.1		<0.55		<0.55	
	MW412	7/27/2005	<0.39		<0.39		<0.78		<0.78		1.1		25		<0.39		<0.78		<0.78		<0.78		**230**		<0.78		<0.39		<0.39	
	MW412	10/21/2005	<1.4		<1.4		<2.8		<2.8		<2.8		28		<1.4		<2.8		<2.8		<2.8		**200**		<2.8		<1.4		<1.4	
	MW412	5/5/2006	<0.39		<0.39		<0.78		<0.78		<0.78		17		<0.39		<0.78		<0.78		<0.78		**100**		<0.78		<0.39		<0.39	
	MW412	10/18/2006	<0.39		<0.39		<0.78		<0.78		0.82		14		<0.39		<0.78		<0.78		<0.78		**71**		<0.78		<0.39		<0.39	
	MW412	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		1.8		<0.39		<0.78		<0.78		<0.78		**5.7**		<0.78		<0.39		<0.39	
	MW412	10/17/2007	<0.39		<0.39		<0.78		1		1.8		39		<0.39		<0.78		<0.78		<0.78		**300**		<0.78		<0.39		<0.39	
	MW412	5/21/2008	<0.39		<0.39		<0.78		1.2		1.8		51		<0.39		<0.78		<0.78		<0.78		**440**		<0.78		<0.39		<0.39	
	MW412	10/29/2008	<0.44		<0.44		<0.88		0.98		1.7		34		<0.44		<0.88		<0.88		<0.88		**170**		<0.88		<0.44		<0.44	
	MW412(DUP)	10/29/2008	<0.4		<0.4		<0.79		1.1		1.8		42		<0.4		<0.79		<0.79		<0.79		**250**		<0.79		<0.4		<0.4	
	MW412	5/6/2009	<0.16		<0.31		<0.31		0.93		1.4		35		<0.16		<0.31		<0.31		<0.31		**210**		<0.39		<0.16		<0.16	
	MW412	10/27/2009	<0.17		<0.33		<0.33		0.96		1.6		30	/ J	<0.17		<0.33		<0.33		<0.33		**130**		<0.42		<0.17		<0.17	
	MW412	4/12/2010	<0.18		<0.35		<0.35		1		1.6		38		<0.18		<0.35		<0.35		<0.35		**220**		<0.44		<0.18		<0.18	
	MW412	10/26/2010	<0.23		<0.45		<0.45		1.3		1.8		29		<0.23		<0.45		<0.45		<0.45		**200**		<0.57		<0.23		<0.23	
	MW412	4/14/2011	<0.28		<0.54		<0.54		0.94		<0.54		26		<0.28		<0.54		<0.54		<0.54		**110**		<0.68		<0.28		<0.28	
	MW412	10/17/2011	<0.22		<0.22		<0.22		<0.42		<0.42		19		<0.22		<0.42		<0.42		<0.42		**67**		<0.53		<0.22		<0.22	U / UJ
	MW412	4/11/2012	<0.16		<0.31		<0.31		0.89		1.7		28	/ J	0.24		<0.31		<0.31		<0.31		**120**		<0.39		0.11	F / J	<0.16	
	MW412	10/30/2012	<0.16		<0.31		<0.31		<0.31		1.9		26		<0.16		<0.31		<0.31		<0.31		**120**		<0.39		<0.16		<0.16	
	Early Warning/Downgradient																													
	MW630	5/21/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	10/28/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	5/26/2004	<0.5		<0.5 (0.054)		<1 (0.27)		<1		<1		<1		<0.5		<1		<1		<1		<0.5		<1		<0.5		<0.5	
	MW630	10/27/2004	<0.55		<0.55 (0.17)		<1.1 (0.2)		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		1.7		<1.1		<0.55		<0.55	
	MW630	7/26/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	10/26/2005	<0.4		<0.4		<0.79		<0.79		<0.79		<0.79		<0.4		<0.79		<0.79		<0.79		<0.4		<0.79		<0.4		<0.4	
	MW630	5/5/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	10/13/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	4/27/2007	<0.55		<0.55		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		2		<1.1		<0.55		<0.55	
	MW630(DUP)	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		1.6		<0.78		<0.39		<0.39	
	MW630	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630(DUP)	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	5/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		0.83		<0.78		<0.39		<0.39	
	MW630	10/28/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW630	5/6/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW630	10/26/2009	<0.16		<0.32		<0.32		<0.32		<0.32		0.83	/ J	<0.16		<0.32		<0.32		<0.32		0.96		<0.4		<0.16		<0.16	
	MW630	4/9/2010	<0.25		<0.49		<0.49		<0.49		<0.49		3.7	/ J	<0.25		<0.49		<0.49		<0.49		**8.9**		<0.62		<0.25		<0.25	
	MW630(DUP)	4/9/2010	<0.18		<0.35		<0.35		<0.35		<0.35		4.8	/ J	<0.18		<0.35		<0.35		<0.35		**11**		<0.44		<0.18		<0.18	
	MW630	10/26/2010	<0.57		<1.1		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.4		<0.57		<0.57	
	MW630	4/14/2011	<0.26		<0.5		<0.5		<0.5		<0.5		6.6		<0.26		<0.5		<0.5		<0.5		**13**		<0.62		<0.26		<0.26	
	MW630	10/14/2011	<0.45		<0.45		<0.45		<0.88		<0.88		4		<0.45		<0.88		<0.88		<0.88		**8**		<1.1		<0.45		<0.45	
	MW630(DUP)	10/14/2011	<0.22		<0.22		<0.22		<0.43		<0.43		4.6		<0.22		<0.43		<0.43		<0.43		**7.8**		<0.54		<0.22		<0.22	
	MW630	4/11/2012	<0.16		<0.31		<0.31		0.077	F / J	0.18	F / J	4.7	/ J	<0.16		<0.31		<0.31		<0.31		**8.7**		<0.39		<0.16		<0.16	
	MW630(DUP)	4/11/2012	<0.16		<0.31		<0.31		0.072	F / J	0.15	F / J	4.7	/ J	<0.16		<0.31		<0.31		<0.31		**8.7**		<0.39		<0.16		<0.16	
	MW630	10/30/2012	<0.16		<0.31		<0.31		<0.31		<0.31		0.35		<0.16		<0.31		<0.31		<0.31		0.36		<0.39		<0.16		<0.16	

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TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L3	***Early Warning/Downgradient***																													
	MW631	5/21/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631	10/28/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631	5/26/2004	<0.42		<0.42 (0.045)		<0.83 (0.22)		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	MW631	10/27/2004	<0.42		<0.42 (0.13)		<0.83 (0.15)		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	MW631	7/26/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631(DUP)	7/26/2005	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		<0.95		<0.95		<0.47		<0.95		<0.47		<0.47	
	MW631	10/26/2005	<0.43		<0.43		<1.2		<1.2		<0.86		<0.86		<0.6		<0.86		<1.2		<1.2		<0.6		<1.2		<0.6		<0.6	
	MW631	5/5/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631(DUP)	5/5/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631	10/13/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631(DUP)	10/13/2006	<0.49		<0.49		<0.98		<0.98		<0.98		<0.98		<0.49		<0.98		<0.98		<0.98		<0.49		<0.98		<0.49		<0.49	
	MW631	4/27/2007	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		<0.95		<0.95		<0.47		<0.95		<0.47		<0.47	
	MW631	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631	5/20/2008	<0.49		<0.49		<0.99		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW631	10/28/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW631	5/6/2009	<0.27		<0.53		<0.53		<0.53		<0.53		<0.53		<0.27		<0.53		<0.53		<0.53		<0.27		<0.66		<0.27		<0.27	
	MW631	10/26/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW631	4/9/2010	<0.24		<0.46		<0.46		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW631	10/26/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW631	4/14/2011	<0.23		<0.45		<0.45		<0.45		<0.45		<0.45		<0.23		<0.45		<0.45		<0.45		<0.23		<0.57		<0.23		<0.23	
	MW631	10/14/2011	<0.23		<0.23		<0.23		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.56		<0.23		<0.23	
	MW631	4/11/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW631	10/30/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW631(DUP)	10/30/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	Early Warning/Downgradient																													
	MW633	5/21/2003	<0.39		<0.39 (0.042		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		2.1		<0.78		<0.39		<0.39	
	MW633	10/27/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		3.3		<0.39		<0.78		<0.78		<0.78		**9.8**		<0.78		<0.39		<0.39	
	MW633	5/25/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		2.1		<0.78		<0.39		<0.39	
	MW633	10/26/2004	<0.46		<0.46 (0.14)		<0.92 (0.17)		<0.92		<0.92		1.2		<0.46		<0.92		<0.92		<0.92		**3.8**		<0.92		<0.46		<0.46	
	MW633	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		1.4		<0.78		<0.39		<0.39	
	MW633	10/21/2005	<1.3		<1.3		<2.5		<2.5		<2.5		4		<1.3		<2.5		<2.5		<2.5		**11**		<2.5		<1.3		<1.3	
	MW633	5/10/2006	<0.44		<0.44		<0.88		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW633	10/18/2006	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW633	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		1.7		<0.39		<0.78		<0.78		<0.78		**5.1**		<0.78		<0.39		<0.39	
	MW633	10/17/2007	<0.4		<0.4		<0.81		1.1		1.8		35		<0.4		<0.81		<0.81		<0.81		**300**		<0.81		<0.4		<0.4	
	MW633	5/21/2008	<0.39		<0.39		<0.78		1		1.7		47		<0.39		<0.78		<0.78		<0.78		**390**		<0.78		<0.39		<0.39	
	MW633(DUP)	5/21/2008	<0.39		<0.39		<0.78		0.88		1.4		43		<0.39		<0.78		<0.78		<0.78		**280**		<0.78		<0.39		<0.39	
	MW633	10/29/2008	<0.4		<0.4		<0.81		<0.81		<0.81		1.1		<0.4		<0.81		<0.81		<0.81		**4.5**		<0.81		<0.4		<0.4	
	MW633	5/6/2009	<0.17		<0.33		<0.33		<0.33		<0.33		5.7		<0.17		<0.33		<0.33		<0.33		**33**		<0.41		<0.17		<0.17	
	MW633	10/27/2009	<0.16		<0.31		<0.31		<0.31		<0.31		2	/ J	<0.16		<0.31		<0.31		<0.31		**7.7**		<0.39		<0.16		<0.16	
	MW633	4/12/2010	<0.18		<0.34		<0.34		<0.34		<0.34		8.4		<0.18		<0.34		<0.34		<0.34		**56**		<0.43		<0.18		<0.18	
	MW633	10/26/2010	<0.32		<0.61		<0.61		<0.61		<0.61		3.9		<0.32		<0.61		<0.61		<0.61		**16**		<0.77		<0.32		<0.32	
	MW633	4/14/2011	<0.39		<0.76		<0.76		<0.76		<0.76		1.2		<0.39		<0.76		<0.76		<0.76		**4.2**		<0.96		<0.39		<0.39	
	MW633	10/17/2011	<0.39		<0.39		<0.39		<0.76	U / UJ	<0.76		3.1		<0.39		<0.76		<0.76		<0.76		**7.9**		<0.96		<0.39		<0.39	
	MW633	4/11/2012	<0.16		<0.31		<0.31		<0.31		<0.31		2	/ J	<0.16		<0.31		<0.31		<0.31		**6.7**		<0.39		<0.16		<0.16	
	MW633	10/30/2012	<0.16		<0.31		0.13	F / J	<0.31		<0.31		2.7		<0.16		<0.31		<0.31		<0.31		**10**		<0.39		<0.16		<0.16	
	Compliance/Downgradient																													
	MW632	10/22/2009	<0.37		<0.71		<0.71		<0.71		<0.71		<0.71		<0.37		<0.71		<0.71		<0.71		<0.37		<0.89		<0.37		<0.37	
	MW632	4/9/2010	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW632	10/26/2010	<0.19		<0.36		<0.36		<0.36		<0.36		<0.36		<0.19		<0.36		<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	MW632	4/14/2011	<0.18		<0.36		<0.36		<0.36		<0.36		<0.36		<0.18		<0.36		<0.36		<0.36		<0.18		<0.45		<0.18		<0.18	
	MW632	10/13/2011	<0.25		<0.25		<0.25		<0.48		<0.48		<0.48		<0.25		<0.48		<0.48		<0.48		<0.25		<0.60		<0.25		<0.25	
	SW777	5/9/2003	<0.43		<0.43 (0.046)		<0.86 (0.23)		<0.86		<0.86		<0.86		<0.43		<0.86		<0.86		<0.86		0.73		<0.86		<0.43		<0.43	
	SW777	10/10/2003	<0.42		<0.42 (0.045)		<0.83 (0.22)		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	SW777	5/11/2004	<0.53		<0.53 (0.057)		<1.1 (0.28)		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		1.1	/ J	<1.1		<0.53		<0.53	
	SW777	10/14/2004	<0.73		<0.73 (0.23)		<1.5 (0.27)		<1.5		<1.5		<1.5		<0.73		<1.5		<1.5		<1.5		<0.73		<1.5		<0.73		<0.73	
	SW777	7/27/2005	<0.46		<0.46		<0.91		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	SW777	10/26/2005	<0.72		<0.72		<1.4		<1.4		<1.4		<1.4		<0.72		<1.4		<1.4		<1.4		<0.72		<1.4		<0.72		<0.72	
	SW777	5/5/2006	<0.55		<0.55		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	SW777	10/17/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW777	4/27/2007	<0.41		<0.41		<0.82		<0.82		<0.82		<0.82		<0.41		<0.82		<0.82		<0.82		<0.41		<0.82		<0.41		<0.41	
	SW777	10/17/2007	<0.52		<0.52		<1		<1		<1		<1		<0.52		<1		<1		<1		<0.52		<1		<0.52		<0.52	
	SW777	5/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW777	10/23/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW777	5/7/2009	<0.19		<0.38		<0.38		<0.38		<0.38		<0.38		<0.19		<0.38		<0.38		<0.38		<0.19		<0.47		<0.19		<0.19	
	SW777	10/23/2009	<0.4		<0.78		<0.78		<0.78		<0.78		<0.78		<0.4		<0.78		<0.78		<0.78		<0.4		<0.98		<0.4		<0.4	
	SW777	4/9/2010	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.46		<0.19		<0.19	
	SW777	10/26/2010	<0.55		<1.1		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.3		<0.55		<0.55	
	SW777	4/14/2011	<0.34		<0.66		<0.66		<0.66		<0.66		<0.66		<0.34		<0.66		<0.66		<0.66		<0.34		<0.83		<0.34		<0.34	
	SW777	10/14/2011	<0.34		<0.34		<0.34		<0.65		<0.65		<0.65		<0.34		<0.65		<0.65		<0.65		<0.34		<0.82		<0.34		<0.34	
	SW777	4/11/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		0.25		<0.39		<0.16		<0.16	
	SW777	10/30/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound	1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]	10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG	4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
L3	***Downgradient***																												
	SW557	5/9/2003	<0.47		<0.47 (0.050)		<0.94 (0.25)		<0.94		<0.94		<0.94		<0.47		<0.94		<0.94		<0.94		<0.47		<0.94		<0.47		<0.47	
	SW557	10/10/2003	<0.44		<0.44 (0.047)		<0.87 (0.23)		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		1.4		<0.87		<0.44		<0.44	
	SW557	5/11/2004	<0.62		<0.62 (0.067)		<1.2 (0.33)		<1.2		<1.2		<1.2		<0.62		<1.2		<1.2		<1.2		<0.62		<1.2		<0.62		<0.62	
	SW557	10/14/2004	<0.46		<0.46 (0.14)		<0.92 (0.17)		<0.92		<0.92		<0.92		<0.46		<0.92		<0.92		<0.92		<0.46		<0.92		<0.46		<0.46	
	SW557	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW557	10/26/2005	<0.46		<0.46		<0.91		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	SW557	5/5/2006	<0.62		<0.62		<1.2		<1.2		<1.2		<1.2		<0.62		<1.2		<1.2		<1.2		<0.62		<1.2		<0.62		<0.62	
	SW557	10/17/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW557	4/27/2007	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	SW557	10/17/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW557	5/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW557	10/23/2008	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		<0.95		<0.95		<0.47		<0.95		<0.47		<0.47	
	SW557	5/7/2009	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	SW557(DUP)	5/7/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31	U / UJ	<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	SW557	10/23/2009	<0.43		<0.83		<0.83		<0.83		<0.83		<0.83		<0.43		<0.83		<0.83		<0.83		<0.43		<1		<0.43		<0.43	
	SW557(DUP)	10/23/2009	<0.43		<0.83		<0.83		<0.83		<0.83		<0.83		<0.43		<0.83		<0.83		<0.83		<0.43		<1		<0.43		<0.43	
	SW557	4/9/2010	<0.26		<0.51		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	SW557(DUP)	4/9/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	SW557	10/26/2010	<0.37		<0.71		<0.71		<0.71		<0.71		<0.71		<0.37		<0.71		<0.71		<0.71		<0.37		<0.89		<0.37		<0.37	
	SW557	4/14/2011	<0.41		<0.79		<0.79		<0.79		<0.79		<0.79		<0.41		<0.79		<0.79		<0.79		<0.41		<0.99		<0.41		<0.41	
	SW557	10/14/2011	<0.47		<0.47		<0.47		<0.91		<0.91		<0.91		<0.47		<0.91		<0.91		<0.91		<0.47		<1.2		<0.47		<0.47	
	SW557	4/10/2012	<0.16		<0.31		<0.31		<0.31		<0.31		1.1	/ J	<0.16		<0.31		<0.31		<0.31		3.2		<0.39		<0.16		<0.16	
	SW557	10/30/2012	<0.16		<0.31		0.44	/ J	<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	Downgradient																												
	SW558	5/9/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW558	5/11/2004	<0.68		<0.68 (0.074)		<1.4 (0.36)		<1.4		<1.4		<1.4		<0.68		<1.4		<1.4		<1.4		<0.68		<1.4		<0.68		<0.68	
	SW558	5/5/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW558	4/27/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW558	10/17/2007	<0.49		<0.49		<0.99		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	SW558	5/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW558	10/23/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	SW558	4/14/2011	<0.17		<0.34		<0.34		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	SW558	4/10/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
L14	***In-Plume***																												
	MW508	5/21/2003	<0.61		<0.61 (0.066)		<1.2 (0.32)		<1.2		<1.2		25		<0.61		<1.2		<1.2		<1.2		**16**		<1.2		<0.61		<0.61	
	MW508	10/22/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		45		<0.39		<0.78		<0.78		<0.78		**110**		<0.78		<0.39		<0.39	
	MW508	5/27/2004	<0.58		<0.58 (0.062)		<1.2 (0.31)		<1.2		<1.2		37		<0.58		<1.2		<1.2		<1.2		**110**		<1.2		<0.58		<0.58	
	MW508	10/25/2004	<0.49		<0.49 (0.15)		<0.99 (0.18)		<0.99		<0.99		150		<0.49		<0.99		<0.99		<0.99		**520**		<0.99		<0.49		<0.49	
	MW508	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		33		<0.39		<0.78		<0.78		<0.78		**170**		<0.78		<0.39		<0.39	
	MW508	10/24/2005	<0.39		<0.39		<0.78		<0.78		0.91		91		<0.39		<0.78		<0.78		<0.78		**430**		<0.78		<0.39		<0.39	
	MW508	5/8/2006	<0.39		<0.39		<0.78		<0.78		<0.78		2.1		<0.39		<0.78		<0.78		<0.78		1.4		<0.78		<0.39		<0.39	
	MW508	10/16/2006	<0.46		<0.46		<0.92		<0.92		<0.92		<0.92		<0.46		<0.92		<0.92		<0.92		<0.46		<0.92		<0.46		<0.46	
	MW508	5/2/2007	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	MW508(DUP)	5/2/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW508	10/15/2007	<0.48		<0.48		<0.96		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW508	5/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW508	10/28/2008	<0.56		<0.56		<1.1		<1.1		<1.1		<1.1		<0.56		<1.1		<1.1		<1.1		<0.56		<1.1		<0.56		<0.56	
	MW508	5/1/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW508	10/23/2009	<0.23		<0.45		<0.45		<0.45		<0.45		0.6		<0.23		<0.45		<0.45		<0.45		<0.23		<0.57		<0.23		<0.23	
	MW508	4/6/2010	<0.19		<0.36		<0.36		<0.36		<0.36		<0.36		<0.19		<0.36		<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	MW508	10/26/2010	<0.23		<0.44		<0.44		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.55		<0.23		<0.23	
	MW508	4/18/2011	<0.18		<0.34		<0.34		<0.34		<0.34		<0.34	U / UJ	<0.18		<0.34		<0.34		<0.34		<0.18		<0.43		<0.18		<0.18	
	MW508	10/14/2011	<0.38		<0.38		<0.38		<0.73		<0.73		<0.73		<0.38		<0.73		<0.73		<0.73		<0.38		<0.92		<0.38		<0.38	
	MW511	5/21/2003	<0.6		<0.6 (0.065)		<1.2 (0.32)		<1.2		<1.2		6		<0.6		<1.2		<1.2		<1.2		**55**		<1.2		<0.6		<0.6	
	MW511	10/22/2003	<0.49		<0.49 (0.052)		<0.98 (0.26)		<0.98		<0.98		17		<0.49		<0.98		<0.98		<0.98		**160**		<0.98		<0.49		<0.49	
	MW511	5/27/2004	<0.44		<0.44 (0.048)		<0.88 (0.23)		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW511(DUP)	5/27/2004	<0.48		<0.48 (0.052)		<0.96 (0.26)		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW511	10/25/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		13		<0.39		<0.78		<0.78		<0.78		**120**		<0.78		<0.39		<0.39	
	MW511	7/27/2005	<0.4		<0.4		<0.81		<0.81		<0.81		12		<0.4		<0.81		<0.81		<0.81		**130**		<0.81		<0.4		<0.4	
	MW511	10/24/2005	<0.6		<0.6		<1.2		<1.2		<1.2		9.8		<0.6		<1.2		<1.2		<1.2		**80**		<1.2		<0.6		<0.6	
	MW511	5/8/2006	<0.42		<0.42		<0.83		<0.83		<0.83		1.6		<0.42		<0.83		<0.83		<0.83		**5.5**		<0.83		<0.42		<0.42	
	MW511	10/16/2006	<0.6		<0.6		<1.2		<1.2		<1.2		14		<0.6		<1.2		<1.2		<1.2		**110**		<1.2		<0.6		<0.6	
	MW511	5/2/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW511	10/15/2007	<0.4		<0.4		<0.79		<0.79		<0.79		19		<0.4		<0.79		<0.79		<0.79		**170**		<0.79		<0.4		<0.4	
	MW511	5/20/2008	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		0.46		<0.81		<0.4		<0.4	
	MW511	10/28/2008	<0.39		<0.39		<0.78		<0.78		<0.78		7.3		<0.39		<0.78		<0.78		<0.78		**58**		<0.78		<0.39		<0.39	
	MW511	4/30/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW511	10/26/2009	<0.18		<0.36		<0.36		<0.36		<0.36		6.4		<0.18		0.29	F /	<0.36		<0.36		**31**		<0.45		<0.18		<0.18	
	MW511	4/7/2010	<0.38		<0.73		<0.73		<0.73		<0.73		<0.73		<0.38		<0.73		<0.73		<0.73		<0.38		<0.92		<0.38		<0.38	
	MW511	10/26/2010	<0.24		<0.47		<0.47		<0.47		<0.47		13		<0.24		<0.47		<0.47		<0.47		**110**		<0.59		<0.24		<0.24	
	MW511	4/18/2011	<0.18		<0.36		<0.36		<0.36		<0.36		0.14	F / J	<0.18		<0.36		<0.36		<0.36		0.94		<0.45		<0.18		<0.18	
	MW511	10/14/2011	<0.33		<0.33		<0.33		<0.65		<0.65		10		<0.33		<0.65		<0.65		<0.65		**84**		<0.81		<0.33		<0.33	
	MW511	10/26/2012	<0.16		0.41		0.17	F / J	<0.31		<0.31		11		<0.16		0.32		<0.31		0.5		**76**		<0.39		<0.16		<0.16	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L14	***In-Plume***																													
	MW512	5/21/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		1.4		2.1		61		<0.39		<0.78		<0.78		<0.78		**190**		<0.78		<0.39		<0.39	
	MW512	10/22/2003	<0.52		<0.52 (0.056)		<1 (0.28)		2.1		3.1		86		<0.52		<1		<1		<1		**210**		<1		<0.52		<0.52	
	MW512	5/27/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		8.9		<0.39		<0.78		<0.78		<0.78		**21**		<0.78		<0.39		<0.39	
	MW512	10/26/2004	<0.51		<0.51 (0.16)		<1 (0.19)		2.1		3.1		85		<0.51		<1		<1		<1		**230**		<1		<0.51		<0.51	
	MW512	7/27/2005	<0.47		<0.47		<0.95		2.3		3.4		90		<0.47		<0.95		<0.95		<0.95		**300**		<0.95		<0.47		<0.47	
	MW512	10/24/2005	<0.39		<0.39		<0.78		2		2.9		90		<0.39		<0.78		<0.78		<0.78		**190**		<0.78		<0.39		<0.39	
	MW512	5/8/2006	<0.75		<0.75		<1.5		<1.5		2.3		76		<0.75		<1.5		<1.5		<1.5		**290**		<1.5		<0.75		<0.75	
	MW512	10/16/2006	<0.55		<0.55		<1.1		2.7		3.8		91		<0.55		<1.1		<1.1		<1.1		**290**		<1.1		<0.55		<0.55	
	MW512	5/1/2007	<0.39		<0.39		<0.78		<0.78		<0.78		7.8		<0.39		<0.78		<0.78		<0.78		**11**		<0.78		<0.39		<0.39	
	MW512	10/15/2007	<0.51		<0.51		<1		1.8		2.6		84		<0.51		<1		<1		<1		**200**		<1		<0.51		<0.51	
	MW512	5/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		4.6		<0.39		<0.78		<0.78		<0.78		**10**		<0.78		<0.39		<0.39	
	MW512(DUP)	5/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		4.5		<0.39		<0.78		<0.78		<0.78		11		<0.78		<0.39		<0.39	
	MW512	10/27/2008	<0.39		<0.39		<0.78		2		2.8		68		<0.39		<0.78		<0.78		<0.78		**190**		<0.78		<0.39		<0.39	
	MW512(DUP)	10/27/2008	<0.42		<0.42		<0.83		2.1		3		70		<0.42		<0.83		<0.83		<0.83		**210**		<0.83		<0.42		<0.42	
	MW512	4/30/2009	<0.17		<0.33		<0.33		<0.33		<0.33		1.3		<0.17		<0.33		<0.33		<0.33		0.62		<0.42		<0.17		<0.17	
	MW512	10/23/2009	<0.28		<0.55		<0.55		0.6		0.83		20		<0.28		<0.55		<0.55		<0.55		**42**		<0.69		<0.28		<0.28	
	MW512	4/6/2010	<0.40		<0.78		<0.78		<0.78		<0.78		7.3		<0.40		<0.78		<0.78		<0.78		**11**		<0.98		<0.40		<0.40	
	MW512	10/26/2010	<0.31		<0.59		<0.59		1.7		2.4		61		<0.31		<0.59		<0.59		<0.59		**240**		<0.75		<0.31		<0.31	
	MW512	4/18/2011	<0.36		<0.70		<0.70		0.76		1.2		42	/ J	<0.36		<0.70		<0.70		<0.70		**150**		<0.88		<0.36		<0.36	
	MW512	10/14/2011	<0.28		<0.28		<0.28		0.82		<0.54		74		<0.28		<0.54		<0.54		<0.54		**400**		<0.68		<0.28		<0.28	
	MW512	10/26/2012	<0.16		0.39		0.18	F / J	1.5		2.1		58		<0.16		0.33		<0.31		0.5		**220**		<0.39		<0.16		<0.16	
	Early Warning																													
	H7	5/21/2003	<0.6		<0.6 (0.065)		<1.2 (0.32)		<1.2		<1.2		<1.2		<0.6		<1.2		<1.2		<1.2		<0.6		<1.2		<0.6		<0.6	
	H7	10/22/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		0.63		<0.78		<0.39		<0.39	
	H7	5/27/2004	<0.5		<0.5 (0.054)		<1 (0.27)		<1		<1		<1		<0.5		<1		<1		<1		<0.5		<1		<0.5		<0.5	
	H7	10/25/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	H7	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	H7	10/24/2005	<0.62		<0.62		<1.2		<1.2		<1.2		<1.2		<0.62		<1.2		<1.2		<1.2		1.3		<1.2		<0.62		<0.62	
	H7	5/8/2006	<0.49		<0.49		<0.98		<0.98		<0.98		<0.98		<0.49		<0.98		<0.98		<0.98		<0.49		<0.98		<0.49		<0.49	
	H7	10/16/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	H7	5/2/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	H7	10/15/2007	<0.63		<0.63		<1.3		<1.3		<1.3		<1.3		<0.63		<1.3		<1.3		<1.3		<0.63		<1.3		<0.63		<0.63	
	H7	5/21/2008	<0.47		<0.47		<0.94		<0.94		<0.94		<0.94		<0.47		<0.94		<0.94		<0.94		<0.47		<0.94		<0.47		<0.47	
	H7	10/27/2008	<0.44		<0.44		<0.87		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	H7	4/30/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	H7	10/23/2009	<0.33		<0.64		<0.64		<0.64		<0.64		<0.64		<0.33		<0.64		<0.64		<0.64		0.4		<0.8		<0.33		<0.33	
	H7	4/6/2010	<0.30		<0.59		<0.59		<0.59		<0.59		<0.59		<0.30		<0.59		<0.59		<0.59		<0.30		<0.74		<0.30		<0.30	
	H7	10/26/2010	<0.17		<0.34		<0.34		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	H7	4/18/2011	<0.25		<0.48		<0.48		<0.48		<0.48		<0.48	U / UJ	<0.25		<0.48		<0.48		<0.48		<0.25		<0.60		<0.25		<0.25	
	H7	10/14/2011	<0.29		<0.29		<0.29		<0.56		<0.56		<0.56		<0.29		<0.56		<0.56		<0.56		0.24	F /	<0.70		<0.29		<0.29	
	H7	10/26/2012	<0.16		**1.5**		**0.58**		<0.31		<0.31		<0.31		<0.16		1.4		<0.31		1.5		0.97		<0.39		<0.16		<0.16	

TABLE A1-2

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
L14	***Compliance***																													
	MW603	5/21/2003	<0.48		<0.48 (0.052)		<0.96 (0.26)		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48		<0.48	
	MW603	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW603	5/27/2004	<0.64		<0.64 (0.069)		<1.3 (0.34)		<1.3		<1.3		<1.3		<0.64		<1.3		<1.3		<1.3		<0.64		<1.3		<0.64		<0.64	
	MW603	10/25/2004	<0.61		<0.61 (0.19)		<1.2 (0.22)		<1.2		<1.2		<1.2		<0.61		1.9		<1.2		<1.2		<0.61		<1.2		<0.61		<0.61	
	MW603	7/27/2005	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		<0.95		<0.95		<0.47		<0.95		<0.47		<0.47	
	MW603	10/24/2005	<0.52		<0.52		<1		<1		<1		<1		<0.52		<1		<1		<1		<0.52		<1		<0.52		<0.52	
	MW603	5/8/2006	<0.62		<0.62		<1.2		<1.2		<1.2		<1.2		<0.62		<1.2		<1.2		<1.2		<0.62		<1.2		<0.62		<0.62	
	MW603	10/16/2006	<0.58		<0.58		<1.2		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW603	5/2/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW603	10/15/2007	<0.7		<0.7		<1.4		<1.4		<1.4		<1.4		<0.7		<1.4		<1.4		<1.4		<0.7		<1.4		<0.7		<0.7	
	MW603	5/21/2008	<0.57		<0.57		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW603	10/27/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW603	4/29/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW603(DUP)	4/29/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW603	10/22/2009	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW603(DUP)	10/22/2009	<0.23		<0.45		<0.45		<0.45		<0.45		<0.45		<0.23		<0.45		<0.45		<0.45		<0.23		<0.57		<0.23		<0.23	
	MW603	4/6/2010	<0.26		<0.50		<0.50		<0.50		<0.50		<0.50		<0.26		<0.50		<0.50		<0.50		<0.26		<0.62		<0.26		<0.26	
	MW603	10/26/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW603(DUP)	10/26/2010	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW603	4/15/2011	<0.32		<0.62		<0.62		<0.62		<0.62		<0.62		<0.32		<0.62		<0.62		<0.62		<0.32		<0.78		<0.32		<0.32	
	MW603	10/14/2011	<0.21		<0.21		<0.21		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.51		<0.21		<0.21	
	MW604	5/21/2003	<0.44		<0.44 (0.047)		<0.87 (0.23)		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	MW604	10/23/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW604	5/27/2004	<0.61		<0.61 (0.066)		<1.2 (0.32)		<1.2		<1.2		<1.2		<0.61		<1.2		<1.2		<1.2		<0.61		<1.2		<0.61		<0.61	
	MW604	10/25/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW604	7/27/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW604	10/24/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW604	5/8/2006	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW604	10/16/2006	<0.61		<0.61		<1.2		<1.2		<1.2		<1.2		<0.61		<1.2		<1.2		<1.2		<0.61		<1.2		<0.61		<0.61	
	MW604	5/2/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW604	10/15/2007	<0.51		<0.51		<1		<1		<1		<1		<0.51		<1		<1		<1		<0.51		<1		<0.51		<0.51	
	MW604	5/21/2008	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW604	10/27/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW604	4/30/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW604	5/5/2009	<0.17		<0.33		<0.33		NA		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW604	10/22/2009	<0.23		<0.45		<0.45		<0.45		<0.45		<0.45		<0.23		<0.45		<0.45		<0.45		<0.23		<0.57		<0.23		<0.23	
	MW604	4/7/2010	<0.37		<0.71		<0.71		<0.71		<0.71		<0.71		<0.37		<0.71		<0.71		<0.71		<0.37		<0.90		<0.37		<0.37	
	MW604	10/26/2010	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.41		<0.17		<0.17	
	MW604	4/15/2011	<0.18		<0.35		<0.35		<0.35		<0.35		<0.35		<0.18		<0.35		<0.35		<0.35		<0.18		<0.44		<0.18		<0.18	
	MW604	10/14/2011	<0.26		<0.26		<0.26		<0.50		<0.50		<0.50		<0.26		<0.50		<0.50		<0.50		<0.26		<0.62		<0.26		<0.26	

Footnotes:
(1) Project Action Limits (Remedial Goal, {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Preventive Action Limit (Remedial Goal {RG}) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
B = Blank contamination
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = duplicate
The laboratory is aware of instances where the MRL for 2,4- and 2,6-DNT exceeded the RG. However, this does not affect protectiveness.

1,3-DNB = 1,3-Dinitrobenzene
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
2-A-4,6-DNT = 2-amino-4,6-Dinitrotoluene
4-A-2,6-DNT = 4-amino-2,6-Dinitrotoluene
HMX = High Melting Explosive
NB = Nitrobenzene
2-NT = 2-Nitrotoluene
3-NT = 3-Nitrotoluene
4-NT = 4-Nitrotoluene
RDX = Royal Demolition Explosive
1,3,5-TNB = 1,3,5-Trinitrobenzene
2,4,6-TNT = 2,4,6-Trinitrotoluene

TABLE A1-3

Summary of Analytical Results - Metals
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Analyte		Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Iron (Dissolved)		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
	Project Action Limit[1]	mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
	Surface Water RG	mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	**Well**	**Date**	**Units**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
L2	***In-Plume***																																												
	MW501	5/20/2008	mg/L	<0.2		0.0046	F /	<0.01		0.084		<0.002		92		<0.01		0.0015	F /	0.0021	F /	0.11	F /	NA		0.0026	F /	45		0.14		NA		<0.0002		0.0026	F /	1.7		<0.005		7.6		<0.005		0.031	
	MW501	10/28/2008	mg/L	0.03	F /	<0.02		0.0073	F /	0.093		<0.002		90		<0.01		<0.005		<0.01		0.84		NA		0.0022	F /	42		0.081		NA		<0.0002		<0.01		1.3		<0.005		6.3		0.0039	F /	0.0067	F /
	MW501(DUP)	10/28/2008	mg/L	0.03	F /	<0.02		0.0065	F /	0.091		<0.002		91		<0.01		<0.005		0.00095	F /	0.72		NA		<0.005		43		0.068		NA		<0.0002		<0.01		1.3		<0.005		6.5		0.0037	F /	0.019	F /
	MW501	10/22/2009	mg/L	<0.2		<0.02		<0.01		0.085		<0.002		96		<0.01		0.0021	F /	<0.01		0.5		NA		<0.005		47		0.044		NA		NA		0.0019	F /	1.4		<0.005		7.1		0.0037	F /	<0.02	
	MW501	10/22/2009	µg/L	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		<0.2		NA		NA		NA		NA		NA		NA	
	MW501	4/12/2010	mg/L	<0.20		<0.020		<0.010		0.076		<0.0020		90		<0.010		0.0032	F /	<0.010		0.19	F / U	NA		<0.0050		44		0.039		NA		NA		<0.010		1.3		<0.0050		6.6		0.0025	F /	<0.020	
	MW501	4/12/2010	µg/L	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		<0.20		NA		NA		NA		NA		NA		NA	
	MW501	10/27/2010	mg/L	<0.20		<0.020		<0.010		0.088		0.00069	F / U	98		<0.010		<0.0050		0.0031	F /	**9.9**		NA		0.0026	F /	46		0.052		NA		NA		<0.010		1.4		<0.0050		7.6		<0.0050		0.005	F /
	MW501	10/27/2010	µg/L	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.089	F /	NA		NA		NA		NA		NA		NA	
L3	***Upgradient***																																												
	SW004	5/6/2009	mg/L	<0.20		<0.020		<0.010		0.037		<0.0020		68		<0.010		0.004	F /	<0.010		<0.10		NA		<0.0050		28		0.036		NA		<0.0002		<0.010		1.5		<0.0050		11		<0.0050		<0.020	
	SW004	10/23/2009	mg/L	2.7		<0.02		<0.01		0.047		<0.002		34		0.0041	F /	0.0019	F /	0.0079	F /	3.9		NA		0.0058		15		0.15		NA		<0.0002		0.007	F /	5.8		<0.005		5.6		0.0079		0.019	F / U
	SW004	4/8/2010	mg/L	0.08	F / U	<0.020		<0.010		0.029		<0.0020		47		<0.010		0.0053		0.0019	F /	0.09	F / U	NA		<0.0050		20		0.023		NA		<0.0002		0.002	F /	2.7		<0.0050		12		0.0021	F /	0.005	F /
	SW004	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.042		0.0006	F / U	75		<0.010		<0.0050		0.0018	F /	0.045	F /	NA		<0.0050		38		0.023		NA		<0.0002		<0.010		2.7		<0.0050		14		<0.0050		<0.020	
	SW004(DUP)	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.042		0.00076	F / U	75		<0.010		<0.0050		0.002	F /	0.055	F /	NA		<0.0050		38		0.023		NA		0.000066	F / J	<0.010		2.7		<0.0050		14		<0.0050		<0.020	
	SW004	4/14/2011	mg/L	0.052	F /	<0.02		<0.01		0.04		<0.002		77		<0.01		<0.005		<0.01		<0.2		NA		<0.005		35		0.056		NA		<0.0002		<0.01		1.5		<0.005		16		0.0024	F /	<0.02	
	SW004(DUP)	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.04		<0.002		77		<0.01		<0.005		<0.01		<0.2		NA		0.0021	F /	35		0.055		NA		<0.0002		<0.01		1.5		<0.005		16		0.0029	F /	<0.02	
	SW004	10/14/2011	mg/L	<0.20		<0.020		<0.010		0.026		0.00072	F /	63		<0.010		<0.0050		0.0014	F /	<0.20		NA		<0.0050		35		0.018		NA		<0.0002	U / UJ	<0.010		1.8		<0.0050		20		<0.0050		<0.020	
	SW004	4/10/2012	mg/L	<0.20		<0.020		<0.010		0.039		0.0009	F /	73		<0.010		<0.0050		0.018	/ U	<0.20		NA		<0.0050		38		0.09		NA		<0.20		<0.010		1.4		<0.0050		15		<0.0050		<0.020	
	In-Plume/Downgradient																																												
	MW410	5/21/2008	mg/L	<0.2		<0.02		<0.01		0.049		<0.002		110		<0.01		<0.005		0.0046	F /	<0.15		NA		0.0023	F /	50		0.18		NA		<0.0002		0.0048	F /	0.56		<0.005		20		<0.005		0.029	
	MW410	10/29/2008	mg/L	0.06	F /	<0.02		<0.01		0.034		<0.002		100		<0.01		<0.005		0.001	F /	0.04	F /	NA		<0.005		50		0.17		NA		<0.0002		0.0035	F /	0.55		<0.005		18		0.004	F /	0.022	
	MW410	10/26/2009	mg/L	<0.2		0.0035	F /	<0.01		0.18		<0.002		110		<0.01		0.0032	F /	<0.01		2.6		NA		<0.005		58		3		NA		NA		0.0039	F /	4.6		<0.005		12		0.0038	F /	<0.02	
	MW410	10/26/2009	µg/L	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		<0.2		NA		NA		NA		NA		NA		NA	
	MW410	4/8/2010	mg/L	6.2		<0.020		<0.010		0.12		0.00026	F /	100		0.0051	F /	0.0012	F /	0.0018	F /	1.2		NA		0.0024	F / U	57		0.4		NA		NA		0.086		4.9		<0.0050		15		0.0036	F /	0.064	
	MW410	4/8/2010	µg/L	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		<0.20		NA		NA		NA		NA		NA		NA	
	MW410	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.18		0.00063	F / U	110		<0.010		<0.0050		<0.010		2.9		NA		<0.0050		57		3.6		NA		NA		<0.010		4.8		<0.0050		12		<0.0050		0.0058	F /
	MW410	10/26/2010	µg/L	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.099	F / J	NA		NA		NA		NA		NA		NA	
	MW412	5/21/2008	mg/L	<0.2		<0.02		<0.01		0.043		<0.002		94		<0.01		<0.005		0.0027	F /	<0.15		NA		0.0029	F /	49		<0.01		NA		<0.0002		<0.01		0.95		<0.005		11		<0.005		0.0069	F /
	MW412	10/29/2008	mg/L	0.016	F /	<0.02		<0.01		0.05		<0.002		95		<0.01		<0.005		<0.01		<0.15		NA		<0.005		49		0.036		NA		<0.0002		<0.01		1.3		<0.005		10		0.0037	F /	0.02	F /
	MW412(DUP)	10/29/2008	mg/L	0.032	F /	<0.02		<0.01		0.052		<0.002		99		<0.01		<0.005		0.001	F /	<0.15		NA		<0.005		51		0.051		NA		<0.0002		<0.01		1.4		<0.005		11		0.0044	F /	0.018	F /
	MW412	5/6/2009	mg/L	<0.2	U / UJ	<0.02	U / UJ	<0.01	U / UJ	0.042	/ J	<0.002	U / UJ	87	/ J	<0.01	U / UJ	0.0018	F / J	<0.01	U / UJ	<0.1	U / UJ	NA		<0.005	U / UJ	47	/ J	0.0025	F / J	NA		<0.0002		<0.01	U / UJ	1.2	/ J	<0.005	U / UJ	9.9	/ J	<0.005	U / UJ	<0.02	U / UJ
	MW412	10/27/2009	mg/L	<0.2		<0.02		<0.01		0.049		<0.002		92		<0.01		0.0018	F /	<0.01		<0.1		NA		<0.005		49		0.003	F /	NA		<0.0002		<0.01		1.2		<0.005		8.1		0.0031	F /	<0.02	
	MW412	4/12/2010	mg/L	<0.20		<0.020		<0.010		0.043		<0.0020		96		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		52		<0.010		NA		<0.0002		<0.010		0.95		<0.0050		8.7		0.0026	F /	<0.020	
	MW412	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.07		0.00079	F / U	100		<0.010		<0.0050		0.002	F /	<0.20		NA		0.0023	F /	52		0.0033	F /	NA		<0.0002		<0.010		1.6		<0.0050		10		<0.0050		0.0053	F /
	MW412	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.04		<0.002		91		<0.01		<0.005		<0.01		<0.2		NA		<0.005		48		<0.01		NA		<0.0002		<0.01		1		<0.005		8.1		0.0025	F /	0.0044	F /
	MW412	10/17/2011	mg/L	<0.20		<0.020		<0.010		0.048		0.00086	F / U	92		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		45		<0.010		NA		<0.0002		<0.010		1.3		<0.0050		6.9		<0.0050		<0.020	
	MW412	4/11/2012	mg/L	<0.20		<0.020		<0.010		0.042		0.0011	F /	96		<0.010		<0.0050		0.026	/ U	<0.20		NA		<0.0050		51		<0.010		NA		<0.20		<0.010		1		<0.0050		7.7		<0.0050		<0.020	
	MW412	10/30/2012	mg/L	<0.2		<0.02		<0.01		0.053		0.00093	F /	100		<0.01		<0.005		0.0018	F /	<0.2		NA		0.0017	F /	52		<0.01		NA		<0.2		<0.01		1.4		<0.005		11		<0.005		<0.02	
	Early Warning/Downgradient																																												
	MW630	5/20/2008	mg/L	<0.2		<0.02		<0.01		0.011		<0.002		72		<0.01		<0.005		0.0019	F /	<0.15		NA		0.0021	F /	38		0.023		NA		<0.0002		0.0066	F /	5.5		<0.005		25		<0.005		0.023	
	MW630	10/28/2008	mg/L	0.026	F /	<0.02		<0.01		0.012		<0.002		75		<0.01		<0.005		<0.01		0.047	F /	NA		0.0026	F /	40		0.018		NA		<0.0002		<0.01		5.1		<0.005		26		0.0036	F /	0.021	
	MW630	10/26/2009	mg/L	<0.2		<0.02		<0.01		0.013		<0.002		90		<0.01		0.00094	F /	<0.01		0.36		NA		<0.005		48		0.015		NA		<0.0002		<0.01		5.7		<0.005		25		0.0038	F /	<0.02	
	MW630	4/9/2010	mg/L	0.021	F / U	<0.020		<0.010		0.011		<0.0020		81		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		43		0.021		NA		<0.0002		<0.010		4.3		<0.0050		22		0.0024	F /	<0.020	
	MW630(DUP)	4/9/2010	mg/L	<0.20		<0.020		<0.010		0.011		<0.0020		81		<0.010		<0.0050		0.0028	F /	<0.20		NA		<0.0050		43		0.021		NA		<0.0002		<0.010		4.3		<0.0050		22		0.0026	F /	0.0036	F /
	MW630	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.012	/ U	0.00076	F / U	78		<0.010		<0.0050		<0.010		0.067	F /	NA		<0.0050		40		0.015		NA		0.000077	F / J	<0.010		5.6		<0.0050		28		<0.0050		<0.020	
	MW630	4/14/2011	mg/L	<0.2		0.0036	F /	<0.01		0.011		<0.002		82		<0.01		<0.005		<0.01		<0.2		NA		<0.005		42		0.016		NA		<0.0002		<0.01		4.7		<0.005		21		0.003	F /	<0.02	
	MW630	10/14/2011	mg/L	<0.20		<0.020		<0.010		0.012		0.00091	F /	84		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		43		0.026		NA		<0.0002	U / UJ	<0.010		5		<0.0050		24		<0.0050		<0.020	
	MW630(DUP)	10/14/2011	mg/L	<0.20		<0.020		<0.010		0.012		0.00092	F /	82		<0.010		<0.0050		<0.010		0.07	F /	NA		<0.0050		42		0.025		NA		<0.0002	U / UJ	<0.010		4.9		<0.0050		23		<0.0050		<0.020	
	MW630	4/11/2012	mg/L	<0.20		<0.020		<0.010		0.011		0.00078	F /	83		<0.010		<0.0050		0.027	/ U	<0.20		NA		<0.0050		43		0.033		NA		<0.20		<0.010		4.4		<0.0050		22		<0.0050		0.0087	F /
	MW630(DUP)	4/11/2012	mg/L	<0.20		<0.020		<0.010		0.011		0.00087	F /	84		<0.010		<0.0050		0.02	/ U	<0.20		NA		<0.0050		44		0.032		NA		<0.20		<0.010		4.4		<0.0050		22		<0.0050		<0.020	
	MW630	10/30/2012	mg/L	<0.2		0.0026	F /	<0.01		0.012	/ F	0.00081	F /	78		<0.01		<0.005		0.0019	F /	<0.2		NA		<0.005		40		0.019		NA		<0.2		<0.01		5.5		<0.005		27		<0.005		<0.02	
	MW631	5/20/2008	mg/L	<0.2		0.0067	F /	<0.01		0.011		<0.002		67		<0.01		<0.005		0.0022	F /	0.06	F /	NA		<0.005		36		0.014		NA		<0.0002		<0.01		5.5		<0.005		26		<0.005		0.025	
	MW631	10/28/2008	mg/L	0.018	F /	<0.02		<0.01		0.011		<0.002		71		<0.01		<0.005		<0.01		0.093	F /	NA		<0.005		38		0.0089	F /	NA		<0.0002		<0.01		5		<0.005		26		0.0037	F /	0.0099	F /
	MW631	10/26/2009	mg/L	<0.2		<0.02		<0.01		0.01		<0.002		70		<0.01		0.0032	F /	<0.01		0.049	F / U	NA		<0.005		38		0.013		NA		<0.0002		<0.01		5.1		<0.005		25		0.003	F /	<0.02	
	MW631	4/9/2010	mg/L	0.037	F / U	<0.020		<0.010		0.011		<0.0020		64		0.0019	F /	<0.0050		<0.010		0.33	/ U	NA		0.0019	F / U	34		0.025		NA		<0.0002		<0.010		4.7		0.00088	F /	25		0.0025	F /	0.095	
	MW631	10/26/2010	mg/L	<0.20		0.0035	F /	<0.010		0.01	/ U	0.0006	F / U	66		<0.010		<0.0050		<0.010		0.1	F /	NA		<0.0050		34		0.0086	F /	NA		0.000062	F / J	<0.010		5.1		<0.0050		28		<0.0050		<0.020	
	MW631	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.014		<0.002		68		<0.01		<0.005		<0.01		<0.2		NA		0.0024	F /	36		0.014		NA		<0.0002		<0.01		5.6		<0.005		26		0.002	F /	0.0088	F /
	MW631	10/14/2011	mg/L	<0.20		<0.020		<0.010		0.018		0.00081	F /	67		<0.010		<0.0050		<0.010		0.1	F /	NA		<0.0050		35		0.029		NA		<0.0002	U / UJ	<0.010		5.1		<0.0050		28		<0.0050		<0.020	
	MW631	4/11/2012	mg/L	<0.20		<0.020		<0.010		0.017		0.00082	F /	67		<0.010		<0.0050		0.015	/ U	<0.20		NA		<0.0050		36		0.022		NA		<0.20		<0.010		4.9		<0.0050		28		<0.0050		<0.020	
	MW631	10/30/2012	mg/L	<0.2		<0.02		<0.01		0.017		0.0007	F /	67		<0.01		<0.005		0.0011	F /	0.17	F /	NA		<0.005		35		0.029		NA		<0.2		<0.01		5.3		<0.005		29		<0.005		<0.02	
	MW631(DUP)	10/30/2012	mg/L	<0.2		<0.02		<0.01		0.017		0.00071	F /	67		<0.01		<0.005		0.0012	F /	0.14	F /	NA		0.0017	F /	34		0.029		NA		<0.2		<0.01		5.2		<0.005		29		<0.005		<0.02	
	MW633	5/21/2008	mg/L	<0.2		<0.02		<0.01		0.039		<0.002		85		<0.01		<0.005		0.0034	F /	<0.15		NA		0.0033	F /	44		<0.01		NA		<0.0002		<0.01		0.89		<0.005		11		<0.005		0.021	
	MW633(DUP)	5/21/2008	mg/L	<0.2		<0.02		<0.01		0.043		<0.002		93		<0.01		<0.005		0.0029	F /	<0.15		NA		0.0022	F /	49		<0.01		NA		<0.0002		<0.01		0.95		<0.005		11		<0.005		0.0067	F /
	MW633	10/29/2008	mg/L	0.026	F /	<0.02		<0.01		0.066		<0.002		80		<0.01		<0.005		0.0012	F /	<0.15		NA		<0.005		35		<0.01		NA		<0.0002		<0.01		1.4		<0.005		23		0.0035	F /	0.025	
	MW633	5/6/2009	mg/L	<0.2	U / UJ	<0.02	U / UJ	<0.01	U / UJ	0.045	/ J	<0.002	U / UJ	72	/ J	<0.01	U / UJ	0.0027	F / J	<0.01	U / UJ	<0.1	U / UJ	NA		<0.005	U / UJ	32	/ J	0.0047	F / J	NA		<0.0002		<0.01	U / UJ	1.3	/ J	<0.005	U / UJ	6	/ J	<0.005	U / UJ	<0.02	U / UJ
	MW633	10/27/2009	mg/L	<0.2		<0.02		<0.01		0.066		<0.002		100		<0.01		0.0032	F /	<0.01		<0.1		NA		<0.005		45		0.0048	F /	NA		<0.0002		0.0013	F /	1.4		<0.005		6.4		0.0033	F /	<0.02	
	MW633	4/12/2010	mg/L	<0.20		<0.020		<0.010		0.045		<0.0020		80		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		38		<0.010		NA		<0.0002		<0.010		0.93		<0.0050		5.6		0.0017	F /	<0.020	
	MW633	10/26/2010	mg/L	0.038	F /	<0.020		<0.010		0.066		0.00052	F / U	93		<0.010		<0.0050		<0.010		0.089	F /	NA		<0.0050		41		0.0062	F /	NA		<0.0002		<0.010		1.5		<0.0050		6.3		<0.0050		<0.020	
	MW633	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.04		<0.002		76		<0.01		<0.005		<0.01		<0.2		NA		0.0018	F /	34		<0.01		NA		<0.0002		<0.01		0.93		<0.005		5.2		0.0025	F /	<0.02	
	MW633	10/17/2011	mg/L	0.16	F /	0.0029	F /	<0.010		0.065		0.00086	F / U	98		<0.010		<0.0050		0.0014	F /	0.25		NA		<0.0050		42		0.0048	F /	NA		<0.0002		<0.010		1.1		<0.0050		10		<0.0050		<0.020	
	MW633	4/11/2012	mg/L	<0.20		<0.020		<0.010		0.047		0.00079	F /	83		<0.010		<0.0050		0.023	/ U	<0.20		NA		<0.0050		37		<0.010		NA		<0.20		<0.010		1		<0.0050		5.7		<0.0050		<0.020	
	MW633	10/30/2012	mg/L	0.069	F /	<0.02		<0.01		0.062		0.0007	F /	93		0.0012	F /	<0.005		0.0027	F /	0.16	F /	NA		<0.005		41		0.0016	F /	NA		<0.2		<0.01		1.4		<0.005		7.9		0.00087	F /	<0.02	

TABLE A1-3

Summary of Analytical Results - Metals
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

			Analyte	Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Iron (Dissolved)		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
		Project Action Limit[(1)]	mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
		Surface Water RG	mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	**Well**	**Date**	**Units**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
L3	***Compliance/Downgradient***																																												
	SW777	5/20/2008	mg/L	<0.2		0.0059	F /	<0.01		0.04		<0.002		74		<0.01		<0.005		0.0031	F /	<0.15		NA		0.0019	F /	34		0.023		NA		<0.0002		<0.01		1		<0.005		5.8		<0.005		0.0072	F /
	SW777	10/23/2008	mg/L	0.024	F /	<0.02		<0.01		0.046		<0.002		85		<0.01		<0.005		0.0011	F /	0.021	F /	NA		<0.005		38		0.024		NA		<0.0002		<0.01		2.2		<0.005		14		0.004	F /	0.0042	F /
	SW777	5/7/2009	mg/L	<0.2	U / UJ	<0.02	U / UJ	<0.01	U / UJ	0.036	/ J	<0.002	U / UJ	64	/ J	<0.01	U / UJ	0.0049	F / J	<0.01	U / UJ	<0.1	U / UJ	NA		<0.005	U / UJ	27	/ J	0.033	/ J	NA		<0.0002		<0.01	U / UJ	1.5	/ J	<0.005	U / UJ	11	/ J	<0.005	U / UJ	<0.02	U / UJ
	SW777	10/23/2009	mg/L	0.53		<0.02		<0.01		0.033		<0.002		33		<0.01		0.0022	F /	0.004	F /	0.77		NA		<0.005		14		0.089		NA		<0.0002		0.0029	F /	5.4		<0.005		5.6		0.0036	F /	<0.02	
	SW777	4/9/2010	mg/L	0.13	F / U	<0.020		<0.010		0.033		<0.0020		60		<0.010		0.0012	F /	0.0017	F /	0.13	F / U	NA		0.0021	F / U	26		0.028		NA		<0.0002		<0.010		1.9		<0.0050		11		0.0021	F /	0.0037	F /
	SW777	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.044		0.00058	F / U	72		<0.010		<0.0050		0.0015	F /	0.11	F /	NA		<0.0050		38		0.092		NA		0.00013	F / J	<0.010		3.9		<0.0050		14		<0.0050		<0.020	
	SW777	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.04		<0.002		75		<0.01		<0.005		<0.01		<0.2		NA		0.0017	F /	34		0.039		NA		<0.0002		<0.01		1.3		<0.005		14		0.003	F /	<0.02	
	SW777	10/14/2011	mg/L	<0.20		<0.020		<0.010		0.031		0.00078	F /	61		<0.010		<0.0050		0.0018	F /	<0.20		NA		<0.0050		34		0.071		NA		<0.0002	U / UJ	0.00081	F /	2.7		<0.0050		19		<0.0050		<0.020	
	SW777	4/11/2012	mg/L	<0.20		<0.020		<0.010		0.039		0.00087	F /	73		<0.010		<0.0050		0.0041	F / U	<0.20		NA		<0.0050		39		0.06		NA		<0.20		<0.010		1.4		<0.0050		14		<0.0050		0.0087	F /
	SW777	10/30/2012	mg/L	<0.2		<0.02		<0.01		0.026		0.00076	F /	42		<0.01		<0.005		0.0029	F /	<0.2		NA		0.0019	F /	35		0.0046	F /	NA		<0.2		<0.01		3		<0.005		8.6		<0.005		0.0053	F /
L3	***Downgradient***																																												
	SW557	5/20/2008	mg/L	<0.2		0.005	F /	<0.01		0.039		<0.002		74		<0.01		<0.005		0.0029	F /	<0.15		NA		<0.005		34		0.039		NA		<0.0002		<0.01		1.3		<0.005		13		<0.005		0.0048	F /
	SW557	10/23/2008	mg/L	0.023	F /	<0.02		<0.01		0.046		<0.002		84		<0.01		<0.005		0.0013	F /	0.042	F /	NA		<0.005		37		0.023		NA		<0.0002		0.018		2.1		<0.005		13		0.0035	F /	0.0063	F /
	SW557	5/7/2009	mg/L	0.031	F / J	<0.02	U / UJ	<0.01	U / UJ	0.045	/ J	<0.002	U / UJ	65	/ J	<0.01	U / UJ	0.0022	F / J	<0.01	U / UJ	<0.1	U / UJ	NA		<0.005	U / UJ	27	/ J	0.028	/ J	NA		<0.0002		0.0016	F / J	1.5	/ J	<0.005	U / UJ	11	/ J	0.0021	F / J	<0.02	U / UJ
	SW557(DUP)	5/7/2009	mg/L	<0.2	U / UJ	<0.02	U / UJ	<0.01	U / UJ	0.038	/ J	<0.002	U / UJ	67	/ J	<0.01	U / UJ	<0.005	U / UJ	<0.01	U / UJ	<0.1	U / UJ	NA		<0.005	U / UJ	28	/ J	0.026	/ J	NA		<0.0002		<0.01	U / UJ	1.6	/ J	<0.005	U / UJ	11	/ J	<0.005	U / UJ	<0.02	U / UJ
	SW557	10/23/2009	mg/L	2	/ J	0.0036	F /	<0.01		0.043		<0.002		35		0.0031	F /	0.0015	F /	0.007	F /	2.8	/ J	NA		0.0043	F /	15		0.13		NA		<0.0002		0.0051	F /	5.8		<0.005		5.7		0.0066		0.012	F / U
	SW557(DUP)	10/23/2009	mg/L	3	/ J	<0.02		<0.01		0.046		<0.002		33		0.0045	F /	0.002	F /	0.0081	F /	4.1	/ J	NA		0.0058		15		0.15		NA		<0.0002		0.0067	F /	5.7		<0.005		5.3		0.0089		0.019	F / U
	SW557	4/9/2010	mg/L	0.059	F / U	<0.020		<0.010		0.025		<0.0020		46		<0.010		<0.0050		<0.010		0.057	F / U	NA		<0.0050		20	/ J	0.016		NA		<0.0002		<0.010		1.4		<0.0050		8.9		0.0012	F /	<0.020	
	SW557(DUP)	4/9/2010	mg/L	0.077	F / U	<0.020		<0.010		0.032		<0.0020		59		<0.010		<0.0050		0.00094	F /	0.07	F / U	NA		<0.0050		26	/ J	0.022		NA		<0.0002		<0.010		1.8		<0.0050		11		0.0018	F /	<0.020	
	SW557	10/26/2010	mg/L	<0.20		<0.020		<0.010		0.043		0.0007	F / U	78		<0.010		0.0015	F /	<0.010		0.051	F /	NA		<0.0050		40		0.02		NA		<0.0002		<0.010		2.8		<0.0050		15		<0.0050		0.0044	F /
	SW557	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.04		<0.002		75		0.0014	F /	<0.005		<0.01		<0.2		NA		0.0024	F /	35		0.048		NA		<0.0002		<0.01		1.4		<0.005		16		0.0028	F /	<0.02	
	SW557	10/14/2011	mg/L	<0.20		<0.020		0.0046	F /	0.025		0.00062	F /	59		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		35		0.0025	F /	NA		<0.0002	U / UJ	<0.010		1.8		<0.0050		20		<0.0050		<0.020	
	SW557	4/10/2012	mg/L	<0.20		<0.020		<0.010		0.039		0.00085	F /	75		<0.010		<0.0050		0.023	/ U	<0.20		NA		<0.0050		39		0.072		NA		<0.20		<0.010		1.4		<0.0050		15		<0.0050		<0.020	
	SW557	10/30/2012	mg/L	<0.2		<0.02		<0.01		0.027		0.0008	F /	43		<0.01		<0.005		0.0025	F /	<0.2		NA		<0.005		35		0.0013	F /	NA		<0.2		<0.01		2.7		<0.005		8.7		<0.005		<0.02	
	SW558	5/20/2008	mg/L	<0.2		0.006	F /	<0.01		0.038		<0.002		72		<0.01		<0.005		0.0024	F /	<0.15		NA		0.0018	F /	33		0.0093	F /	NA		<0.0002		<0.01		0.98		<0.005		5.8		<0.005		0.0053	F /
	SW558	10/23/2008	mg/L	0.049	F /	<0.02		<0.01		0.046		<0.002		87		<0.01		<0.005		0.0012	F /	0.022	F /	NA		<0.005		39		0.024		NA		<0.0002		<0.01		2.2		<0.005		14		0.0037	F /	0.0076	F /
	SW558	4/14/2011	mg/L	<0.2		<0.02		<0.01		0.043		<0.002		74		<0.01		<0.005		<0.01		<0.2		NA		0.0018	F /	33		0.0056	F /	NA		<0.0002		<0.01		0.98		<0.005		5.4		0.0024	F /	<0.02	
	SW558	4/10/2012	mg/L	<0.20		<0.020		<0.010		0.042		0.00079	F /	80		<0.010		<0.0050		0.0066	F / U	<0.20		NA		<0.0050		43		0.0027	F /	NA		<0.20		<0.010		1		<0.0050		6.2		<0.0050		<0.020	

Footnotes:
(1) Project Action Limits (Remedial Goal (RG)) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
An abbreviated list of analytes is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance

< = Result shows laboratory Method Reporting Limit for non-detected results
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate

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Table A1-4

Summary of Groundwater Trends - Estimated Cleanup Times
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Critical Monitoring Well	Critical Compound	Initial [1] Concentration (µg/L)	Date of Initial Concentration	Final Concentration (µg/L) (Remediation Goal - RG)	Record of Decision Estimated Clean-Up time for Site (yrs)	R^2 Value[2]	Estimated Clean-Up Time (yrs)	Estimated Clean-Up Date (yr)	Source Removal Completion Date
L1	MW131	2,4,6-TNT	11,000	2009	9.5	340	0.0031	*	*	2006
		1,3,5-TNB	4,200	2007	5.1		0.3598	**4**	2016	2006
	MW173	RDX	15	2007	2.6		0.3134	**3**	2015	2006
		2,4,6-TNT	20	2009	9.5		0.0198	**4**	2016	2006
L2	MW404	RDX	270	2006	2.6	20	0.2231	**19**	2031	2007
L3	MW412	RDX	440	2008	2.6	50	0.53	**16**	2028	2008
	MW630	RDX	13	2011	2.6		0.1975	*	*	2008
	MW633	RDX	390	2008	2.6		0.2726	**10**	2022	2008
L14	MW511	RDX	170	2007	2.6	80	0.1016	**52**	2064	2005
	MW512	RDX	400	2011	2.6		0.00005	*	*	2005

Note:
Bolded value represents the estimated cleanup time for the associated site.
Estimated clean-up times are approximate and based on constant contamination reduction rates for a specific compound at a specific point within the aquifer.
RG = Remediation Goal
µg/L = micrograms per liter
yr(s) = year(s)
* = Trend curve indicates increasing concentrations. An estimated clean-up time or corresponding date could not be calculated.

2,4,6-TNT = 2,4,6-Trinitrotoluene
1,3,5-TNB = 1,3,5-Trinitrobenzene
RDX = Royal Demolition Explosive

Footnote:
(1) Initial concentration is the maximum observed concentration during the timeframe included.
(2) The R^2 value represents an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables. Shaded analysis results with and R^2 value less than 0.1 are unreliable.

RJR/rjr/CRS
\\nsdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Tables\Table A1-4 - GRU1 Calculated Clean-Up Times_2012.xlsxEst. Cleanup Time - GRU1

TABLE A1-5

Summary of Mann-Kendall Trend Analyses - Explosives
Groundwater Remediation Unit 1
Third Five-Year Review
Joliet Army Ammunition Plant

		Trend Analysis Test	2,4-DNT	2,6-DNT	2-NT	1,3,5-TNB	2,4,6-TNT	RDX
Site L1								
MW131	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	No Trend	NA	**DECREASING**	**DECREASING**	NA
	Trend ≥ 90% Confidence Level		NA	No Trend	NA	**DECREASING**	**DECREASING**	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	**CV>1 NOT-STABLE**	NA	NA	NA	NA
MW173	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	NA	NA	NA	No Trend	No Trend
	Trend ≥ 90% Confidence Level		No Trend	NA	NA	NA	No Trend	No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV<=1 STABLE**	NA	NA	NA	**CV<=1 STABLE**	**CV<=1 STABLE**
WES1	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	NA	NA	No Trend	No Trend	NA
	Trend ≥ 90% Confidence Level		No Trend	NA	NA	No Trend	No Trend	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV<=1 STABLE**	NA	NA	**CV>1 NOT-STABLE**	**CV<=1 STABLE**	NA
WES3	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	No Trend	NA
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	No Trend	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	**CV<=1 STABLE**	NA
Site L2								
MW404	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	NA	**INCREASING**
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	NA	**INCREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
Site L3								
MW412	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	NA	**DECREASING**
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	NA	**DECREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
MW630	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	**CV>1 NOT-STABLE**
MW633	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	NA	**DECREASING**
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	NA	No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
Site L14								
H7	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	No Trend	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		No Trend	No Trend	NA	NA	NA	
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV>1 NOT-STABLE**	**CV<=1 STABLE**	NA	NA	NA	NA
MW511	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	NA	**INCREASING**
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	NA	No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
MW512	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	NA	NA	NA	NA	**INCREASING**
	Trend ≥ 90% Confidence Level		NA	NA	NA	NA	NA	**INCREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA

Notes

For results that were not detected above the reporting limit, 1/2 of the reporting limit was used for the Mann-Kendall trend analysis, as applicable.

1,3,5-TNB = 1,3,5-Trinitrobenzene

2,4,6-TNT = 2,4,6=Trinitrotoluene

2,4-DNT = 2,4-Dinitrotoluene

2,6-DNT = 2,6-Dinitrotoluene

2-NT = 2-Nitrotoluene

CV = Coefficient of variation

MFG = Manufacturing

NA = Not analyzed

RDX = Royal Demolition Explosive

Table A1-6

Monitoring Well Information Table
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
L1	MW131	15029483.20	1344039.100	625.01	622.29	2.5	22.5	24.0	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
	MW171	15028774.67	1343406.032	618.24	615.03	2.9	7.9	11.1	8.00	607.03	1982	OVB	5.0	4.0
	MW172	15028836.84	1344094.147	615.87	613.19	14.5	34.5	37.5	11.00	602.19	1982	BRK	20.0	4.0
	MW173	15028827.26	1344123.204	615.56	612.56	2.8	11.8	15.2	12.00	600.56	1982	OVB	9.0	3.6
	MW174	15028974.94	1344649.467	615.32	612.40	3.5	14.5	18.1	15.00	597.40	1982	OVB	11.0	3.6
	MW175	15029420.69	1343046.596	634.45	630.96	3.7	19.7	23.2	20.00	610.96	1982	OVB	16.0	3.6
	MW176	15030320.57	1343491.565	646.77	643.49	4.8	20.8	23.6	20.80	622.69	1982	OVB	16.0	3.6
	MW177	15028773.31	1343380.183	616.29	613.84	11.8	31.0	33.4	6.50	607.34	1983	BRK	19.2	3.0
	MW178	15030330.01	1343512.024	643.83	640.39	27.3	46.5	50.1	20.00	620.39	1983	BRK	19.2	3.0
	MW400	15030872.22	1344840.211	655.17	652.56	16.2	26.2	28.6	21.00	631.56	1991	COMBO	10.0	4.0
	MW401	15028228.22	1344007.476	611.96	610.20	28.5	43.5	46.1	16.00	594.20	1991	BRK	15.0	4.0
	WES1	15029404.21	1343978.508	623.13	621.43	20.0	40.0	40.0	20.00	601.43	1997	BRK	20.0	4.0
	WES2	15029874.92	1343699.213	637.69	635.98	22.0	42.0	42.0	22.00	613.98	1997	BRK	20.0	4.0
	WES3	15028686.71	1344093.581	611.69	610.33	20.0	40.0	40.0	20.00	590.33	1997	BRK	20.0	4.0
	MW610	15028213.06	1344005.102	612.63	609.62	4.0	14.0	14.0	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
	MW611	15027976.15	1344327.569	620.45	617.83	10.0	20.0	21.0	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
L2	MW132	15026868.16	1339653.570	612.30	609.84	7.5	27.5	29.4	18.00	591.84	1981	COMBO	20.0	4.0
	MW133	15026726.48	1338362.506	605.88	603.51	7.2	27.2	28.7	19.50	584.01	1981	COMBO	20.0	4.0
	MW134	15025646.63	1338233.841	613.30	609.70	6.7	26.7	27.1	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
	MW135	15025761.10	1339631.781	637.35	634.18	6.0	26.0	27.0	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
	MW404	15026798.76	1338548.502	605.88	604.09	7.7	17.7	20.5	12.00	592.09	1991	COMBO	10.0	4.0
	MW405	15027072.91	1338771.791	607.21	605.16	10.8	20.8	23.5	16.00	589.16	1991	COMBO	10.0	4.0
	MW406	15026560.78	1339282.341	623.13	620.72	23.8	33.8	35.7	29.00	591.72	1991	COMBO	10.0	4.0
	MW407	15026676.15	1339269.053	620.05	618.30	20.5	30.5	33.9	25.50	592.80	1991	COMBO	10.0	4.0
	MW501	15025985.85	1338411.03	617.05	614.72	12.7	22.7	NA	25.00	589.72	1991	OVB	10.0	4.0
	MW620	15027048.61	1338602.438	605.07	602.41	7.0	17.0	18.0	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
	MW621	15027058.70	1338599.038	604.96	602.41	22.0	32.0	32.8	20.00	582.41	1999	BRK	10.0	4.0
	MW810	15027142.71	1338476.770	604.58	601.91	7.0	17.3	18.0	UNKNOWN	UNKNOWN	2009	OVB	10.0	4.0
L3	MW1	15025237.01	1338193.456	630.63	628.68	16.5	26.5	27.8	UNKNOWN	UNKNOWN	1986	OVB	10.0	2.0
	MW136	15024523.06	1337305.702	602.70	600.8	7.2	27.2	NA	11.00	589.80	1981	COMBO	20.0	4.0
	MW137	15024661.00	1338608.636	632.90	631.40	7.0	27.0	28.7	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
	MW3	15025504.29	1337801.715	610.34	608.50	9.0	19.0	20.9	19.00	589.50	1986	OVB	10.0	2.0
	MW410	15025282.41	1337409.613	604.38	NA	8.0	18.0	20.3	UNKNOWN	UNKNOWN	1993	OVB	10.0	4.0
	MW411	15024977.88	1337383.946	616.71	NA	13.0	23.0	25.1	18.00	594.54	1991	COMBO	10.0	4.0
	MW412	15024596.02	1337101.399	599.14	597.41	7.4	17.4	19.2	3.00	594.41	1991	BRK	10.0	4.0
	MW630	15024770.15	1337013.674	595.06	592.23	7.0	12.0	12.7	4.00	588.20	1999	BRK	5.0	4.0
	MW631	15024764.63	1337010.736	595.09	592.23	16.0	26.0	27.0	4.00	588.20	1999	BRK	10.0	4.0
	MW632	15024828.58	1336912.350	606.25	603.75	12.0	27.2	27.5	UNKNOWN	UNKNOWN	2009	BRK	15.0	4.0
	MW633	15024474.50	1336978.448	600.37	597.90	7.0	17.0	18.0	5.00	592.90	1999	BRK	10.0	4.0

Table A1-6

Monitoring Well Information Table
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
L14	H-7	15019448.58	1332662.795	584.62	581.45	4.0	14.0	15.5	12.00	569.45	1982	OVB	10.0	2.0
	H-8	15019409.64	1333457.292	591.40	588.14	7.0	22.0	22.9	20.00	568.14	1982	OVB	15.0	2.0
	MW140	15018819.68	1332901.750	584.59	581.68	7.0	27.0	30.3	22.00	559.68	1981	COMBO	20.0	4.0
	MW508	15019632.37	1333106.169	587.44	585.34	10.0	20.0	22.9	UNKNOWN	UNKNOWN	1993	OVB	10.0	4.0
	MW511	15019645.92	1333029.631	587.45	584.98	4.0	14.0	17.0	16.00	568.98	1997	OVB	10.0	4.0
	MW512	15019541.13	1333111.131	588.04	585.98	5.0	15.0	18.2	16.00	569.98	1997	OVB	10.0	4.0
	MW600	15019920.13	1332928.643	587.22	584.75	6.0	11.0	11.0	11.00	573.75	1998	OVB	5.0	2.0
	MW601	15019196.31	1333121.302	586.72	584.29	9.0	19.0	20.0	19.60	564.69	1998	OVB	10.0	2.0
	MW602	15019432.73	1332663.469	583.83	581.22	21.0	31.0	31.0	12.00	569.20	1999	BRK	10.0	4.0
	MW603	15019323.75	1332379.579	580.77	578.27	6.0	16.0	16.0	13.00	565.30	1999	OVB	10.0	4.0
	MW604	15019335.87	1332379.437	581.12	578.27	20.0	30.0	31.0	13.00	565.30	1999	BRK	10.0	4.0

Notes
Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)
UNKOWN = Indicates data not presented on borelogs or provided in RI/FS documentation.
NM = Water level not measured.
BRK = Bedrock
OVB = Overburden
COMBO = Combination Overburden and Bedrock Well
MSL = Feet relative to mean seal level
BGS = Feet below ground surface
ID = Identification
TOC = Top of Casing

Table A1-7

Summary of Groundwater Elevations
Groundwater Remediation Unit 1
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Site	Well ID	TOC Elevation (MSL)	Depth to Water April 2009 (TOC)	Water Elevation April 2009 (MSL)	Depth to Water October 2009 (TOC)	Water Elevation October 2009 (MSL)	Depth to Water April 2010 (TOC)	Water Elevation April 2010 (MSL)	Depth to Water October 2010 (TOC)	Water Elevation October 2010 (MSL)	Depth to Water April 2011 (TOC)	Water Elevation April 2011 (MSL)	Depth to Water October 2011 (TOC)	Water Elevation October 2011 (MSL)	Depth to Water April 2012 (TOC)	Water Elevation April 2012 (MSL)	Depth to Water October 2012 (TOC)	Water Elevation October 2012 (MSL)
L1	MW131	625.01	5.04	619.97	17.49	607.52	11.99	613.02	18.21	606.80	12.59	612.42	15.62	609.39	18.02	606.99	23.12	601.89
	MW171	618.24	4.97	613.27	**DRY**	**DRY**	10.34	607.90	10.72	607.52	10.18	608.06	**DRY**	**DRY**	10.75	607.49	**DRY**	**DRY**
	MW172	615.87	4.21	611.66	9.83	606.04	7.57	608.30	10.18	605.69	7.95	607.92	8.75	607.12	12.52	603.35	10.93	604.94
	MW173	615.56	4.89	610.67	9.58	605.98	7.31	608.25	9.93	605.63	7.71	607.85	8.52	607.04	12.25	603.31	10.70	604.86
	MW174	615.32	4.15	611.17	9.47	605.85	7.27	608.05	9.76	605.56	7.71	607.61	8.48	606.84	12.03	603.29	10.40	604.92
	MW175	634.45	4.41	630.04	21.41	613.04	10.55	623.90	22.68	611.77	10.39	624.06	20.00	614.45	15.14	619.31	**DRY**	**DRY**
	MW176	646.77	8.79	637.98	**DRY**	**DRY**	18.63	628.14	**DRY**	**DRY**	19.41	627.36	**DRY**	**DRY**	24.42	622.35	**DRY**	**DRY**
	MW177	616.29	2.64	613.65	9.15	607.14	6.80	609.49	9.71	606.58	6.68	609.61	8.48	607.81	7.99	608.30	10.94	605.35
	MW178	643.83	15.31	628.52	32.04	611.79	21.90	621.93	35.04	608.79	23.03	620.80	27.30	616.53	28.01	615.82	37.20	606.63
	MW400	655.17	4.51	650.66	9.74	645.43	**NM**	**NM**	11.51	643.66	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
	MW401	611.96	3.75	608.21	6.64	605.32	5.94	606.02	6.82	605.14	6.33	605.63	6.05	605.91	10.46	601.50	7.28	604.68
	WES1	623.13	3.79	619.34	16.75	606.38	11.15	611.98	16.44	606.69	11.51	611.62	14.07	609.06	16.76	606.37	17.72	605.41
	WES2	637.69	13.64	624.05	27.95	609.74	19.94	617.75	29.67	608.02	20.68	617.01	24.77	612.92	26.11	611.58	31.62	606.07
	WES3	611.69	0.79	610.90	5.72	605.97	3.81	607.88	6.06	605.63	4.22	607.47	4.75	606.94	4.63	607.06	6.73	604.96
	MW610	612.63	3.86	608.77	7.87	604.76	6.80	605.83	8.33	604.30	6.82	605.81	7.22	605.41	11.22	601.41	9.01	603.62
	MW611	620.45	5.03	615.42	12.32	608.13	5.88	614.57	13.60	606.85	7.03	613.42	16.24	604.21	14.01	606.44	15.31	605.14
L2	MW132	612.30	2.98	606.32	8.64	603.66	4.23	608.07	8.99	603.31	4.64	607.66	8.79	603.51	**NM**	**NM**	10.32	601.98
	MW133	605.88	2.78	600.82	5.12	600.76	3.53	602.35	5.17	600.71	3.99	601.89	5.38	600.50	**NM**	**NM**	6.14	599.74
	MW134	613.30	4.61	606.61	7.54	605.76	5.13	608.17	7.41	605.89	6.41	606.89	7.97	605.33	6.82	606.48	10.42	602.88
	MW135	637.35	3.61	632.44	12.44	625.48	3.90	633.45	13.82	623.53	4.24	633.11	11.35	626.00	**NM**	**NM**	22.89	614.46
	MW404	605.88	1.93	601.16	5.00	600.88	2.60	603.28	5.31	600.57	3.12	602.76	5.22	600.66	**NM**	**NM**	6.29	599.59
	MW405	607.21	3.22	603.99	5.85	601.36	3.41	603.80	5.95	601.26	3.66	603.55	6.06	601.15	**NM**	**NM**	7.52	599.69
	MW406	623.13	12.29	610.84	19.15	603.98	14.30	608.83	19.58	603.55	14.73	608.40	19.31	603.82	**NM**	**NM**	21.31	601.82
	MW407	620.05	9.23	610.82	16.68	603.37	11.71	608.34	17.17	602.88	12.17	607.88	16.86	603.19	**NM**	**NM**	**NM**	**NM**
	MW501	617.05	3.90	613.15	10.33	606.72	8.30	608.75	11.02	606.03	8.68	608.37	11.00	606.05	**NM**	**NM**	**NM**	**NM**
	MW620	605.07	2.17	602.90	4.28	600.79	2.79	602.28	4.41	600.66	3.02	602.05	4.49	600.58	**NM**	**NM**	5.37	599.70
	MW621	604.96	2.45	602.51	4.18	600.78	3.01	601.95	4.26	600.70	3.21	601.75	4.37	600.59	**NM**	**NM**	5.11	599.85
	MW810	604.58	**DNE**	**DNE**	3.92	600.66	2.81	601.77	4.28	600.30	3.07	601.51	4.38	600.20	**NM**	**NM**	5.38	599.20
L3	MW1	630.63	10.21	620.42	18.64	611.99	13.88	616.75	18.89	611.74	16.15	614.48	19.04	611.59	16.77	613.86	20.70	609.93
	MW136	602.70	3.46	599.24	8.36	594.34	5.91	596.79	9.76	592.94	6.31	596.39	9.01	593.69	8.22	594.48	10.63	592.07
	MW137	632.90	3.47	629.43	21.79	611.11	2.47	630.43	21.83	611.07	3.95	628.95	22.42	610.48	4.55	628.35	24.35	608.55
	MW3	610.34	1.96	608.38	5.61	604.73	3.30	607.04	6.83	603.51	4.31	606.03	6.00	604.34	4.87	605.47	7.21	603.13
	MW410	604.38	11.78	592.60	12.35	592.03	12.06	592.32	12.43	591.95	11.98	592.40	12.22	592.16	12.06	592.32	12.98	591.40
	MW411	616.71	16.90	599.81	20.19	596.52	18.03	598.68	21.14	595.57	17.99	598.72	19.97	596.74	19.10	597.61	22.20	594.51
	MW412	599.14	2.72	596.42	7.43	591.71	4.02	595.12	8.74	590.40	4.68	594.46	7.65	591.49	6.48	592.66	9.78	589.36
	MW630	595.06	4.45	590.61	6.68	588.38	5.86	589.20	6.91	588.15	6.43	588.63	6.75	588.31	6.73	588.33	7.48	587.58
	MW631	595.09	2.55	592.54	5.22	589.87	3.83	591.26	5.77	589.32	4.43	590.66	5.26	589.83	4.76	590.33	6.29	588.80
	MW632	606.25	**DNE**	**DNE**	15.95	590.30	14.83	591.42	16.22	590.03	15.87	590.38	16.21	590.04	15.89	590.36	16.87	589.38
	MW633	600.37	4.44	595.93	10.15	590.22	5.99	594.38	12.40	587.97	6.03	594.34	10.43	589.94	8.89	591.48	11.91	588.46

Table A1-7

Summary of Groundwater Elevations
Groundwater Remediation Unit 1
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Site	Well ID	TOC Elevation (MSL)	Depth to Water April 2009 (TOC)	Water Elevation April 2009 (MSL)	Depth to Water October 2009 (TOC)	Water Elevation October 2009 (MSL)	Depth to Water April 2010 (TOC)	Water Elevation April 2010 (MSL)	Depth to Water October 2010 (TOC)	Water Elevation October 2010 (MSL)	Depth to Water April 2011 (TOC)	Water Elevation April 2011 (MSL)	Depth to Water October 2011 (TOC)	Water Elevation October 2011 (MSL)	Depth to Water April 2012 (TOC)	Water Elevation April 2012 (MSL)	Depth to Water October 2012 (TOC)	Water Elevation October 2012 (MSL)
L14	H-7	584.62	4.02	580.60	9.73	574.89	8.00	576.62	10.39	574.23	8.02	576.60	9.71	574.91	**NM**	**NM**	12.11	572.51
	H-8	591.40	6.63	584.77	6.79	584.61	4.82	586.58	14.01	577.39	7.27	584.13	13.38	578.02	**NM**	**NM**	14.19	577.21
	MW140	584.59	6.76	577.83	9.89	574.70	8.85	575.74	10.33	574.26	9.01	575.58	10.03	574.56	**NM**	**NM**	10.94	573.65
	MW508	587.44	2.97	584.47	9.35	578.09	6.29	581.15	9.98	577.46	6.91	580.53	9.56	577.88	**NM**	**NM**	10.71	576.73
	MW511	587.45	4.32	583.47	9.92	577.87	7.09	580.70	10.68	577.11	7.41	580.04	9.89	577.56	**NM**	**NM**	11.11	576.34
	MW512	588.04	4.18	583.86	9.86	578.18	6.71	581.33	10.44	577.60	7.43	580.61	9.92	578.12	**NM**	**NM**	11.26	576.78
	MW600	587.22	2.61	584.61	9.28	577.94	4.47	582.75	9.94	577.28	5.83	581.39	9.49	577.73	**NM**	**NM**	10.65	576.57
	MW601	586.72	3.66	583.06	8.06	578.66	6.46	580.26	9.45	577.27	7.08	579.64	8.77	577.95	**NM**	**NM**	11.08	575.64
	MW602	583.83	5.07	578.76	10.82	573.01	7.87	575.96	11.28	572.55	8.44	575.39	10.80	573.03	**NM**	**NM**	13.13	570.70
	MW603	580.77	4.54	576.23	8.95	571.82	7.55	573.22	9.51	571.26	7.97	572.80	9.02	571.75	**NM**	**NM**	11.09	569.68
	MW604	581.12	4.18	576.94	9.10	572.02	7.09	574.03	9.66	571.46	7.60	573.52	9.18	571.94	**NM**	**NM**	11.31	569.81

Notes:
ID = Identification
TOC = Top of Casing
MSL = Feet relative to mean seal level
NM = Water level not measured.
DNE = Does not exist. Well had not been installed.

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Table A1-8

Surface Water Elevations
Groundwater Remediation Unit 1
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Site	Surface Water Location	Surface Water Elevation			
		Date	ft (MSL)	Date	ft (MSL)
L1	SW550	4/30/2009	606.04	10/21/2009	604.33
		4/5/2010	604.77	10/25/2010	604.64
		4/13/2011	603.55	10/10/2011	605.22
		4/10/2012	603.85	10/29/2012	604.11
L2	SW555	4/30/2009	601.47	10/21/2009	600.37
		4/5/2010	600.98	10/25/2010	600.33
		4/13/2011	600.52	10/10/2011	600.30
		4/10/2012	**NM**	10/29/2012	600.24
L3	SW557	4/30/2009	589.49	10/21/2009	587.63
		4/5/2010	588.41	10/25/2010	587.66
		4/13/2011	587.99	10/10/2011	587.83
		4/10/2012	**NM**	10/29/2012	**NM**
	SW558	4/30/2009	597.77	10/21/2009	**DRY**
		4/5/2010	595.81	10/25/2010	**DRY**
		4/13/2011	595.86	10/10/2011	**DRY**
		4/10/2012	595.56	10/29/2012	**DRY**
	SW777	4/30/2009	589.49	10/21/2009	587.53
		4/5/2010	588.24	10/25/2010	587.92
		4/13/2011	588.28	10/10/2011	587.93
		4/10/2012	588.07	10/29/2012	587.80
	SW004	4/30/2009	591.54	10/21/2009	589.61
		4/5/2010	590.45	10/25/2010	589.43
		4/13/2011	589.43	10/10/2011	588.73
		4/10/2012	589.43	10/29/2012	589.72

Notes:
ft = feet
MSL = Mean Sea Level

Table A1-9

Vertical Gradient Calculations
Groundwater Remediation Unit 1
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Site	Well ID	Vertical Gradient 4/09 (ft/ft)	Vertical Gradient 10/09 (ft/ft)	Vertical Gradient 4/10 (ft/ft)	Vertical Gradient 10/10 (ft/ft)	Vertical Gradient 4/11 (ft/ft)	Vertical Gradient 10/11 (ft/ft)	Vertical Gradient 4/12 (ft/ft)	Vertical Gradient 10/12 (ft/ft)
L1	MW178	-0.2743	NA	-0.2519	NA	-0.2748	NA	-0.3462	NA
	MW176								
	MW172	0.0450	0.0035	0.0026	0.0035	0.0037	0.0044	0.0027	0.0049
	MW173								
	MW177	0.0182	NA	0.1028	-0.0623	0.0992	NA	0.0538	NA
	MW171								
	MW401	-0.0162	0.0183	0.0060	0.0279	-0.0057	0.0160	0.0033	0.0360
	MW610								
L2[(1)]	MW621	-0.0142	-0.0004	-0.0123	0.0016	-0.0113	0.0004	NM	0.0062
	MW620								
L3/ Landfill L3	MW631	0.0996	0.0869	0.1146	0.0691	0.1167	0.0890	0.1170	0.0746
	MW630								
L14[(1)]	MW602	-0.0725	-0.0956	-0.0308	-0.0884	-0.0566	-0.0955	NM	-0.1047
	H-7								
	MW604	0.0309	0.0108	0.0406	0.0111	0.0369	0.0103	NM	0.0079
	MW603								

Notes:

$$\text{Vertical Gradient} = \frac{\text{Water Level in Deep Well - Water Level in Shallow Well}}{\text{ABS (Water Table Elevation - Screen Midpoint of Deep Well)}}$$

Negative vertical gradients indicate downward flow, positive indicates upward flow.
ft = feet
ft/ft = feet per foot
MSL = Mean sea level
NA - Well dry. Therefore, vertical gradient could not be calculated.
NM = Not measured
ID = Identification

Footnotes:
(1) Sites L2 and L14 not sampled in spring 2012.

Table A1-10

Groundwater Horizontal Gradients
Groundwater Remediation Unit 1
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well Numbers		Horizontal Gradient (ft/ft)							
			April 2009	October 2009	April 2010	October 2010	April 2011	October 2011	April 2012	October 2012
L1 North	MW176	MW173	0.0169	NA[(1)]	0.0123	NA[(1)]	0.0120	NA[(1)]	0.0118	NA[(1)]
L1 South	MW611	MW610	0.0158	0.0080	0.0208	0.0061	0.0181	0.0029	0.0126	0.0036
L2	MW135	MW404	0.0202	0.0164	0.0201	0.0153	0.0202	0.0169	NA[(2)]	0.0099
L3/Landfill L3	MW1	MW410	0.0411	0.0256	0.0313	0.0254	0.0283	0.0249	0.0276	0.0238
L14	MW508	MW603	0.0106	0.0080	0.0102	0.0079	0.0099	0.0079	NA[(3)]	0.0090

Notes:
ft/ft = feet per foot
NA = Not Applicable. Dry well or measurements not completed during spring sampling, gradient cannot be calculated.

Footnotes:
(1) Well MW176 was dry during fall. Therfore, only spring gradients could be calculated.
(2) Site L2 is not sampled in spring. Therefore, only fall gradients could be calculated.
(3) Site L14 is not sampled in spring. Therefore, only fall gradients could be calculated.

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Table A1-11

Groundwater Flow Velocities
Groundwater Remediation Unit 1
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Site	April 2009			October 2009			April 2010			October 2010		
	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
L1	0.000001	0.00	0.5	0.000000	0.00	0.5	0.000000	0.00	0.5	0.000000	0.00	0.2
L2(1)	0.000108	0.31	111.4	0.000098	0.28	101.0	0.000108	0.31	111.4	0.000082	0.23	84.4
L3/Landfill L3(2)	0.000219	0.62	226.7	0.000178	0.50	183.7	0.000151	0.43	156.1	0.000135	0.38	140.1
L14(1,2)	0.000057	0.16	58.5	0.000050	0.14	51.3	0.000053	0.15	54.6	0.000042	0.12	43.6

Site	April 2011			October 2011			April 2012			October 2012		
	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
L1	0.000000	0.00	0.5	0.000000	0.00	0.1	0.000000	0.001	0.4	0.000000	0.001	0.3
L2(1)	0.000108	0.31	111.4	0.000090	0.26	93.2	**NM**	**NM**	**NM**	0.000053	0.15	54.6
L3/Landfill L3(2)	0.000151	0.43	156.1	0.000133	0.38	137.4	0.000147	0.42	152.3	0.000137	0.39	141.8
L14(1,2)	0.000053	0.15	54.6	0.000042	0.12	43.6	**NM**	**NM**	**NM**	0.000048	0.14	49.7

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Notes:
NM = Water level not measurerd
cm/sec = centimeters per second
ft = feet

Footnotes:
(1) Sites L2 and L14 are not sampled in spring beginning 2012. Therefore, only horizontal gradients from Fall 2012 sampling available.
(2) No hydraulic conductivity data were available for Site L3 or Site L14. Values used are from nearby Site L2.

GRU 2 Tables

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Table A1-12

Groundwater Sample Parameters
Groundwater Remediation Unit 2
Third Five-Year Review Report
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Site	Well ID	Parameter Sampled	Sampling Frequency[1]
M1	***In-plume***		
	MW107	S	
	MW231	S	
	MW640[2]	S	
	MW641[2]	S	
	MW642[2]	S	
	Early Warning		
	MW643	S	
	MW644	S	
	Compliance		
	MW645	S	
	MW646	S	
	MW648	S	
	MW649	S	
	SW709	S	
MFG	***In-plume***		
	MW207R	E[3]	Discontinued Fall 2011
	MW212R	E	
	MW652	E	
	MW148RR	E[3]	Discontinued Spring 2012
	MW330	S	
	Early Warning		
	MW123R	E	Cadmium sampling discontinued Fall 2010
	MW124R	E	
	MW162R	E	
	MW313	E	
	MW318	E	
	MW319	E	
	MW654	E	
MFG	***Compliance***		
	MW112	E[3]	Discontinued Spring 2012
	MW113	E[3]	Discontinued Spring 2012
	MW115	E[3]	Discontinued Spring 2012
	MW116	E[3]	Discontinued Spring 2012
	MW117	E	
	MW118	E	
	MW119	E	
Landfill M13	***Upgradient***		
	MW806	E, I, M, SVOC & V	Quarterly
	MW807	E, I, M, SVOC & V	Quarterly
	Downgradient		
	AEHA14R	E, I, M, SVOC & V[3]	Discontinued Spring 2012
	AEHA15	E, I, M, SVOC & V[3]	Discontinued Spring 2012
	MW126R	E, I, M, SVOC & V	Quarterly
	MW362	E, I, M, SVOC & V	Quarterly
	MW808	E, I, M, SVOC & V	Quarterly
	MW809	E, I, M, SVOC & V	Quarterly

Notes:
E - Explosives
M - Metals
S - Sulfate
I - Indicator parameters (Nitrate-N and Sulfate)
SVOC - Semivolatile Organic Compounds
V - Volatile Organic Compounds (VOCs)
MFG - Manufacturing Area. Includes monitoring wells sampled at Sites M6, M7, M9, and Other Areas

Footnotes:
(1) Sampling frequency is semi-annually in spring and fall unless otherwise indicated.
(2) Designation changed from Early Warning to In-Plume in Fall 2011.
(3) Parameters sampled prior to removal from LTM Program.

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
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	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M5	*In-Plume*																													
	MW207R	5/16/2003	<0.7		<0.7 (0.075)		<1.4 (0.37)		<1.4		<1.4		<1.4		<0.7		<1.4		<1.4		<1.4		<0.7		<1.4		<0.7		<0.7	
	MW207R(DUP)	5/16/2003	<0.54		<0.54 (0.058)		<1.1 (0.29)		<1.1		<1.1		<1.1		<0.54		<1.1		<1.1		<1.1		<0.54		<1.1		<0.54		<0.54	
	MW207R	10/21/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		1		<0.78		0.83		**4.9**		<0.78		0.73		<0.39	
	MW207R(DUP)	10/21/2003	<0.39		**0.79**	/ J	<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		1.1		<0.78		0.91		<0.39		<0.78		0.51		<0.39	
	MW207R	5/20/2004	<0.58		<0.58 (0.063)		<1.2 (0.31)		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW207R(DUP)	5/20/2004	<0.52		<0.52 (0.056)		<1 (0.28)		<1		<1		<1		<0.52		<1		<1		<1		<0.52		<1		<0.52		<0.52	
	MW207R	10/20/2004	<0.57		<0.57 (0.18)		<1.1 (0.21)		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW207R(DUP)	10/20/2004	<0.69		<0.69 (0.22)		<1.4 (0.25)		<1.4		<1.4		<1.4		<0.69		<1.4		<1.4		<1.4		<0.69		<1.4		<0.69		<0.69	
	MW207R	7/20/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW207R	10/13/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW207R	5/1/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		0.48		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW207R	10/12/2006	<0.54		<0.54		<1.1		<1.1		<1.1		<1.1		<0.54		<1.1		<1.1		<1.1		<0.54		<1.1		<0.54		<0.54	
	MW207R	4/23/2007	<0.62		<0.62		<1.2		<1.2		<1.2		<1.2		<0.62		<1.2		<1.2		<1.2		<0.62		<1.2		<0.62		<0.62	
	MW207R	10/4/2007	<0.5		<0.5		<1		<1		<1		<1		<0.5		<1		<1		<1		<0.5		<1		<0.5		<0.5	
	MW207R(DUP)	10/4/2007	<0.49		<0.49		<0.99		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW207R	5/1/2008	0.039	F /	0.12	F /	<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		0.12	F /	<0.39		<0.39	
	MW207R(DUP)	5/1/2008	0.047	F /	0.14	F /	<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		0.13	F /	<0.39		<0.39	
	MW207R	10/13/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW207R	10/23/2009	<0.85		<1.7		<1.7		<1.7		<1.7		<1.7		<0.85		<1.7		<1.7		<1.7		<0.85		<2.1		<0.85		<0.85	
	MW207R	4/7/2010	<0.30		<0.59		<0.59		<0.59		<0.59		<0.59		<0.30		<0.59		<0.59		<0.59		<0.30		<0.74		<0.30		<0.30	
	MW207R	11/3/2010	0.24	F /	0.22	F /	<0.57		<0.57		<0.57		<0.57		<0.30		<0.57		<0.57		<0.57		<0.30		<0.72		0.49		<0.30	
	MW207R	4/21/2011	0.14	F /	0.24	F /	<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52	U / UJ	<0.21		<0.21	
M6	*In-Plume*																													
	MW212R	5/15/2003	<58		**6400**		**2200**		130		160		<120		<58		**18000**		1600		10000		<58		<120		<58		**710**	
	MW212R	10/17/2003	<3.9		**4400**		**1500**		100		98		<7.8		12		**14000**		1200		8400		<3.9		<7.8		<3.9		**400**	
	MW212R	5/24/2004	<5.5		**64**		**95**		14		11		<11		<5.5		<11		<11		<11		<5.5		<11		<5.5		**9.6**	
	MW212R	10/21/2004	<3.9		**2800**		**860**		66	/ J	67		<7.8		14	/ J	**12000**		970		6500		<3.9		<7.8		<3.9		**210**	
	MW212R	7/13/2005	<3.9		**490**		**200**		32		23		<7.8		<3.9		3500		290		1900		<3.9		<7.8		<3.9		**26**	B /
	MW212R	10/18/2005	<39		**17000**		**3500**		340		320		<78		<39		**81000**		4000		47000		<39		<78		<39		**1000**	
	MW212R	5/1/2006	<4.1		**2800**		**630**		34		28		<8.2		<4.1		**7500**		590		5800		<4.1		<8.2		<4.1		**260**	
	MW212R	10/6/2006	<40		**6300**		**1800**		190		140		<81		<40		**31000**		2600		19000		<40		<81		<40		**880**	
	MW212R	4/24/2007	<3.9		**650**		**250**		45		37		<7.8		<3.9		3300		370		2300		<3.9		<7.8		<3.9		**25**	
	MW212R	10/10/2007	<39		**3800**		**1300**		190		200		<78		<39		**19000**		1700		12000		<39		<78		<39		**440**	
	MW212R	5/9/2008	<4.8		**5700**		**1000**		70		72		<9.6		<4.8		**21000**		1300		15000		<4.8		<9.6		<4.8		**460**	
	MW212R(DUP)	5/9/2008	<3.9		4400		970		68		70		<7.8		4.3		17000		1200		12000		<3.9		<7.8		<3.9		450	
	MW212R	10/16/2008	<0.42		<0.42		<0.83		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	MW212R	5/7/2009	<16		**1000**		**340**		<31		<31		<31	U / UJ	<16		1800		370		1300		<16		<39		<16		**150**	
	MW212R	10/26/2009	<22		**4500**		**1200**		<43		<43		<43		<22		**20000**		1600		11000		<22		<55		<22		**870**	
	MW212R	4/9/2010	<0.24		**95**		**84**		15		13		<0.46		<0.24		4.8		39		<0.46		<0.24		<0.58		<0.24		8.2	
	MW212R	11/2/2010	<2.0		**140**		**280**		19		14		<3.8		<2.0		2900		260		1700		<2.0		<4.8	U / UJ	<2.0		**67**	
	MW212R	4/21/2011	<28		**2400**		**730**		70		73		<54		<28		4800	/ J	710	/ J	2100	/ J	<28		<68		<28		**230**	/ J
	MW212R(DUP)	4/21/2011	<25		**2900**		**870**		64		74		<49		<25		**8100**	/ J	920	/ J	4200	/ J	<25		<61		<25		**350**	/ J
	MW212R	10/19/2011	<35		**2700**		**1100**		100		57	F / NJ	<68		<35		**12000**		<68		7500		<35		<86		<35		**230**	
	MW212R(DUP)	10/19/2011	<30		**2700**		**1000**		120		54	F / J	<59		<30		**12000**		<59		7700		<30		<74		<30		**210**	
	MW212R	4/15/2012	1.1	F /	**620**		**260**		64	/ J	51	/ J	<3.1		1.9		4100		<3.1		2100		<1.6		<3.9		<1.6		**39**	
	MW212R	10/23/2012	<16		**2500**		**640**		270	/ J	160	/ J	<31		<16		**12000**		<31		6700		<16		<39		<16		**200**	
	MW212R(DUP)	10/23/2012	<16		**3200**		**920**		290	/ J	170	/ J	<31		<16		**15000**		<31		7900		<16		<39		<16		**340**	
	MW652	5/15/2003	9.7		**6200**		**2200**		150		86		<7.9		20		**27000**		2300		17000		<4		<7.9		<4		**1400**	
	MW652(DUP)	5/15/2003	**11**		**7500**		**2700**		180		110		<8.7		24		**34000**		2700		21000		<4.4		<8.7		<4.4		**1700**	
	MW652	10/17/2003	7.1		**4900**		**2000**		130		72		<7.9		19		**19000**		1600		13000		<4		<7.9		<4		**1300**	
	MW652(DUP)	10/17/2003	8.3		**5600**		**2300**		150		86		<9.1		22		**23000**		1800		14000		<4.6		<9.1		<4.6		**1500**	
	MW652	5/24/2004	10		**7100**		**2700**		220		130		<9.1		30		**35000**		2700		23000		<4.6		<9.1		<4.6		**2100**	
	MW652(DUP)	5/24/2004	9.4		**6800**		**2500**		200		120		<7.8		27		**34000**		3000		23000		<3.9		<7.8		<3.9		**2100**	
	MW652	10/21/2004	**13**		**10000**		**4900**		300	/ J	190		<7.8		39		**47000**		3700		31000		<3.9		<7.8		<3.9		**2300**	
	MW652(DUP)	10/21/2004	**13**		**14000**		**4900**	/ J	290	/ J	180		<10		38		**66000**		3800		43000		<5.1		<10		<5.1		**2400**	
	MW652	7/13/2005	<58		**10000**		**3500**		280		<120		<120		<58		**56000**		3900		37000		<58		<120		<58		**2200**	B /
	MW652	10/18/2005	9.3		**21000**		**5400**		270		130		<7.8		25		**98000**		5700		65000		<3.9		<7.8		<3.9		**3400**	
	MW652	5/1/2006	<39		**2900**		**970**		<78		<78		<78		<39		**11000**		1000		8100		<39		<78		<39		**560**	
M6	*In-Plume*																													
	MW652	10/6/2006	<42		**5100**		**1800**		140		91		<85		<42		**23000**		1900		15000		<42		<85		<42		**1300**	
	MW652	4/24/2007	<3.9		**2200**		**670**		60		35		<7.8		<3.9		**9000**		820		6700		<3.9		<7.8		<3.9		**450**	
	MW652	10/10/2007	<39		**4600**		**1700**		160		120		<78		<39		**20000**		1700		13000		<39		<78		<39		**1100**	
	MW652	5/7/2008	4.8		**3800**		**1300**		80		90		<7.8		9.7		**17000**		1400		12000		<3.9		<7.8		<3.9		**710**	
	MW652(DUP)	5/7/2008	5.1		4100		1300		85		96		<7.8		10		18000		1600		13000		<3.9		<7.8		<3.9		710	
	MW652	10/16/2008	<3.9		**4200**		**2700**		120		99		<7.8		<3.9		**17000**		1500		12000		<3.9		<7.8		<3.9		**910**	
	MW652(DUP)	10/16/2008	<3.9		**4400**		**2100**		130		100		<7.8		<3.9		**18000**		1500		12000		<3.9		<7.8		<3.9		**850**	
	MW652	5/7/2009	<16		**2000**		**630**		<31		<31		<31	U / UJ	<16		**5300**		680		5500		<16		<39		<16		**340**	
	MW652	10/26/2009	<21		**4900**		**1500**		120		120		<41		<21		**23000**		1700		14000		<21		<51		<21		**810**	
	MW652	4/9/2010	<29		**8000**		**2800**		<57		<57		<57		<29		**36000**		2800		25000		<29		<72		<29		**1400**	
	MW652	11/2/2010	<2.1		**5800**		**2800**		180		120		<4.1		<2.1		**28000**		2000		18000		<2.1		<5.2	U / UJ	<2.1		**1200**	
	MW652	4/21/2011	<23		**5400**		**1400**		75		73		<44		<23		**24000**		1700	/ J	17000		<23		<56		<23		**770**	
	MW652(DUP)	4/21/2011	<18		**5900**		**1500**		79		79		<36		<18		**27000**		2300	/ J	20000		<18		<45		<18		**870**	
	MW652	10/19/2011	<20		**2800**		**1500**		86		60	/ J	<39		<20		**13000**		<39		8100		<20		<49		<20		**520**	
	MW652(DUP)	10/19/2011	<32		**3000**		**1700**		96		69	/ J	<63		<32		**14000**		<63		9000		<32		<79		<32		**590**	
	MW652	4/14/2012	9.5	F /	**8400**		**3300**		360		380	/ J	<31		<16		**44000**		<31		28000		<16		<39		<16		**1600**	
	MW652(DUP)	4/14/2012	7.9	F /	**6800**		**2700**		320		320	/ J	<31		<16		**35000**		<31		22000	/ J	<16		<39		<16		**1300**	
	MW652	10/23/2012	<16		**5100**		**2000**		280		230	/ J	<31		<16		**23000**		<31		14000		<16		<39		<16		**950**	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
	Early Warning																													
	MW123R	10/14/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW123R	5/19/2004	<0.57		<0.57 (0.061)		<1.1 (0.3)		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW123R	10/20/2004	<0.65		<0.65 (0.2)		<1.3 (0.24)		<1.3		<1.3		<1.3		<0.65		<1.3		<1.3		<1.3		<0.65		<1.3		<0.65		<0.65	
	MW123R	7/18/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW123R	10/17/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW123R	5/1/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW123R	10/10/2006	<0.57		<0.57		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW123R	4/25/2007	<0.54		<0.54		<1.1		<1.1		<1.1		<1.1		<0.54		<1.1		<1.1		<1.1		<0.54		<1.1		<0.54		<0.54	
	MW123R	10/11/2007	<0.46		<0.46		<0.91		<0.91		<0.91		<0.91		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	MW123R	5/8/2008	<0.53		<0.53		<1.1		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		<0.53		<0.53	
	MW123R	10/20/2008	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW123R(DUP)	10/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW123R	5/6/2009	<0.2		<0.39		<0.39		<0.39		<0.39		<0.39		<0.2		<0.39		<0.39		<0.39		<0.2		<0.49		<0.2		<0.2	
	MW123R	10/26/2009	<0.2		<0.39		<0.39		<0.39		<0.39		<0.39		<0.2		<0.39		<0.39		<0.39		<0.2		<0.49		<0.2		<0.2	
	MW123R	4/8/2010	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW123R	11/1/2010	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		1		<0.37		0.46		<0.19		<0.46		<0.19		<0.19	
	MW123R	4/20/2011	<0.26		<0.51		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW123R	10/18/2011	<0.34		<0.34		<0.34		<0.65		<0.65		<0.65		<0.34		<0.65		<0.65		<0.65		<0.34		<0.82		<0.34		<0.34	
	MW123R	4/14/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW123R(DUP)	4/14/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW123R	10/23/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW162R	5/13/2003	<0.58		<0.58 (0.062)		<1.2 (0.31)		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW162R	10/15/2003	<0.54		<0.54 (0.058)		<1.1 (0.29)		<1.1		<1.1		<1.1		<0.54		<1.1		<1.1		<1.1		<0.54		<1.1		<0.54		<0.54	
	MW162R	5/19/2004	<0.54		<0.54 (0.058)		<1.1 (0.29)		<1.1		<1.1		<1.1		<0.54		<1.1		<1.1		<1.1		<0.54		<1.1		<0.54		<0.54	
	MW162R	10/20/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	7/13/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	10/20/2005	<0.63		<0.63		<1.3		<1.3		<1.3		<1.3		<0.63		<1.3		<1.3		<1.3		<0.63		<1.3		<0.63		<0.63	
	MW162R	5/3/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	10/11/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	4/25/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	10/9/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	5/1/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	10/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW162R	5/6/2009	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW162R	10/26/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW162R	4/8/2010	<0.29		<0.57		<0.57		<0.57		<0.57		<0.57		<0.29		<0.57		<0.57		<0.57		<0.29		<0.72		<0.29		<0.29	
	MW162R	11/1/2010	<0.27		<0.52		<0.52		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.65		<0.27		<0.27	
	MW162R	4/20/2011	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW162R	10/18/2011	<0.41		<0.41		<0.41		<0.79		<0.79		<0.79		<0.41		<0.79		<0.79		<0.79		<0.41		<0.99		<0.41		<0.41	
	MW162R(DUP)	10/18/2011	<0.33		<0.33		<0.33		<0.64		<0.64		<0.64		<0.33		<0.64		<0.64		<0.64		<0.33		<0.81		<0.33		<0.33	
	MW162R	4/14/2012	<0.16		0.27	F / J	0.14	F /	<0.31		<0.31		<0.31		<0.16		0.7		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW162R	10/23/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M6	*Early Warning*																													
	MW313	5/16/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	10/17/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	5/24/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		1.8		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	10/22/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	7/19/2005	<0.63		<0.63		<1.3		<1.3		<1.3		<1.3		<0.63		<1.3		<1.3		<1.3		<0.63		<1.3		<0.63		<0.63	
	MW313	10/19/2005	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW313	5/2/2006	<0.58		<0.58		<1.2		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW313	10/11/2006	<0.6		<0.6		<1.2		<1.2		<1.2		<1.2		<0.6		<1.2		<1.2		<1.2		<0.6		<1.2		<0.6		<0.6	
	MW313	4/30/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	10/10/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	5/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	10/16/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW313	5/7/2009	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37	U / UJ	<0.19		<0.37		<0.37		<0.37		<0.19		<0.46		<0.19		<0.19	
	MW313(DUP)	5/7/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31	U / UJ	<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW313	10/26/2009	<0.2		<0.39		<0.39		<0.39		<0.39		<0.39		<0.2		0.63		<0.39		0.27	F /	<0.2		<0.49		<0.2		<0.2	
	MW313(DUP)	10/26/2009	<0.19		<0.36		<0.36		<0.36		<0.36		<0.36		<0.19		<0.36		<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	MW313	4/9/2010	<0.29		<0.56		<0.56		<0.56		<0.56		<0.56		<0.29		<0.56		<0.56		<0.56		<0.29		<0.71		<0.29		<0.29	
	MW313	11/2/2010	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW313(DUP)	11/2/2010	<0.38		<0.73		<0.73		<0.73		<0.73		<0.73		<0.38		<0.73		<0.73		<0.73		<0.38		<0.92		<0.38		<0.38	
	MW313	4/21/2011	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48	U / UJ	<0.20		<0.20	
	MW313	10/19/2011	<0.36		<0.36		<0.36		<0.70		<0.70		<0.70		<0.36		<0.70		<0.70		<0.70		<0.36		<0.88		<0.36		<0.36	
	MW313	4/15/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW313	10/23/2012	<1.6		**5**		**3.3**	/ J	<3.1		<3.1		<3.1		<1.6		44		<3.1		28		<1.6		<3.9		<1.6		<1.6	
	MW318	5/14/2003	<0.66		<0.66 (0.071)		<1.3 (0.35)		<1.3		<1.3		<1.3		<0.66		<1.3		<1.3		<1.3		<0.66		<1.3		<0.66		<0.66	
	MW318	10/14/2003	<0.46		<0.46 (0.049)		<0.91 (0.24)		<0.91		<0.91		6.1		<0.46		<0.91		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	MW318	5/19/2004	<0.65		<0.65 (0.07)		<1.3 (0.35)		<1.3		<1.3		<1.3		<0.65		<1.3		<1.3		<1.3		<0.65		<1.3	U / J	<0.65		<0.65	
	MW318	10/21/2004	<2		<2 (0.61)		**6.7**	/ J	<3.9		<3.9		<3.9		<2		<3.9		<3.9		<3.9		<2		<3.9		<2		<2	
	MW318	7/13/2005	<0.55		<0.55		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	MW318(DUP)	7/13/2005	<0.55		<0.55		<1.1		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	MW318	10/18/2005	<0.44		<0.44		<0.88		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW318(DUP)	10/18/2005	<0.44		<0.44		<0.87		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	MW318	5/2/2006	<0.78		<0.78		<1.6		<1.6		<1.6		3.4		<0.78		<1.6		<1.6		<1.6		<0.78		<1.6		<0.78		<0.78	
	MW318(DUP)	5/2/2006	<0.78		<0.78		<1.6		<1.6		<1.6		4.1		<0.78		<1.6		<1.6		<1.6		<0.78		<1.6		<0.78		<0.78	
	MW318	10/10/2006	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		4.4		<0.95		<0.47		<0.95		<0.47		<0.47	
	MW318(DUP)	10/10/2006	<0.4		<0.4		<0.79		<0.79		<0.79		<0.79		<0.4		<0.79		2.8		<0.79		<0.4		<0.79		<0.4		<0.4	
	MW318	4/23/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW318	10/9/2007	<0.51		<0.51		<1		<1		<1		<1		<0.51		<1		<1		<1		<0.51		<1		<0.51		<0.51	
	MW318	5/7/2008	<0.94		<0.94		<1.9		<1.9		<1.9		<1.9		<0.94		<1.9		<1.9		<1.9		<0.94		<1.9		<0.94		<0.94	
	MW318	10/14/2008	<0.78		<0.78		<1.6		<1.6		<1.6		<1.6		<0.78		<1.6		<1.6		<1.6		**4.4**		<1.6		<0.78		<0.78	
	MW318	5/6/2009	<0.16	U / UJ	<0.31	U / UJ	<0.31	U / UJ	<0.31	U / UJ	<0.31	U / UJ	<0.31	U / UJ	<0.16	U / UJ	<0.31	U / UJ	<0.31	U / UJ	<0.31	U / UJ	<0.16	U / UJ	<0.39	U / UJ	<0.16	U / UJ	<0.16	U / UJ
	MW318	10/26/2009	<0.83		<1.6		<1.6		<1.6		<1.6		<1.6		<0.83		<1.6		<1.6		<1.6		<0.83		<2		<0.83		<0.83	
	MW318	4/8/2010	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52		<0.21		<0.21	
	MW318	11/2/2010	<0.36		<0.70		<0.70		<0.70		<0.70		<0.70		<0.36		<0.70		<0.70		<0.70		<0.36		<0.88		<0.36		<0.36	
	MW318	4/21/2011	<0.29		<0.56		<0.56		<0.56		<0.56		<0.56		<0.29		0.85		<0.56		<0.56		<0.29		<0.71		<0.29		<0.29	
	MW318	10/19/2011	<0.95		<0.95		**2.8**	/ NJ	<1.8		<1.8		<1.8		<0.95		<1.8		<1.8		<1.8		<0.95		<2.3		<0.95		2.9	/ J
	MW318	4/14/2012	<0.32		0.21	F / J	**0.45**	F / J	<0.62		<0.62		<0.62		<0.32		<0.62		<0.62		<0.62		<0.32		<0.78		<0.32		<0.32	
	MW318	10/23/2012	<0.8		<1.6		<1.6		<1.6		<1.6		<1.6		<0.8		<1.6		<1.6		<1.6		<0.8		<2		<0.8		<0.8	
	MW319	5/14/2003	<2		<2 (0.21)		<3.9 (1)		<3.9		<3.9		<3.9		<2		<3.9		<3.9		<3.9		<2		<3.9		<2		<2	
	MW319	10/14/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW319	5/19/2004	<0.42		<0.42 (0.046)		<0.85 (0.22)		<0.85		<0.85		<0.85		<0.42		<0.85		<0.85		<0.85		<0.42		<0.85	U / J	<0.42		<0.42	
	MW319	10/21/2004	<2.7		<2.7 (0.83)		<5.3 (0.98)		<5.3		<5.3		<5.3		<2.7		<5.3		<5.3		<5.3		<2.7		<5.3		<2.7		<2.7	
	MW319	7/13/2005	<0.49		<0.49		<0.99		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW319	10/18/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW319	5/2/2006	<0.78		<0.78		<1.6		<1.6		<1.6		8.9		<0.78		<1.6		<1.6		<1.6		<0.78		<1.6		<0.78		<0.78	
	MW319	10/10/2006	<0.43		<0.43		**11**		<0.86		<0.86		<0.86		<0.43		<0.86		6.7		<0.86		<0.43		<0.86		<0.43		<0.43	
	MW319	4/23/2007	<0.41		<0.41		**2**		<0.82		<0.82		<0.82		<0.41		<0.82		<0.82		<0.82		<0.41		<0.82		<0.41		<0.41	
	MW319	10/9/2007	<0.67		<0.67		<1.3		<1.3		<1.3		<1.3		<0.67		<1.3		<1.3		<1.3		<0.67		<1.3		<0.67		<0.67	
	MW319	5/7/2008	<2		<2		<4		<4		<4		<4		<2		<4		<4		<4		<2		<4		<2		<2	
	MW319	10/14/2008	<0.83		<0.83		<1.7		<1.7		<1.7		<1.7		<0.83		<1.7		<1.7		<1.7		**12**		<1.7		<0.83		<0.83	
	MW319	5/6/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW319	10/26/2009	<0.8		<1.6		<1.6		<1.6		<1.6		<1.6		<0.8		<1.6		<1.6		<1.6		<0.8		<2		<0.8		<0.8	
	MW319	4/8/2010	<0.25		<0.49		**3**		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	
	MW319	11/2/2010	<0.19		**6.2**	/ J	<0.36		<0.36		<0.36		<0.36		<0.19		0.85	/ J	<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	MW319	4/21/2011	<0.18		**0.74**		<0.35		<0.35		<0.35		<0.35		<0.18		<0.35		<0.35		<0.35		<0.18		<0.44		<0.18		<0.18	
	MW319	10/19/2011	<0.87		<0.87		<0.87		<1.7		<1.7		<1.7		<0.87		<1.7		<1.7		<1.7		<0.87		<2.1		<0.87		5.8	/ J
	MW319	4/14/2012	<0.32		<0.62		<0.62		<0.62		<0.62		<0.62		<0.32		<0.62		<0.62		<0.62		<0.32		<0.78		<0.32		0.29	F / J
	MW319	10/23/2012	<0.8		<1.6		<1.6		<1.6		<1.6		<1.6		<0.8		<1.6		<1.6		<1.6		<0.8		<2		<0.8		<0.8	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M6	*Early Warning*																													
	MW654	5/15/2003	<0.48		<0.48 (0.052)		<0.96 (0.26)		<0.96		1.1		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW654	10/20/2003	<0.39		**1.7**	/ J	**1.1**		1.7		2.1		<0.78		<0.39		2		<0.78		2.2		0.55		<0.78		<0.39		<0.39	
	MW654	5/21/2004	<0.39		**0.79**		**1.1**		1.7		2.2		<0.78		<0.39		1.8		<0.78		2		<0.39		<0.78		<0.39		<0.39	
	MW654	10/22/2004	<0.4		**3**		**1.9**		1.6		2		<0.81		<0.4		3.3		<0.81		1.8		<0.4		<0.81		<0.4		<0.4	
	MW654	7/13/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW654	10/18/2005	<0.39		**0.55**		<0.78		<0.78		0.85		<0.78		<0.39		1.1		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW654	5/2/2006	<0.39		<0.39		<0.78		<0.78		0.88		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW654	10/6/2006	<0.46		**1.2**		<0.91		<0.91		1.2		<0.91		<0.46		1.3		<0.91		<0.91		<0.46		<0.91		<0.46		<0.46	
	MW654	4/24/2007	<0.39		**0.95**		<0.78		1.7		3.2		<0.78		<0.39		1.2		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW654	10/10/2007	<0.44		<0.44		<0.87		1.6		3		<0.87		<0.44		<0.87		<0.87		<0.87		**3.4**		<0.87		<0.44		<0.44	
	MW654	5/6/2008	<0.47		<0.47		<0.94		1.4		2.6		<0.94		<0.47		<0.94		<0.94		<0.94		0.55		<0.94		<0.47		<0.47	
	MW654	10/16/2008	<0.66		<0.66		<1.3		<1.3		<1.3		<1.3		<0.66		<1.3		<1.3		<1.3		<0.66		<1.3		<0.66		<0.66	
	MW654(DUP)	10/16/2008	<0.39		<0.39		<0.78		<0.78		1.7		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW654	5/7/2009	<0.16		<0.31		<0.31		2.2		5.8		<0.31	U / UJ	<0.16		<0.31		<0.31		<0.31		0.7		<0.39		<0.16		<0.16	
	MW654	10/26/2009	<0.21		**0.63**		0.25	F /	0.36	F /	0.69		<0.41		<0.21		1.6		<0.41		0.58		<0.21		<0.52		<0.21		<0.21	
	MW654	4/9/2010	<0.26		<0.51		<0.51		1.3		4.4		<0.51		<0.26		<0.51		<0.51		<0.51		0.7		<0.64		<0.26		<0.26	
	MW654	11/2/2010	<0.16		0.084	F /	0.1	F /	0.19	F /	1		<0.31		<0.16		0.7		<0.31		0.25	F /	<0.16		<0.39	U / UJ	<0.16		<0.16	
	MW654	4/21/2011	<0.20		<0.38		<0.38		0.81		3		<0.38		<0.20		0.35	F /	<0.38		<0.38		<0.20		<0.48	U / UJ	<0.20		<0.20	
	MW654	10/19/2011	<0.20		<0.20		<0.20		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW654	4/15/2012	<0.16		**1.7**		**0.97**		0.7		2.2		<0.31		<0.16		18		0.23	F / J	11		0.31	/ J	<0.39		<0.16		0.18	/ J
	MW654	10/23/2012	<1.6		**8.9**		**4.8**		<3.1		<3.1		<3.1		<1.6		86		<3.1		52		<1.6		<3.9		<1.6		<1.6	
M7	*Early Warning*																													
	MW124R	5/13/2003	<2.3		<2.3 (2.5)		<4.6 (1.2)		19		28		<4.6		<2.3		<4.6		<4.6		<4.6		<2.3		<4.6		<2.3		**10**	
	MW124R(DUP)	5/13/2003	<2		<2 (0.21)		<3.9 (1)		18		27		<3.9		<2		<3.9		<3.9		<3.9		<2		<3.9		<2		**12**	
	MW124R	10/15/2003	<0.39		**2.9**		<0.78 (0.21)		55		66		1.3		<0.39		<0.78		<0.78		<7.8		**6.5**		<0.78		**6.3**		**120**	
	MW124R(DUP)	10/15/2003	<0.55		**3.3**		**1.7**		56		66		<11		<0.55		<1.1		<1.1		<11		**6.4**		<1.1		**6.8**		**160**	
	MW124R	5/18/2004	<5.1		<5.1 (0.55)		<10 (2.7)		28		32		<10		<5.1		<10		<10		<10		<5.1		<10		**7.7**		**140**	
	MW124R(DUP)	5/18/2004	<5.2		<5.2 (0.56)		<10 (2.8)		24		28		<10		<5.2		<10		<10		<10		<5.2		<10		**5.7**		**110**	
	MW124R	10/20/2004	<4.8		<4.8 (1.5)		<9.6 (1.8)		35		37		<9.6		<4.8		<9.6		<9.6		<9.6		<4.8		<9.6		<4.8		**74**	
	MW124R(DUP)	10/20/2004	<6.4		<6.4 (2)		<13 (2.3)		45		47		<13		<6.4		<13		<13		<13		**8**		<13		<6.4		**99**	
	MW124R	7/18/2005	<6.9		<6.9		<14		43		46		<14		<6.9		<14		<14		<14		<6.9		<14		<6.9		**86**	
	MW124R(DUP)	7/18/2005	<5.8		<5.8		<12		43		45		<12		<5.8		<12		<12		<12		<5.8		<12		<5.8		**84**	
	MW124R	10/21/2005	<2.1		**6.3**		<4.2		48		48		<4.2		<2.1		<4.2		<4.2		<4.2		**4.1**		<4.2		<2.1		**41**	
	MW124R(DUP)	10/21/2005	<1.9		**6.9**		<3.8		52		52		<3.8		<1.9		<3.8		<3.8		<3.8		**4.2**		<3.8		<1.9		**42**	
	MW124R	5/4/2006	<3.9		<3.9		<7.8		13		16		<7.8		<3.9		<7.8		<7.8		<7.8		**4.6**		<7.8		<3.9		**32**	
	MW124R(DUP)	5/4/2006	<3.9		<3.9		<7.8		13		16		<7.8		<3.9		<7.8		<7.8		<7.8		**4.7**		<7.8		<3.9		**32**	
	MW124R	10/11/2006	<7.3		<7.3		<15		42		39		<15		<7.3		<15		<15		<15		<7.3		<15		<7.3		**69**	
	MW124R(DUP)	10/11/2006	<7		<7		<14		41		41		<14		<7		<14		<14		<14		**7.5**		<14		<7		**79**	
	MW124R	4/30/2007	<0.53		**1.8**		**1.6**		17		17		<1.1		<0.53		<1.1		<1.1		7.9		**5.2**		<1.1		1.6		**58**	
	MW124R	10/11/2007	<0.51		**1.4**		<1		22		20		<1		<0.51		<1		<1		<1		2.5		<1		<0.51		5.5	
	MW124R(DUP)	10/11/2007	<0.43		1.7		<0.86		23		18		0.99		<0.43		<0.86		<0.86		<0.86		2.3		<0.86		<0.43		7.1	
	MW124R	5/8/2008	<0.49		**1**		<0.99		13		13		<0.99		<0.49		<0.99		<0.99		<0.99		1.7		<0.99		<0.49		**13**	
	MW124R(DUP)	5/8/2008	<0.49		1.1		<0.99		14		13		<0.99		<0.49		<0.99		<0.99		<0.99		1.7		<0.99		<0.49		13	
	MW124R	10/16/2008	<0.39		**0.84**		<0.78		15		13		<0.78		<0.39		<0.78		<0.78		<0.78		2.1		<0.78		<0.39		2.6	
	MW124R(DUP)	10/16/2008	<0.39		**0.8**		<0.78		13		12		<0.78		<0.39		<0.78		<0.78		<0.78		1.9		<0.78		<0.39		2.5	
	MW124R	5/6/2009	<0.23		**1.1**		<0.44		17		14		<0.44		<0.23		<0.44		<0.44		<0.44		2.2		<0.55		<0.23		**21**	
	MW124R	10/26/2009	<0.24		**0.65**		<0.46		13		10		<0.46		<0.24		0.27	F /	<0.46		0.35	F /	1		<0.58		<0.24		2.3	
	MW124R	4/8/2010	<0.25		<0.49		<0.49		10		8.8		<0.49		<0.25		<0.49		<0.49		<0.49		1.1		<0.61		<0.25		1.6	
	MW124R(DUP)	4/8/2010	<0.21		**0.68**		<0.41		9.8		8.5		<0.41		<0.21		<0.41		<0.41		<0.41		1.1		<0.52		<0.21		1.6	
	MW124R	11/3/2010	<0.29		<0.56		<0.56		0.87		0.7		<0.56		<0.29		<0.56		<0.56		<0.56		0.36		<0.71		<0.29		<0.29	
	MW124R	4/20/2011	<0.20		0.11	F /	<0.38		3.2		3.1		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW124R	10/18/2011	<0.22		<0.22		<0.22		<0.42		<0.42		6	/ J	<0.22		<0.42		<0.42		<0.42		0.66	/ J	<0.53		<0.22		<0.22	
	MW124R(DUP)	10/18/2011	<0.25		<0.25		<0.25		<0.49		<0.49		6.9	/ J	<0.25		<0.49		<0.49		<0.49		0.65	/ J	<0.61		<0.25		<0.25	
	MW124R	4/14/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW124R	10/23/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
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	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M3	*Compliance*																													
	MW112	5/14/2003	<0.52		<0.52 (0.056)		<1 (0.28)		<1		<1		<1		<0.52		<1		<1		<1		<0.52		<1		<0.52		<0.52	
	MW112	10/14/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW112	5/18/2004	<0.49		<0.49 (0.053)		<0.99 (0.26)		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW112	10/19/2004	<0.4		<0.4 (0.13)		<0.81 (0.15)		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	MW112	7/18/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW112	10/21/2005	<0.81		<0.81		<1.6		<1.6		<1.6		<1.6		<0.81		<1.6		<1.6		<1.6		<0.81		<1.6		<0.81		<0.81	
	MW112	5/4/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW112	10/11/2006	<0.53		<0.53		<1.1		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		<0.53		<0.53	
	MW112	4/30/2007	<0.41		<0.39		<0.78		<0.82		<0.82		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.41	
	MW112	10/11/2007	<0.63		<0.63		<1.3		<1.3		<1.3		<1.3		<0.63		<1.3		<1.3		<1.3		<0.63		<1.3		<0.63		<0.63	
	MW112	5/8/2008	<0.44		<0.44		<0.88		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW112	10/15/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW112(DUP)	10/15/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW112	5/7/2009	<0.17		<0.34		<0.34		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW112	10/22/2009	<0.31		<0.6		<0.6		<0.6		<0.6		<0.6		<0.31		<0.6		<0.6		<0.6		<0.31		<0.76		<0.31		<0.31	
	MW112	4/7/2010	<0.26		<0.50		<0.50		<0.50		<0.50		<0.50		<0.26		<0.50		<0.50		<0.50		<0.26		<0.63		<0.26		<0.26	
	MW112	11/2/2010	<0.30		<0.58		<0.58		<0.58		<0.58		<0.58		<0.30		<0.58		<0.58		<0.58		<0.30		<0.73		<0.30		<0.30	
	MW112	4/20/2011	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.51		<0.21		<0.21	
	MW112	10/17/2011	<0.43		<0.43		<0.43		<0.83		<0.83		<0.83		<0.43		<0.83		<0.83		<0.83		<0.43		<1.0		<0.43		<0.43	
	MW113	5/13/2003	<0.42		<0.42 (0.046)		<0.85 (0.22)		<0.85		<0.85		<0.85		<0.42		<0.85		<0.85		<0.85		<0.42		<0.85		<0.42		<0.42	
	MW113	10/14/2003	<0.44		<0.44 (0.048)		<0.88 (0.23)		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW113	5/18/2004	<0.57		<0.57 (0.062)		<1.1 (0.3)		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW113	10/19/2004	<0.76		<0.76 (0.24)		<1.5 (0.28)		<1.5		<1.5		<1.5		<0.76		<1.5		<1.5		<1.5		<0.76		<1.5		<0.76		<0.76	
	MW113	7/18/2005	<0.42		<0.42		<0.85		<0.85		<0.85		<0.85		<0.42		<0.85		<0.85		<0.85		<0.42		<0.85		<0.42		<0.42	
	MW113	10/21/2005	<1.1		<1.1		<2.2		<2.2		<2.2		<2.2		<1.1		<2.2		<2.2		<2.2		<1.1		<2.2		<1.1		<1.1	
	MW113	5/4/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW113	10/11/2006	<0.57		<0.57		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW113	4/30/2007	<0.47		<0.47		<0.95		<0.95		<0.95		<0.95		<0.47		<0.95		<0.95		<0.95		<0.47		<0.95		<0.47		<0.47	
	MW113	10/12/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW113	5/8/2008	<0.57		<0.57		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW113	10/13/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW113	5/7/2009	<0.23		<0.44		<0.44		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.55		<0.23		<0.23	
	MW113	10/22/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW113	4/7/2010	<0.31		<0.61		<0.61		<0.61		<0.61		<0.61		<0.31		<0.61		<0.61		<0.61		<0.31		<0.77		<0.31		<0.31	
	MW113	11/2/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.55		<0.22		<0.22	
	MW113	4/20/2011	<0.19		<0.36		<0.36		<0.36		<0.36		<0.36		<0.19		<0.36		<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	MW113	10/17/2011	<0.46		<0.46		<0.46		<0.88		<0.88		<0.88		<0.46		<0.88		<0.88		<0.88		<0.46		<1.1		<0.46		<0.46	
M4	*Compliance*																													
	MW115	5/13/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW115	10/15/2003	<0.48		<0.48 (0.052)		<0.96 (0.26)		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW115	5/18/2004	<0.56		<0.56 (0.06)		<1.1 (0.3)		<1.1		<1.1		<1.1		<0.56		<1.1		<1.1		<1.1		<0.56		<1.1		<0.56		<0.56	
	MW115	10/19/2004	<0.73		<0.73 (0.23)		<1.5 (0.27)		<1.5		<1.5		<1.5		<0.73		<1.5		<1.5		<1.5		<0.73		<1.5		<0.73		<0.73	
	MW115	7/20/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW115	10/20/2005	<0.61		<0.61		<1.2		<1.2		<1.2		<1.2		<0.61		<1.2		<1.2		<1.2		<0.61		<1.2		<0.61		<0.61	
	MW115	5/3/2006	<0.42		<0.42		<0.83		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	MW115	10/11/2006	<0.77		<0.77		<1.5		<1.5		<1.5		<1.5		<0.77		<1.5		<1.5		<1.5		<0.77		<1.5		<0.77		<0.77	
	MW115	4/19/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW115	10/15/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW115	5/9/2008	<0.65		<0.65		<1.3		<1.3		<1.3		<1.3		<0.65		<1.3		<1.3		<1.3		<0.65		<1.3		<0.65		<0.65	
	MW115	10/13/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW115	5/8/2009	<0.28		<0.54		<0.54		<0.54		<0.54		<0.54		<0.28		<0.54		<0.54		<0.54		<0.28		<0.68		<0.28		<0.28	
	MW115	10/22/2009	<0.2		<0.39		<0.39		<0.39		<0.39		<0.39		<0.2		<0.39		<0.39		<0.39		<0.2		<0.49		<0.2		<0.2	
	MW115	4/8/2010	<0.26		<0.51		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW115	11/3/2010	<0.27		<0.52		<0.52		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.66		<0.27		<0.27	
	MW115	4/20/2011	<0.26		<0.51		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW115	10/17/2011	<0.27		<0.27		<0.27		<0.53		<0.53		<0.53		<0.27		<0.53		<0.53		<0.53		<0.27		<0.67		<0.27		<0.27	U / UJ

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
Other Areas	***Compliance***																													
	MW116	5/13/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW116	10/15/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW116	5/19/2004	<0.49		<0.49 (0.053)		<0.99 (0.26)		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW116	10/19/2004	<0.73		<0.73 (0.23)		<1.5 (0.27)		<1.5		<1.5		<1.5		<0.73		<1.5		<1.5		<1.5		<0.73		<1.5		<0.73		<0.73	
	MW116	7/14/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW116	10/20/2005	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW116	5/3/2006	<0.6		<0.6		<1.2		<1.2		<1.2		<1.2		<0.6		<1.2		<1.2		<1.2		<0.6		<1.2		<0.6		<0.6	
	MW116	10/11/2006	<0.9		<0.9		<1.8		<1.8		<1.8		<1.8		<0.9		<1.8		<1.8		<1.8		<0.9		<1.8		<0.9		<0.9	
	MW116	4/30/2007	<0.58		<0.58		<1.2		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW116	10/11/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW116	5/9/2008	<0.49		<0.49		<0.98		<0.98		<0.98		<0.98		<0.49		<0.98		<0.98		<0.98		<0.49		<0.98		<0.49		<0.49	
	MW116	5/8/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW116	10/22/2009	<0.27		<0.52		<0.52		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.66		<0.27		<0.27	
	MW116(DUP)	10/22/2009	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.55		<0.22		<0.22	
	MW116	4/8/2010	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW116	11/2/2010	<0.31		<0.59		<0.59		<0.59		<0.59		<0.59		<0.31		<0.59		<0.59		<0.59		<0.31		<0.75		<0.31		<0.31	
	MW116	4/19/2011	<0.24		<0.46		<0.46		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW116(DUP)	4/19/2011	<0.43		<0.84		<0.84		<0.84		<0.84		<0.84		<0.43		<0.84		<0.84		<0.84		<0.43		<1.1		<0.43		<0.43	
	MW116	10/17/2011	<0.33		<0.33		<0.33		<0.65		<0.65		<0.65		<0.33		<0.65		<0.65		<0.65		<0.33		<0.81		<0.33		<0.33	U / UJ
	MW117	5/13/2003	<0.65		<0.65 (0.070)		<1.3 (0.35)		<1.3		<1.3		<1.3		<0.65		<1.3		<1.3		<1.3		<0.65		<1.3		<0.65		<0.65	
	MW117	10/15/2003	<0.53		<0.53 (0.057)		<1.1 (0.28)		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		<0.53		<0.53	
	MW117	5/19/2004	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW117	10/19/2004	<0.64		<0.64 (0.2)		<1.3 (0.23)		<1.3		<1.3		<1.3		<0.64		<1.3		<1.3		<1.3		<0.64		<1.3		<0.64		<0.64	
	MW117	7/14/2005	<0.44		<0.44		<0.87		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	MW117	10/20/2005	<0.58		<0.58		<1.2		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW117	5/3/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW117	10/11/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW117	4/30/2007	<0.43		<0.43		<0.86		<0.86		<0.86		<0.86		<0.43		<0.86		<0.86		<0.86		<0.43		<0.86		<0.43		<0.43	
	MW117	10/11/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW117	5/9/2008	<0.44		<0.44		<0.87		<0.87		<0.87		<0.87		<0.44		1.4		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	MW117	5/8/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW117(DUP)	5/8/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW117	10/22/2009	<0.18		<0.35		<0.35		<0.35		<0.35		<0.35		<0.18		<0.35		<0.35		<0.35		<0.18		<0.44		<0.18		<0.18	
	MW117	4/8/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.54		<0.22		<0.22	
	MW117	11/1/2010	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW117(DUP)	11/1/2010	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52		<0.21		<0.21	
	MW117	4/20/2011	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW117(DUP)	4/20/2011	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW117	10/17/2011	<0.40		<0.40		<0.40		<0.77		<0.77		<0.77		<0.40		<0.77		<0.77		<0.77		<0.40		<0.97		<0.40		<0.40	U / UJ
	MW117	4/13/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31	U / UJ	<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW117	10/23/2012	<1.6	U / UJ	**2.6**	F / J	<3.1	U / UJ	<3.1	U / UJ	<3.1	U / UJ	<3.1	U / UJ	<1.6	U / UJ	24	/ J	<3.1	U / UJ	16	/ J	<1.6	U / UJ	<3.9	U / UJ	<1.6	U / UJ	<1.6	U / UJ
	MW118	5/13/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW118	10/16/2003	<0.51		<0.51 (0.055)		<1 (0.27)		<1		<1		<1		<0.51		<1		<1		<1		<0.51		<1		<0.51		<0.51	
	MW118	5/19/2004	<0.55		<0.55 (0.059)		<1.1 (0.29)		<1.1		<1.1		<1.1		<0.55		<1.1		<1.1		<1.1		<0.55		<1.1		<0.55		<0.55	
	MW118	10/22/2004	<0.48		<0.48 (0.15)		<0.96 (0.18)		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW118	7/13/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		0.77	U /
	MW118	10/19/2005	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW118	5/3/2006	<0.52		<0.52		<1		<1		<1		<1		<0.52		<1		<1		<1		<0.52		<1		<0.52		<0.52	
	MW118	10/11/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW118	4/30/2007	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	MW118	10/12/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW118	5/6/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW118	10/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW118	5/8/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW118	10/22/2009	<0.18		<0.34		<0.34		<0.34		<0.34		<0.34		<0.18		<0.34		<0.34		<0.34		<0.18		<0.43		<0.18		<0.18	
	MW118	4/8/2010	<0.23		<0.44		<0.44		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.56		<0.23		<0.23	
	MW118	11/2/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.55		<0.22		<0.22	
	MW118	4/20/2011	<0.18		<0.35		<0.35		<0.35		<0.35		<0.35		<0.18		<0.35		<0.35		<0.35		<0.18		<0.44		<0.18		<0.18	
	MW118	10/17/2011	<0.33		<0.33		<0.33		<0.65		<0.65		<0.65		<0.33		<0.65		<0.65		<0.65		<0.33		<0.81		<0.33		<0.33	U / UJ
	MW118	4/13/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31	U / UJ	<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW118	10/23/2012	<1.6	U / UJ	**2.3**	F / J	<3.1	U / UJ	<3.1	U / UJ	<3.1	U / UJ	<3.1	U / UJ	<1.6	U / UJ	20	/ J	<3.1	U / UJ	15	/ J	<1.6	U / UJ	<3.9	U / UJ	<1.6	U / UJ	<1.6	U / UJ

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
Other Areas	***Compliance***																													
	MW119	5/13/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW119	10/16/2003	<0.39		<0.39 (0.042)		<0.78 (0.21)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW119	5/19/2004	<0.68		<0.68 (0.073)		<1.4 (0.36)		<1.4		<1.4		<1.4		<0.68		<1.4		<1.4		<1.4		<0.68		<1.4		<0.68		<0.68	
	MW119	10/22/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW119	7/18/2005	<0.57		<0.57		<1.1		<1.1		<1.1		<1.1		<0.57		<1.1		<1.1		<1.1		<0.57		<1.1		<0.57		<0.57	
	MW119	10/21/2005	<0.52		<0.52		<1		<1		<1		<1		<0.52		<1		<1		<1		<0.52		<1		<0.52		<0.52	
	MW119	5/3/2006	<0.44		<0.44		<0.87		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	MW119	10/9/2006	<0.49		<0.49		<0.99		<0.99		<0.99		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW119	4/30/2007	<0.6		<0.6		<1.2		<1.2		<1.2		<1.2		<0.6		<1.2		<1.2		<1.2		<0.6		<1.2		<0.6		<0.6	
	MW119	10/10/2007	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW119(DUP)	10/10/2007	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	MW119	5/6/2008	<0.72		<0.72		<1.4		<1.4		<1.4		<1.4		<0.72		<1.4		<1.4		<1.4		<0.72		<1.4		<0.72		<0.72	
	MW119	10/15/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW119	5/7/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31 U / UJ		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW119	10/22/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW119	4/8/2010	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW119	11/2/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.55		<0.22		<0.22	
	MW119	4/20/2011	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW119	10/17/2011	<0.41		<0.41		<0.41		<0.80		<0.80		<0.80		<0.41		<0.80		<0.80		<0.80		<0.41		<1.0		<0.41		<0.41 U / UJ	
	MW119	4/13/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31 U / UJ		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW119	10/23/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
M13	***Upgradient***																													
	MW806	5/15/2008	<0.56		<0.56		<1.1		<1.1		<1.1		<1.1		<0.56		<1.1		<1.1		<1.1		<0.56		<1.1		<0.56		<0.56	
	MW806	8/19/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW806	10/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW806	2/4/2009	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW806	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW806	7/29/2009	<0.2		<0.38		<0.38		<0.38		<0.38		<0.38		<0.2		<0.38		<0.38		<0.38		<0.2		<0.48		<0.2		<0.2	
	MW806	10/28/2009	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.46		<0.19		<0.19	
	MW806	1/15/2010	<0.19		<0.36		<0.36		<0.36		<0.36		<0.36		<0.19		<0.36		<0.36		<0.36		<0.19		<0.46		<0.19		<0.19	
	MW806	4/14/2010	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW806	7/21/2010	<0.27		<0.52		<0.52		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.65		<0.27		<0.27	
	MW806	10/28/2010	<0.25		<0.49		<0.49		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	
	MW806	1/27/2011	<0.25		<0.49		<0.49		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	
	MW806	4/19/2011	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW806	7/28/2011	<0.22		<0.22		<0.22		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW806	10/12/2011	<0.31		<0.31		<0.31		<0.61		<0.61		<0.61		<0.31		<0.61		<0.61		<0.61		<0.31		<0.77		<0.31		<0.31 U / UJ	
	MW806	2/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW806	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW806	7/17/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW806	10/24/2012	<0.16		**1.4**		**0.96**		<0.31		<0.31		<0.31		<0.16		5.5		<0.31		5		<0.16		<0.39		<0.16		<0.16	
	MW807	5/15/2008	<0.41		<0.41		<0.82		<0.82		<0.82		<0.82		<0.41		<0.82		<0.82		<0.82		<0.41		<0.82		<0.41		<0.41	
	MW807(DUP)	5/15/2008	<0.83		<0.83		<1.7		<1.7		<1.7		<1.7		<0.83		<1.7		<1.7		<1.7		<0.83		<1.7		<0.83		<0.83	
	MW807	8/19/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW807(DUP)	8/19/2008	<0.41		<0.41		<0.82		<0.82		<0.82		<0.82		<0.41		<0.82		<0.82		<0.82		<0.41		<0.82		<0.41		<0.41	
	MW807	10/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW807	2/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW807	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW807	7/29/2009	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW807	10/28/2009	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW807	1/15/2010	<0.32		<0.61		<0.61		<0.61		<0.61		<0.61		<0.32		<0.61		<0.61		<0.61		<0.32		<0.77		<0.32		<0.32	
	MW807	4/14/2010	<0.17		<0.34		<0.34		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW807	7/21/2010	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW807	10/28/2010	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.50		<0.21		<0.21	
	MW807	1/27/2011	<0.25		<0.48		<0.48		<0.48		<0.48		<0.48		<0.25		<0.48		<0.48		<0.48		<0.25		<0.60		<0.25		<0.25	
	MW807	4/19/2011	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW807	7/28/2011	<0.22		<0.22		<0.22		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53 U / UJ		<0.22		<0.22	
	MW807	10/12/2011	<0.23		<0.23		<0.23		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.55		<0.23		<0.23	
	MW807	2/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW807	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16 U / UJ	
	MW807	7/17/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW807	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M13	*Downgradient*																													
	AEHA14R	5/15/2008	<0.62		<0.62		<1.2		<1.2		<1.2		<1.2		<0.62		<1.2		<1.2		<1.2		<0.62		<1.2		<0.62		<0.62	
	AEHA14R	8/20/2008	<0.48		<0.48		<0.96		<0.96		1.3		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	AEHA14R	10/22/2008	<0.39		<0.39		<0.78		0.9		1.5		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	AEHA14R	2/5/2009	<0.23		<0.44		<0.44		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.56		<0.23		<0.23	
	AEHA14R	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	AEHA14R	7/29/2009	<0.16		<0.32		<0.32		0.65		1		<0.32		<0.16		<0.32		<0.32		<0.32		<0.16		<0.4		<0.16		<0.16	
	AEHA14R	10/29/2009	<0.26		<0.50		<0.50		0.78		1.2		<0.50		<0.26		<0.50		<0.50		<0.50		<0.26		<0.62		<0.26		<0.26	
	AEHA14R	1/14/2010	<0.20		<0.38		<0.38		0.54		0.85		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	AEHA14R	4/13/2010	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		0.67	
	AEHA14R	7/21/2010	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	AEHA14R	10/29/2010	<0.30		<0.57		<0.57		0.47	F /	0.82		<0.57		<0.30		<0.57		<0.57		<0.57		<0.30		<0.72		<0.30		<0.30	
	AEHA14R	1/28/2011	<0.30		<0.57		<0.57		0.59		0.9		<0.57		<0.30		<0.57		<0.57		<0.57		<0.30		<0.72		<0.30		<0.30	
	AEHA14R	4/18/2011	<0.21		<0.40		<0.40		0.46		0.69		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.50		<0.21		<0.21	
	AEHA14R	7/28/2011	<0.29		<0.29		<0.29		0.59		0.87		<0.55		<0.29		<0.55		<0.55		<0.55		<0.29		<0.70		<0.29		<0.29	
	AEHA14R	10/13/2011	<0.30		<0.30		<0.30		<0.59		<0.59		<0.59		<0.30		<0.59		<0.59		<0.59		<0.30		<0.74		<0.30		<0.30	
	AEHA14R	3/1/2012	<0.16		<0.31		<0.31		0.79		1.1		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	AEHA15	5/20/2008	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	AEHA15	8/20/2008	<0.44		<0.44		<0.88		<0.88		1.3		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	AEHA15	10/22/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	AEHA15	2/5/2009	<0.16		<0.32		<0.32		<0.32		<0.32		<0.32		<0.16		<0.32		<0.32		<0.32		<0.16		<0.40		<0.16		<0.16	
	AEHA15	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	AEHA15	7/29/2009	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.47		<0.19		<0.19	
	AEHA15(DUP)	7/29/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	AEHA15	10/29/2009	<0.18		<0.36		<0.36		<0.36		<0.36		<0.36		<0.18		<0.36		0.35	F / U	<0.36		<0.18		<0.45		<0.18		<0.18	
	AEHA15	1/14/2010	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.47		<0.19		<0.19	
	AEHA15	4/14/2010	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.51		<0.21		<0.21	
	AEHA15	7/21/2010	<0.25		<0.49		<0.49		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	
	AEHA15	10/29/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		0.13	F /
	AEHA15	1/28/2011	<0.26		<0.50		<0.50		<0.50		<0.50		<0.50		<0.26		<0.50		<0.50		<0.50		<0.26		<0.62		<0.26		<0.26	
	AEHA15	4/18/2011	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.47		<0.19		<0.19	
	AEHA15	7/28/2011	<0.24		<0.24		<0.24		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	AEHA15	10/12/2011	<0.28		<0.28		<0.28		<0.54		<0.54		<0.54		<0.28		<0.54		<0.54		<0.54		<0.28		<0.68		<0.28		<0.28	
	AEHA15	3/1/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW126	10/21/2004	<0.39		<0.39 (0.12)		<0.78 (0.14)		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW126R	2/4/2004	<0.42		<0.42 (0.046)		<0.85 (0.22)		<0.85		<0.85		<0.85		<0.42		<0.85		<0.85		<0.85		<0.42		<0.85		<0.42		<0.42	
	MW126R	5/25/2004	<0.58		<0.58 (0.063)		<1.2 (0.31)		<1.2		<1.2		<1.2		<0.58		<1.2		<1.2		<1.2		<0.58		<1.2		<0.58		<0.58	
	MW126R(DUP)	5/25/2004	<0.85		<0.85 (0.091)		<1.7 (0.45)		<1.7		<1.7		<1.7		<0.85		<1.7		<1.7		<1.7		<0.85		<1.7		<0.85		<0.85	
	MW126R	7/22/2005	<0.48		<0.48		<0.96		<0.96		<0.96		<0.96		<0.48		<0.96		<0.96		<0.96		<0.48		<0.96		<0.48		<0.48	
	MW126R	10/20/2005	<0.7		<0.7		<1.4		<1.4		<1.4		<1.4		<0.7		<1.4		<1.4		<1.4		<0.7		<1.4		<0.7		<0.7	
	MW126R	5/4/2006	<0.64		<0.64		<1.3		<1.3		<1.3		<1.3		<0.64		<1.3		<1.3		<1.3		<0.64		<1.3		<0.64		<0.64	
	MW126R	10/17/2006	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW126R	4/26/2007	<0.56		<0.56		<1.1		<1.1		<1.1		<1.1		<0.56		<1.1		<1.1		<1.1		<0.56		<1.1		<0.56		<0.56	
	MW126R	10/12/2007	<0.45		<0.45		<0.9		<0.9		<0.9		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW126R	5/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW126R	8/20/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW126R	10/22/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW126R	2/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW126R	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW126R	7/28/2009	<0.26		<0.51		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW126R	10/29/2009	<0.23		<0.45		<0.45		<0.45		<0.45		<0.45		<0.23		<0.45		<0.45		<0.45		<0.23		<0.57		<0.23		<0.23	
	MW126R	1/14/2010	<0.29		<0.55		<0.55		<0.55		<0.55		<0.55		<0.29		<0.55		<0.55		<0.55		<0.29		<0.70		<0.29		<0.29	
	MW126R	4/14/2010	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW126R(DUP)	4/14/2010	<0.51		<0.98		<0.98		<0.98		<0.98		<0.98		<0.51		<0.98		<0.98		<0.98		<0.51		<1.2		<0.51		<0.51	
	MW126R	7/20/2010	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW126R	10/28/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.54		<0.22		<0.22	
	MW126R	1/28/2011	<0.27		<0.52		<0.52		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.65		<0.27		<0.27	
	MW126R	4/19/2011	<0.46		<0.90		<0.90		<0.90		<0.90		<0.90		<0.46		<0.90		<0.90		<0.90		<0.46		<1.1		<0.46		<0.46	
	MW126R	7/28/2011	<0.28		<0.28		<0.28		<0.54		<0.54		<0.54		<0.28		<0.54		<0.54		<0.54		<0.28		<0.68	U / UJ	<0.28		<0.28	
	MW126R	10/13/2011	<0.31		<0.31		<0.31		<0.61		<0.61		<0.61		<0.31		<0.61		<0.61		<0.61		<0.31		<0.77		<0.31		<0.31	
	MW126R	2/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW126R	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		0.35		<0.31		0.3	F /	<0.16		<0.39		<0.16		<0.16	
	MW126R	7/17/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW126R	10/25/2012	<0.16		**1.1**		**0.62**		<0.31		<0.31		<0.31		<0.16		2.1		0.17	F / J	2.4		<0.16		<0.39		0.22		<0.16	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	*Downgradient*																													
	MW362	2/3/2004	<0.39		**5.7**		<0.78 (0.21)		1.6		1.3		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW362	5/25/2004	<0.71		**1.9**		<1.4 (0.38)		2.1		1.7		<1.4		<0.71		<1.4		<1.4		<1.4		<0.71		<1.4		<0.71		<0.71	
	MW362	10/21/2004	<0.39		**8.1**		**0.88**		2.1		1.7		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW362	7/21/2005	<0.54		**6.9**		<1.1		1.9		1.5		<1.1		<0.54		<1.1		<1.1		<1.1		<0.54		<1.1		<0.54		<0.54	
	MW362	10/24/2005	<0.6		<0.6		<1.2		<1.2		<1.2		<1.2		<0.6		<1.2		<1.2		<1.2		<0.6		<1.2		<0.6		<0.6	
	MW362	5/4/2006	<0.39		<0.39		**0.8**		2		1.7		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW362	10/18/2006	<0.53		<0.53		<1.1		<1.1		<1.1		<1.1		<0.53		<1.1		<1.1		<1.1		<0.53		<1.1		<0.53		<0.53	
	MW362	4/26/2007	<0.42		<0.42		<0.85		1.8		1.6		<0.85		<0.42		<0.85		<0.85		<0.85		<0.42		<0.85		<0.42		<0.42	
	MW362(DUP)	4/26/2007	<0.49		<0.49		<0.99		1.9		1.6		<0.99		<0.49		<0.99		<0.99		<0.99		<0.49		<0.99		<0.49		<0.49	
	MW362	10/12/2007	<0.39		**6.7**		<0.78		1.8		1.5		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW362	5/13/2008	<0.45		<0.45		<0.9		1.3		1.1		<0.9		<0.45		<0.9		<0.9		<0.9		<0.45		<0.9		<0.45		<0.45	
	MW362	8/20/2008	<0.44		<0.44		<0.88		<0.88		<0.88		<0.88		<0.44		<0.88		<0.88		<0.88		<0.44		<0.88		<0.44		<0.44	
	MW362	10/22/2008	<0.39		**0.55**		<0.78		1.1		0.91		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW362	2/5/2009	<0.16		**7.1**		<0.31		1.5		1.2		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW362	5/5/2009	<0.16		<0.31		<0.31		0.94		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW362	7/28/2009	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW362	10/29/2009	<0.17		**4.3**		0.42		0.96		0.75		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW362	1/14/2010	<0.30		**6.5**		<0.58		1.4		1.1		<0.58		<0.30		<0.58		<0.58		<0.58		<0.30		<0.73		<0.30		<0.30	
	MW362(DUP)	1/14/2010	<0.19		**6.4**		<0.37		1.3		1.1		<0.37		<0.19		<0.37		<0.37		<0.37		<0.19		<0.47		<0.19		<0.19	
	MW362	4/14/2010	<0.24		**5**		<0.47		1.6		1.3		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW362	7/20/2010	<0.22		**3.3**		<0.42		1.6		1.3		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW362	10/28/2010	<0.25		**7.2**		<0.48		1.7		1.3		<0.48		<0.25		<0.48		<0.48		<0.48		<0.25		<0.60		<0.25		<0.25	
	MW362	1/28/2011	<0.23		**7.5**		**0.78**		1.9		1.7		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.56		<0.23		<0.23	
	MW362	4/19/2011	<0.18		**3.2**		**1.2**		1.7		1.4		<0.34		<0.18		<0.34		<0.34		<0.34		<0.18		<0.43		<0.18		<0.18	
	MW362	7/28/2011	<0.44		**3.3**		**0.65**		1.4		1.2		<0.85		<0.44		<0.85		<0.85		<0.85		**4.8**		<1.1	U / UJ	<0.44		<0.44	
	MW362	10/13/2011	<0.26		**2.9**		0.36		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW362	2/29/2012	<0.16		**1.5**		<0.31		0.83		0.78		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW362	4/16/2012	<0.16		**4.9**		<0.31		1.2		1.1		<0.31		<0.16		0.24	F / J	<0.31		<0.31	U / UJ	<0.16		<0.39		<0.16		0.073	F /
	MW362(DUP)	4/16/2012	<0.16		**5.4**		<0.31		1.2		1		<0.31		<0.16		2	/ J	0.19	F /	1.9	/ J	<0.16		<0.39		<0.16		0.097	F /
	MW362	7/17/2012	<0.16		**3.6**		**0.68**		1.6		1.3		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW362	10/25/2012	<0.16		**6.7**		**1**		1.4		0.97		<0.31		<0.16		1.6		0.16	F /	1.9		**13**		<0.39		<0.16		0.08	F /
	MW808	5/15/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW808	8/19/2008	<0.44		<0.44		<0.87		<0.87		<0.87		<0.87		<0.44		<0.87		<0.87		<0.87		<0.44		<0.87		<0.44		<0.44	
	MW808	10/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW808(DUP)	10/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW808	2/4/2009	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.51		<0.21		<0.21	
	MW808(DUP)	2/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808(DUP)	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	7/29/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	10/29/2009	<0.18		<0.35		<0.35		<0.35		<0.35		<0.35		<0.18		<0.35		<0.35		<0.35		<0.18		<0.44		<0.18		<0.18	
	MW808	1/15/2010	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW808	4/13/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	7/20/2010	<0.28		<0.54		<0.54		<0.54		<0.54		<0.54		<0.28		<0.54		<0.54		<0.54		<0.28		<0.68		<0.28		<0.28	
	MW808(DUP)	7/20/2010	<0.19		<0.38		<0.38		<0.38		<0.38		<0.38		<0.19		<0.38		<0.38		<0.38		<0.19		<0.47		<0.19		<0.19	
	MW808	10/29/2010	<0.40		<0.78		<0.78		<0.78		<0.78		<0.78		<0.40		<0.78		<0.78		<0.78		<0.40		<0.98		<0.40		<0.40	
	MW808	1/27/2011	<0.24		<0.46		<0.46		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW808(DUP)	1/27/2011	<0.30		<0.58		<0.58		<0.58		<0.58		<0.58		<0.30		<0.58		<0.58		<0.58		<0.30		<0.73		<0.30		<0.30	
	MW808	4/18/2011	<0.20		<0.38		<0.38		<0.38		<0.38		<0.38		<0.20		<0.38		<0.38		<0.38		<0.20		<0.48		<0.20		<0.20	
	MW808(DUP)	4/18/2011	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.54		<0.22		<0.22	
	MW808	7/28/2011	<0.25		<0.25		<0.25		<0.48		<0.48		<0.48		<0.25		<0.48		<0.48		<0.48		<0.25		<0.60		<0.25		<0.25	
	MW808(DUP)	7/28/2011	<0.24		<0.24		<0.24		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW808	10/12/2011	<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.19		<0.38		<0.38		<0.38		<0.19		<0.47		<0.19		<0.19	
	MW808	2/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	7/18/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808(DUP)	7/18/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW808	10/25/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

TABLE A1-13

Summary of Analytical Results - Explosives
Groundwater Remediation Unit 2
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	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***																													
	MW809	5/15/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW809	8/19/2008	<0.4		<0.4		<0.81		<0.81		<0.81		<0.81		<0.4		<0.81		<0.81		<0.81		<0.4		<0.81		<0.4		<0.4	
	MW809	10/21/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW809	2/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	7/29/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	10/29/2009	<0.25		<0.49		<0.49		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	
	MW809(DUP)	10/29/2009	<0.22		<0.42		<0.42		<0.42		<0.42		<0.42		<0.22		<0.42		<0.42		<0.42		<0.22		<0.53		<0.22		<0.22	
	MW809	1/15/2010	<0.22		<0.43		<0.43		<0.43		<0.43		<0.43		<0.22		<0.43		<0.43		<0.43		<0.22		<0.54		<0.22		<0.22	
	MW809	4/13/2010	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	7/20/2010	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW809	10/29/2010	<0.24		<0.46		<0.46		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW809(DUP)	10/29/2010	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW809	1/27/2011	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52		<0.21		<0.21	
	MW809	4/19/2011	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW809	7/28/2011	<0.23		<0.23		<0.23		<0.44		<0.44		<0.44		<0.23		<0.44		<0.44		<0.44		<0.23		<0.55		<0.23		<0.23	
	MW809	10/12/2011	<0.26		<0.26		<0.26		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		<0.26		<0.64		<0.26		<0.26	
	MW809(DUP)	10/12/2011	<0.24		<0.24		<0.24		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW809	2/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809(DUP)	2/29/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	7/18/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809	10/25/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW809(DUP)	10/25/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

Footnotes:
(1) Project Action Limits (Remedial Goal, {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Preventive Action Limit (Remedial Goal {RG}) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
B = Blank contamination
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate

1,3-DNB = 1,3-Dinitrobenzene
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
2-A-4,6-DNT = 2-amino-4,6-Dinitrotoluene
4-A-2,6-DNT = 4-amino-2,6-Dinitrotoluene
HMX = High Melting Explosive
NB = Nitrobenzene
2-NT = 2-Nitrotoluene
3-NT = 3 Nitrotoluene
4-NT = 4-Nitrotoluene
RDX = Royal Demolition Explosive
1,3,5-TNB = 1,3,5-Trinitrobenzene
2,4,6-TNT = 2,4,6-Trinitrotoluene

The laboratory is aware of instances where the MRL for 2,4- and 2,6-DNT exceeded the RG. However, this does not affect protectiveness.

TABLE A1-14

Summary of Analytical Results - Metals
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Analyte			Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Iron (Dissolved)		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
	Project Action Limit[(1)]		mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
	Surface Water RG		mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	**Well**	**Date**	**Units**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
	MW123R	5/8/2008	mg/L	<0.2		<0.02		<0.01		0.029		<0.002		120		<0.01		0.0047	F /	<0.01		4.1		NA		<0.005		55		0.37		NA		<0.0002		0.0066	F /	1.4		<0.005		21		<0.005		0.0091	F /
	MW123R	10/20/2008	mg/L	<0.2		<0.02		0.011		0.034		<0.002		120		<0.01		0.0041	F /	0.00086	F /	7.1		NA		0.0021	F /	55		0.33		NA		<0.0002		0.0084	F /	1.4		<0.005		17		0.0046	F /	0.03	
	MW123R(DUP)	10/20/2008	mg/L	<0.2		<0.02		0.011		0.033		<0.002		120		<0.01		0.0042	F /	<0.01		7		NA		<0.005		55		0.33		NA		<0.0002		0.0082	F /	1.4		<0.005		18		0.0048	F /	0.037	
	MW123R	10/26/2009	mg/L	NA		NA		NA		NA		<0.002		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
	MW123R	4/8/2010	mg/L	NA		NA		NA		NA		<0.0020		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M13	***Upgradient***																																														
	MW806	5/15/2008	mg/L	<0.2		<0.02		<0.01		0.095		<0.002		80		<0.01		<0.005		<0.01		<0.15		NA		<0.005		46		0.053		NA		<0.0002		<0.01		2.8		<0.005		24		<0.005		0.013	F /
	MW806	8/19/2008	mg/L	<0.2		<0.02		<0.01		0.093		<0.002		78		<0.01		<0.005		0.0012	F /	0.058	F /	NA		<0.005		46		0.051		NA		<0.0002		<0.01		2.3		<0.005		25		0.002	F /	0.0047	F /
	MW806	10/21/2008	mg/L	0.016	F /	<0.02		<0.01		0.1		<0.002		77		<0.01		<0.005		<0.01		0.61		NA		0.0032	F /	46		0.038		NA		<0.0002		<0.01		2		<0.005		24		0.0043	F /	0.024	
	MW806	2/4/2009	mg/L	<0.20		<0.020		<0.010		0.094		<0.0020		77		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		46		0.013		NA		<0.0002		<0.010		1.9	/ J	<0.0050		24		0.0041	F /	<0.020	F / U
	MW806	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.099		<0.0020		77		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		44		<0.010		NA		<0.0002		<0.010		2.1		<0.0050		28		<0.0050		<0.020	
	MW806	7/29/2009	mg/L	<0.2		0.0027	F /	<0.01		0.091		<0.002		78		<0.01		0.0018	F /	<0.01		0.12		NA		0.0058	/ U	46		0.077		NA		<0.0002		<0.01		1.9	/ J	<0.005		24		0.0032	F /	<0.02	
	MW806	10/28/2009	mg/L	<0.20		<0.020		<0.010		0.093		<0.0020		75		<0.010		<0.0050		<0.010		0.26		NA		<0.0050		44		0.03		NA		<0.0002		<0.010		1.9	/ J	<0.0050		23		0.0024	F /	<0.020	
	MW806	1/15/2010	mg/L	<0.20		<0.020		<0.010		0.093		<0.0020		73		<0.010		0.0043	F /	<0.010		<0.10		NA		<0.0050		45		0.0061	F /	NA		<0.0002		0.0014	F /	1.9	/ J	<0.0050		24		0.0035	F /	<0.020	
	MW806	4/14/2010	mg/L	<0.20		<0.020		<0.010		0.098		<0.0020		82		<0.010		<0.0050		0.001	F /	<0.20		NA		<0.0050		49		0.00057	F /	NA		<0.0002		<0.010		2	/ J	<0.0050		25		0.0036	F /	<0.020	
	MW806	7/21/2010	mg/L	<0.20		<0.020		<0.010		0.092		<0.0020		83		<0.010		<0.0050		<0.010		0.11	F / U	NA		<0.0050		48		0.06		NA		<0.0002		<0.010		1.8		<0.0050		25		0.003	F /	0.005	F / U
	MW806	10/28/2010	mg/L	<0.20		<0.020		<0.010		0.099		0.00045	F / U	77		<0.010		<0.0050		<0.010		0.79		NA		<0.0050		44		0.021		NA		<0.0002		<0.010		1.9		<0.0050		25		<0.0050		0.0035	F /
	MW806	1/27/2011	mg/L	0.083	F /	<0.020		<0.010		0.085		<0.0020		72		<0.010		<0.0050		0.0015	F /	<0.20		NA		<0.0050		43	/ J	0.0073	F /	NA		<0.0002		<0.010		2.3		<0.0050		27	/ J	0.0019	F /	0.036	
	MW806	4/19/2011	mg/L	<0.20		0.0029	F /	<0.010		0.095		0.001	F / U	80		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		45		0.001	F /	NA		<0.0002		<0.010		2		<0.0050		26		<0.0050		0.011	F /
	MW806	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.096		0.00069	F / U	77		<0.010		<0.0050		<0.010		0.27		NA		<0.0050		44		0.063		NA		<0.0002		<0.010		1.8		<0.0050		25		<0.0050		<0.020	
	MW806	10/12/2011	mg/L	<0.20		<0.020		<0.010		0.091		0.00098	F /	75		<0.010		<0.0050		<0.010		0.68		NA		<0.0050		43		0.032		NA		<0.0002		<0.010		1.8		<0.0050		24		<0.0050		<0.020	
	MW806	2/29/2012	mg/L	<0.20		<0.020		<0.010		0.096		<0.0020		76		0.001	F /	<0.0050		<0.010		<0.20		NA		<0.0050		46		0.0017	F /	NA		<0.20		<0.010		2.1	/ J	<0.0050		24		0.0031	F /	<0.020	
	MW806	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.082		0.00068	F /	68		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		40	/ J	0.0024	F /	NA		<0.20	U / UJ	<0.010		1.6		<0.0050		22	/ J	<0.0050		0.013	F /
	MW806	7/17/2012	mg/L	<0.2		<0.02		<0.01		0.1		0.00078	F /	81		<0.01		<0.005		0.0014	F /	0.65		NA		<0.005		46		0.025		NA		U / R		<0.01		1.9		<0.005		24		<0.005		<0.02	
	MW806	10/24/2012	mg/L	<0.2		<0.02		<0.01		0.097		0.00097	F /	79		<0.01		<0.005		0.0013	F /	0.089	F /	NA		<0.005		45		0.021		NA		<0.2		<0.01		1.9		<0.005		26		<0.005		<0.02	
	MW807	5/15/2008	mg/L	0.02	F /	<0.02		<0.01		0.094		<0.002		180		<0.01		0.0024	F /	<0.01		0.69		NA		<0.005		86		0.14		NA		<0.0002		0.0056	F /	15		<0.005		310		0.0017	F /	0.11	
	MW807(DUP)	5/15/2008	mg/L	0.018	F /	<0.02		<0.01		0.089		<0.002		170		<0.01		0.0017	F /	<0.01		0.55		NA		<0.005		81		0.13		NA		<0.0002		0.0045	F /	13		<0.005		300		0.0019	F /	0.1	
	MW807	8/19/2008	mg/L	<0.2		<0.02		<0.01		0.023		<0.002		43		<0.01		<0.005		0.0036	F /	<0.15		NA		<0.005		21		<0.01		NA		<0.0002		0.0051	F /	13		<0.005		66		0.0017	F /	0.013	F /
	MW807(DUP)	8/19/2008	mg/L	<0.2		<0.02		<0.01		0.021		<0.002		40		<0.01		<0.005		0.0024	F /	<0.15		NA		<0.005		19		0.0029	F /	NA		<0.0002		0.0038	F /	12		<0.005		65		<0.005		0.011	F /
	MW807	10/21/2008	mg/L	<0.2		<0.02		<0.01		0.1		<0.002		190		<0.01		0.0014	F /	<0.01		0.77		NA		<0.005		91		0.11		NA		<0.0002		0.0031	F /	11		<0.005		350		0.0062		0.019	F /
	MW807	2/4/2009	mg/L	0.018	F /	<0.020		<0.010		0.096		<0.0020		180		<0.010		0.0013	F /	<0.010		1.3		NA		<0.0050		91		0.079		NA		<0.0002		<0.010		14	/ J	<0.0050		330		0.0049	F /	<0.020	
	MW807	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.095		<0.0020		180		<0.010		0.00053	F /	<0.010		1.1		NA		<0.0050		87		0.083		NA		<0.0002		<0.010		9.1		<0.0050		350		<0.0050		<0.020	
	MW807	7/29/2009	mg/L	<0.2		0.0028	F /	<0.01		0.097		<0.002		190		<0.01		0.0012	F /	<0.01		1.1		NA		<0.005		97		0.096		NA		<0.0002		0.0021	F /	14	/ J	<0.005		400		0.0041	F /	<0.02	
	MW807	10/28/2009	mg/L	<0.20		<0.020		<0.010		0.11		<0.0020		190		<0.010		0.00044	F /	<0.010		1		NA		<0.0050		97		0.097		NA		<0.0002		0.002	F /	13	/ J	<0.0050		390		0.004	F /	0.018	F / U
	MW807	1/15/2010	mg/L	<0.20		<0.020		<0.010		0.095		<0.0020		180		<0.010		0.0034	F /	<0.010		1.3		NA		<0.0050		91		0.079		NA		<0.0002		0.0021	F /	15	/ J	<0.0050		410		0.0046	F /	<0.020	
	MW807	4/14/2010	mg/L	<0.20		<0.020		<0.010		0.1		<0.0020		200		<0.010		<0.0050		<0.010		1.3		NA		<0.0050		100		0.08		NA		<0.0002		<0.010		15	/ J	<0.0050		410		0.004	F /	<0.020	
	MW807	7/21/2010	mg/L	<0.20		<0.020		<0.010		0.094		<0.0020		190		<0.010		<0.0050		<0.010		0.98		NA		<0.0050		96		0.096		NA		<0.0002		0.0021	F /	14		<0.0050		380		0.0034	F /	0.0036	F / U
	MW807	10/28/2010	mg/L	<0.20		0.0039	F /	<0.010		0.087		0.00084	F / U	170		<0.010		<0.0050		0.0016	F /	1.1		NA		<0.0050		86		0.069		NA		<0.0002		<0.010		9.9		<0.0050		370		<0.0050		<0.020	
	MW807	1/27/2011	mg/L	<0.20		<0.020		<0.010		0.085		<0.0020		170		<0.010		<0.0050		<0.010		1.1		NA		<0.0050		82	/ J	0.068		NA		<0.0002		<0.010		15		<0.0050		360	/ J	0.0033	F /	<0.020	
	MW807	4/19/2011	mg/L	<0.20		0.0097	F /	<0.010		0.09		0.0011	F / U	180		0.0022	F /	<0.0050		0.0032	F /	0.91		NA		0.0037	F /	84		0.1		NA		<0.0002		<0.010		8.3		<0.0050		380		0.0022	F /	0.017	F /
	MW807	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.093		0.001	F / U	180		<0.010		<0.0050		<0.010		1		NA		<0.0050		90		0.086		NA		<0.0002		0.0016	F /	9.5		<0.0050		400		<0.0050		<0.020	
	MW807	10/12/2011	mg/L	<0.20		0.0032	F /	<0.010		0.089		0.00099	F /	180		<0.010		<0.0050		0.0029	F /	0.81		NA		<0.0050		88		0.097		NA		<0.0002		<0.010		8.6		<0.0050		410		<0.0050		<0.020	
	MW807	2/29/2012	mg/L	0.026	F /	0.003	F / U	<0.010		0.097		<0.0020		180		<0.010		<0.0050		<0.010		0.82		NA		0.0017	F / U	89		0.092		NA		<0.20		0.0021	F /	14	/ J	<0.0050		400		0.004	F /	<0.020	
	MW807	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.088		0.00098	F /	160		<0.010		<0.0050		<0.010		0.59		NA		<0.0050		79	/ J	0.11		NA		<0.20	U / UJ	0.0025	F /	7.2		<0.0050		380	/ J	<0.0050		0.0095	F /
	MW807	7/17/2012	mg/L	<0.2		0.0031	F /	<0.01		0.095		0.0012	F /	180		<0.01		<0.005		0.0022	F /	0.2		NA		<0.005		89		0.15		NA		U / R		0.0025	F /	7.6		<0.005		390		<0.005		<0.02	
	MW807	10/24/2012	mg/L	<0.2		0.0033	F /	<0.01		0.094		0.0009	F /	180		<0.01		<0.005		0.0014	F /	0.5		NA		<0.005		90		0.12		NA		<0.2		0.0021	F /	7.6		<0.005		390		<0.005		<0.02	

TABLE A1-14

Summary of Analytical Results - Metals
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Analyte		Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Iron (Dissolved)		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
	Project Action Limit[(1)]	mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
	Surface Water RG	mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	**Well**	**Date**	**Units**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13																																													
																									Downgradient																					
	AEHA14R	5/15/2008	mg/L	<0.2		<0.02		<0.01		0.12		<0.002		180		<0.01		<0.005		<0.01		<0.15		NA		<0.005		82		0.0056	F /	NA		<0.0002		<0.01		5.7		<0.005		120		0.0015	F /	0.051	
	AEHA14R	8/20/2008	mg/L	<0.2		<0.02		<0.01		0.00066	F /	<0.002		3.8		<0.01		<0.005		<0.01		<0.15		NA		<0.005		1		<0.01		NA		<0.0002		<0.01		0.11	F /	<0.005		2.1		<0.005		0.0088	F /
	AEHA14R	10/22/2008	mg/L	0.027	F /	<0.02		<0.01		0.00094	F /	<0.002		0.061	F /	<0.01		<0.005		0.0051	F /	0.033	F /	NA		0.0027	F /	<0.1		<0.01		NA		<0.0002		<0.01		<0.5		<0.005		<1		<0.005		0.0062	F /
	AEHA14R	2/5/2009	mg/L	0.029	F /	<0.020		<0.010		0.14		<0.0020		210		<0.010		<0.0050		<0.010		<0.10	F / U	NA		<0.0050		94		0.019		NA		<0.0002		<0.010		6.1	/ J	<0.0050		150		0.0053		<0.020	F / U
	AEHA14R	5/4/2009	mg/L	0.22		<0.020		<0.010		0.11		<0.0020		170		<0.010		0.00043	F /	0.0031	F /	0.22		NA		<0.0050		74		0.01		NA		<0.0002		<0.010		5.2		<0.0050		120		<0.0050		<0.020	
	AEHA14R	7/29/2009	mg/L	0.12	F /	<0.02		<0.01		0.11		<0.002		170		<0.01		0.001	F /	<0.01		0.11		NA		<0.005		75		0.025		NA		<0.0002		0.0021	F /	6.6	/ J	<0.005		91		0.004	F /	<0.02	
	AEHA14R	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.093		<0.0020		120		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		55		0.014		NA		<0.0002		<0.010		4.8	/ J	<0.0050		64		0.003	F /	<0.020	
	AEHA14R	1/14/2010	mg/L	<0.20		0.0036	F / U	<0.010		0.084		<0.0020		120		<0.010		0.0039	F /	<0.010		<0.10		NA		<0.0050		54		0.012		NA		<0.0002		0.002	F /	3.8	/ J	<0.0050		65		0.0046	F /	<0.020	
	AEHA14R	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.075		<0.0020		110		<0.010		0.0019	F /	0.0014	F /	<0.20		NA		<0.0050		48		0.0027	F /	NA		<0.0002		<0.010		3.4	/ J	<0.0050		79		0.003	F /	<0.020	
	AEHA14R	7/21/2010	mg/L	<0.20		<0.020		<0.010		0.12		<0.0020		150		<0.010		<0.0050		0.003	F /	<0.20		NA		<0.0050		65		0.0063	F /	NA		<0.0002		<0.010		5.6		0.00093	F /	110		0.0027	F /	0.0089	F / U
	AEHA14R	10/29/2010	mg/L	<0.20		<0.020		<0.010		0.12		0.00074	F / U	140		<0.010		<0.0050		0.0018	F /	0.04	F /	NA		<0.0050		62		0.0053	F /	NA		<0.0002		<0.010		5.1		<0.0050		120		<0.0050		0.0043	F /
	AEHA14R	1/28/2011	mg/L	<0.20		<0.020		<0.010		0.1		<0.0020		130		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		57		<0.010		NA		<0.0002		<0.010		6.1	/ J	<0.0050		130		0.0025	F /	<0.020	
	AEHA14R	4/18/2011	mg/L	<0.20		0.003	F /	<0.010		0.07		0.0012	F / U	150		<0.010		<0.0050		0.0023	F /	<0.20		NA		<0.0050		68		<0.010		NA		<0.0002		<0.010		6.1		<0.0050		110		<0.0050		0.021	
	AEHA14R	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.096		0.00086	F / U	150		<0.010		<0.0050		0.0017	F /	<0.20		NA		<0.0050		67		0.0015	F /	NA		<0.0002		<0.010		13		<0.0050		95		<0.0050		<0.020	
	AEHA14R	10/13/2011	mg/L	<0.20		<0.020		<0.010		0.081		0.00095	F /	120		<0.010		<0.0050		0.0019	F /	<0.20		NA		<0.0050		51		0.0011	F /	NA		<0.0002		<0.010		9.8		<0.0050		48		<0.0050		<0.020	
	AEHA14R	3/1/2012	mg/L	0.027	F /	<0.020		<0.010		0.089		<0.0020		110		<0.010		<0.0050		0.0012	F /	<0.20		NA		<0.0050		50		0.0019	F /	NA		<0.20		<0.010		12		<0.0050		50		0.0029	F /	<0.020	
	AEHA15	5/20/2008	mg/L	<0.2		0.0052	F /	<0.01		0.059		<0.002		55		<0.01		<0.005		0.0019	F /	<0.15		NA		<0.005		35		<0.01		NA		<0.0002		<0.01		1.4		<0.005		19		<0.005		0.011	F /
	AEHA15	8/20/2008	mg/L	<0.2		<0.02		<0.01		<0.01		<0.002		3.5		<0.01		<0.005		<0.01		<0.15		NA		<0.005		0.93		<0.01		NA		<0.0002		<0.01		0.09	F /	<0.005		2		<0.005		0.0052	F /
	AEHA15	10/22/2008	mg/L	0.029	F /	<0.02		<0.01		0.00035	F /	<0.002		0.079	F /	<0.01		<0.005		0.005	F /	0.05	F /	NA		0.0034	F /	<0.1		<0.01		NA		<0.0002		<0.01		<0.5		<0.005		<1		<0.005		0.009	F /
	AEHA15	2/5/2009	mg/L	<0.20		<0.020		<0.010		0.064		<0.0020		56		<0.010		<0.0050		<0.010		<0.10	F / U	NA		<0.0050		36		0.032		NA		<0.0002		<0.010		1.3	/ J	<0.0050		19		0.0028	F /	<0.020	F / U
	AEHA15	5/4/2009	mg/L	<0.20		<0.020		<0.010		0.064		<0.0020		59		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		36		0.0077	F /	NA		<0.0002		<0.010		1.4		<0.0050		22		<0.0050		<0.020	
	AEHA15	7/29/2009	mg/L	3		<0.02		<0.01		0.083		<0.002		130	/ J	0.0054	F /	0.0061		0.011		**7.3**		NA		0.0076	/ U	77		0.61	/ J	NA		<0.0002		0.0097	F /	3	/ J	<0.005		21		0.0098		0.014	F /
	AEHA15(DUP)	7/29/2009	mg/L	3.2		<0.02		0.0024	F /	0.079		<0.002		100	/ J	0.0057	F /	0.0061		0.0096	F /	**6.5**		NA		0.0057	/ U	61		0.45	/ J	NA		<0.0002		0.0095	F /	3	/ J	<0.005		20		0.0091		0.015	F /
	AEHA15	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.064		<0.0020		51		<0.010		0.00066	F /	<0.010		0.84		NA		<0.0050		34		0.12		NA		<0.0002		<0.010		1.1	/ J	<0.0050		18		0.0016	F /	<0.020	
	AEHA15	1/14/2010	mg/L	<0.20		0.0024	F / U	<0.010		0.064		<0.0020		52		<0.010		0.00074	F / U	<0.010		0.56		NA		<0.0050		35		0.065		NA		<0.0002		<0.010		1.2	/ J	<0.0050		18		0.0026	F /	<0.020	
	AEHA15	4/14/2010	mg/L	0.022	F /	<0.020		<0.010		0.059		<0.0020		57		<0.010		<0.0050		0.0013	F /	0.042	F /	NA		<0.0050		37		0.0043	F /	NA		<0.0002		<0.010		1.2	/ J	<0.0050		19		0.0025	F /	0.0038	F /
	AEHA15	7/21/2010	mg/L	<0.20		<0.020		<0.010		0.056		<0.0020		56		<0.010		<0.0050		<0.010		0.12	F / U	NA		<0.0050		35		0.084		NA		<0.0002		0.0016	F /	1.1		<0.0050		18		0.0018	F /	0.011	F / U
	AEHA15	10/29/2010	mg/L	0.05	F /	<0.020		<0.010		0.066		0.00069	F / U	56		<0.010		<0.0050		<0.010		1.1		NA		<0.0050		35		0.072		NA		0.000059	F / J	<0.010		1.3		<0.0050		21		<0.0050		<0.020	
	AEHA15	1/28/2011	mg/L	0.044	F /	<0.020		<0.010		0.062		<0.0020		55		<0.010		<0.0050		<0.010		0.69		NA		<0.0050		35		0.05		NA		<0.0002		<0.010		1.4	/ J	<0.0050		18		0.0021	F /	0.0067	F /
	AEHA15	4/18/2011	mg/L	<0.20		<0.020		<0.010		0.061		0.001	F / U	56		<0.010		<0.0050		<0.010		0.047	F /	NA		<0.0050		35		0.0014	F /	NA		<0.0002		<0.010		1.6		<0.0050		21		<0.0050		0.013	F /
	AEHA15	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.065		0.00076	F / U	58		<0.010		<0.0050		<0.010		0.062	F /	NA		<0.0050		37		0.22		NA		<0.0002		<0.010		1.3		<0.0050		21		<0.0050		<0.020	
	AEHA15	10/12/2011	mg/L	<0.20		0.0028	F /	<0.010		0.06		0.00079	F /	55		<0.010		<0.0050		0.0016	F /	0.73		NA		<0.0050		35		0.075		NA		<0.0002		<0.010		1.2		<0.0050		19		<0.0050		<0.020	
	AEHA15	3/1/2012	mg/L	5.7		<0.020		0.0076	F /	0.1		<0.0020		140		0.0088	F /	0.0066		0.013		**15**		NA		0.012		77		0.54		NA		<0.20		0.013		4.6		<0.0050		20		0.014		0.029	
	MW126R	5/20/2008	mg/L	<0.2		0.0052	F /	<0.01		0.058		<0.002		71		<0.01		<0.005		0.0024	F /	<0.15		NA		0.0018	F /	46		0.0041	F /	NA		<0.0002		<0.01		2.6		<0.005		25		<0.005		0.011	F /
	MW126R	8/20/2008	mg/L	<0.2		<0.02		<0.01		<0.01		<0.002		3.4		<0.01		<0.005		0.0012	F /	<0.15		NA		<0.005		0.91		<0.01		NA		<0.0002		<0.01		0.082	F /	<0.005		2		<0.005		0.0042	F /
	MW126R	10/22/2008	mg/L	0.02	F /	<0.02		<0.01		0.00087	F /	<0.002		0.08	F /	<0.01		<0.005		0.0049	F /	0.039	F /	NA		0.0028	F /	<0.1		<0.01		NA		<0.0002		<0.01		<0.5		<0.005		<1		<0.005		0.0058	F /
	MW126R	2/5/2009	mg/L	<0.20		<0.020		<0.010		0.055		<0.0020		68		<0.010		<0.0050		<0.010		<0.10	F / U	NA		<0.0050		43		0.0089	F /	NA		<0.0002		<0.010		2.2	/ J	<0.0050		24		0.0033	F /	<0.020	F / U
	MW126R	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.056		<0.0020		73		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		43		0.0069	F /	NA		<0.0002		<0.010		2		<0.0050		27		<0.0050		<0.020	
	MW126R	7/28/2009	mg/L	<0.20		<0.020		<0.010		0.058		<0.0020		72		<0.010		<0.0050		<0.010		0.18		NA		<0.0050		45		0.022		NA		<0.0002		<0.010		2.2		<0.0050		27	/ J	0.0024	F /	<0.020	
	MW126R	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.066		<0.0020		79		<0.010		<0.0050		<0.010		0.052	F /	NA		<0.0050		46		0.03		NA		<0.0002		<0.010		2.6	/ J	<0.0050		30		0.003	F /	<0.020	
	MW126R	1/14/2010	mg/L	<0.20		0.0039	F / U	<0.010		0.13		<0.0020		120		<0.010		0.0026	F / U	<0.010		<0.10		NA		<0.0050		64		0.022		NA		<0.0002		0.0022	F /	4.5	/ J	<0.0050		140		0.0041	F /	<0.020	
	MW126R	4/14/2010	mg/L	<0.20		<0.020		<0.010		0.099		<0.0020		97		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		49		0.00056	F /	NA		<0.0002		<0.010		4.1	/ J	<0.0050		200		0.0032	F /	<0.020	
	MW126R(DUP)	4/14/2010	mg/L	<0.20		<0.020		<0.010		0.098		<0.0020		97		<0.010		<0.0050		0.0013	F /	<0.20		NA		<0.0050		50		<0.010		NA		<0.0002		<0.010		3.9	/ J	<0.0050		200		0.0025	F /	<0.020	
	MW126R	7/20/2010	mg/L	<0.20		<0.020		<0.010		0.064		<0.0020		77		0.0015	F /	<0.0050		<0.010		0.091	F / U	NA		<0.0050		45		0.03		NA		<0.0002		0.0018	F /	2.3		0.0009	F /	47		0.0027	F /	0.0068	F / U
	MW126R	10/28/2010	mg/L	<0.20		<0.020		<0.010		0.086		0.00066	F / U	92		<0.010		<0.0050		0.0032	F /	<0.20		NA		<0.0050		45		0.015		NA		<0.0002		<0.010		3.3		<0.0050		46		<0.0050		0.0051	F /
	MW126R	1/28/2011	mg/L	<0.20		<0.020		<0.010		0.069		<0.0020		78		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		44		0.0058	F /	NA		<0.0002		<0.010		3	/ J	<0.0050		38		0.0021	F /	<0.020	
	MW126R	4/19/2011	mg/L	<0.20		<0.020		<0.010		0.062		0.00099	F / U	75		<0.010		<0.0050		0.0014	F /	<0.20		NA		<0.0050		44		0.0027	F /	NA		<0.0002		<0.010		2.5		<0.0050		42		<0.0050		0.021	
	MW126R	7/28/2011	mg/L	<0.20		0.0034	F /	<0.010		0.058		0.00089	F / U	72		<0.010		<0.0050		<0.010		0.14	F /	NA		<0.0050		43		0.025		NA		<0.0002		<0.010		2		<0.0050		32		<0.0050		<0.020	
	MW126R	10/13/2011	mg/L	<0.20		<0.020		<0.010		0.057		0.00091	F /	68		<0.010		<0.0050		0.064		0.19	F /	NA		<0.0050		43		0.027		NA		<0.0002		<0.010		2.3		<0.0050		28		<0.0050		0.04	
	MW126R	2/29/2012	mg/L	<0.20		<0.020		<0.010		0.055		<0.0020		67		<0.010		<0.0050		<0.010		<0.20		NA		0.0016	F / U	43		0.0088	F /	NA		<0.20		<0.010		2.4	/ J	<0.0050		26		0.0029	F /	<0.020	
	MW126R	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.048		0.00078	F /	61		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		39	/ J	0.0032	F /	NA		<0.20	U / UJ	0.0022	F /	2		<0.0050		25	/ J	<0.0050		0.009	F /
	MW126R	7/17/2012	mg/L	<0.2		<0.02		<0.01		0.054		0.00079	F /	69		<0.01		<0.005		0.0014	F /	0.12	F /	NA		<0.005		43		0.019		NA		U / R		<0.01		2.2		<0.005		24		<0.005		<0.02	
	MW126R	10/25/2012	mg/L	<0.2		0.0036	F / U	<0.01		0.058		<0.002		70		0.0011	F / U	<0.005		<0.01		0.88		NA		<0.005		44		0.023		NA		<0.2		<0.01		2.4		<0.005		24		0.004	F /	<0.02	
	MW362	5/13/2008	mg/L	0.032	F /	<0.02		<0.01		0.045		<0.002		140		<0.01		<0.005		<0.01		<0.15		NA		<0.005		91		0.041		NA		<0.0002		<0.01		7.9		<0.005		160		0.0012	F /	0.046	
	MW362	8/20/2008	mg/L	<0.2		<0.02		<0.01		<0.01		<0.002		3.4		<0.01		<0.005		<0.01		<0.15		NA		<0.005		0.92		<0.01		NA		<0.0002		<0.01		0.087	F /	<0.005		2		<0.005		0.0049	F /
	MW362	10/22/2008	mg/L	<0.2		<0.02		<0.01		0.046		<0.002		170		<0.01		0.0013	F /	<0.01		<0.15		NA		<0.005		99		0.11		NA		<0.0002		0.0049	F /	7.5		<0.005		150		0.0056		0.016	F /
	MW362	2/5/2009	mg/L	0.017	F /	<0.020		<0.010		0.048		<0.0020		170		<0.010		0.0014	F /	<0.010		<0.10	F / U	NA		<0.0050		97		0.17		NA		<0.0002		0.0037	F /	7.7	/ J	<0.0050		190		0.0056		<0.020	F / U
	MW362	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.041		<0.0020		150		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		89		0.016		NA		<0.0002		<0.010		5.8		<0.0050		150		<0.0050		<0.020	
	MW362	7/28/2009	mg/L	<0.20		<0.020		<0.010		0.043		<0.0020		160		<0.010		0.0025	F /	<0.010		<0.10		NA		<0.0050		97		0.059		NA		<0.0002		0.0033	F /	7.7		<0.0050		160	/ J	0.0045	F /	<0.020	
	MW362	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.048		<0.0020		170		<0.010		0.0008	F /	<0.010		<0.10		NA		<0.0050		100		0.17		NA		<0.0002		0.0042	F /	7.9	/ J	<0.0050		180		0.0037	F /	<0.020	
	MW362	1/14/2010	mg/L	<0.20		<0.020		<0.010		0.048		<0.0020		160		<0.010		0.00098	F / U	<0.010		<0.10		NA		<0.0050		97		0.18		NA		<0.0002		0.0046	F /	8.2	/ J	<0.0050		220		0.004	F /	<0.020	
	MW362(DUP)	1/14/2010	mg/L	<0.20		<0.020		<0.010		0.048		<0.0020		160		<0.010		0.004	F /	<0.010		<0.10		NA		<0.0050		99		0.18		NA		<0.0002		0.005	F /	8.3	/ J	<0.0050		220		0.0044	F /	<0.020	
	MW362	4/14/2010	mg/L	<0.20		<0.020		<0.010		0.051		<0.0020		180		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		110		0.088		NA		<0.0002		0.0036	F /	8.9	/ J	<0.0050		250		0.0045	F /	<0.020	
	MW362	7/20/2010	mg/L	<0.20		<0.020		<0.010		0.049		<0.0020		180		<0.010		<0.0050		<0.010		0.17	F / U	NA		<0.0050		110		0.072		NA		<0.0002		0.0029	F /	6.5		0.00094	F /	280		0.0032	F /	0.0075	F / U
	MW362	10/28/2010	mg/L	<0.20		<0.020		<0.010		0.053		0.00059	F / U	180		<0.010		<0.0050		0.002	F /	0.088	F /	NA		<0.0050		100		0.18		NA		<0.0002		0.0031	F /	7		<0.0050		300		<0.0050		<0.020	
	MW362	1/28/2011	mg/L	<0.20		<0.020		<0.010		0.054		<0.0020		180		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		100		0.23		NA		<0.0002		0.004	F /	11	/ J	<0.0050		340		0.0034	F /	<0.020	
	MW362	4/19/2011	mg/L	<0.20		0.0032	F /	<0.010		0.05		0.0014	F / U	180		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		100		0.077		NA		<0.0002		0.001	F /	6.8		<0.0050		290		<0.0050		0.013	F /
	MW362	7/28/2011	mg/L	<0.20		0.0034	F /	<0.010		0.047		0.001	F / U	180		<0.010		<0.0050		0.0016	F /	<0.20		NA		<0.0050		100		0.083		NA		<0.0002		0.0029	F /	6.7		<0.0050		260		<0.0050		<0.020	
	MW362	10/13/2011	mg/L	<0.20		<0.020		<0.010		0.043		0.0012	F /	160		<0.010		0.00058	F /	<0.010		<0.20		NA		<0.0050		99		0.083		NA		<0.0002		0.0029	F /	6.2		<0.0050		220		<0.0050		<0.020	
	MW362	2/29/2012	mg/L	<0.20		0.0035	F / U	<0.010		0.044		<0.0020		160		0.001	F /	0.0011	F /	<0.010		<0.20		NA		0.0016	F / U	100		0.043		NA		<0.20		0.0044	F /	8.5	/ J	<0.0050		180		0.0047	F /	<0.020	
	MW362	4/16/2012	mg/L	0.034	F /	<0.020		<0.010		0.041		0.00098	F /	150		<0.010		<0.0050		<0.010		0.14	F /	NA		<0.0050		89	/ J	0.078		NA		<0.20	U / UJ	0.0042	F /	5.8		<0.0050		200	/ J	<0.0050		<0.020	
	MW362(DUP)	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.042		0.001	F /	150		<0.010		<0.0050		<0.010		0.38		NA		<0.0050		93	/ J	0.078		NA		<0.20	U / UJ	0.0063	F /	6		<0.0050		210	/ J	<0.0050		0.011	F /
	MW362	7/17/2012	mg/L	<0.2		0.0032	F /	<0.01		0.048		0.0011	F /	180		<0.01		<0.005		0.0022	F /	<0.2		NA		<0.005		100		0.096		NA		U / R		0.0035	F /	7		<0.005		270		<0.005		<0.02	
	MW362	10/25/2012	mg/L	<0.2		<0.02		<0.01		0.05		<0.002		180		<0.01		0.0011	F /	<0.01		<0.2		NA		<0.005		110		0.18		NA		<0.2		0.0051	F /	7.1		<0.005		300		0.0046	F /	<0.02	

TABLE A1-14

Summary of Analytical Results - Metals
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

		Analyte		Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Iron (Dissolved)		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
	Project Action Limit[1]		mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
	Surface Water RG		mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	Well	Date	Units	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M13																						*Downgradient*																									
	MW808	5/15/2008	mg/L	0.018	F /	<0.02		<0.01		0.18		<0.002		180		<0.01		0.0073		0.0014	F /	0.042	F /	NA		<0.005		78		0.9		NA		<0.0002		0.019		3.6		<0.005		130		<0.005		0.057	
	MW808	8/19/2008	mg/L	<0.2		<0.02		<0.01		0.19		<0.002		190		<0.01		0.0062		0.00084	F /	<0.15		NA		<0.005		84		1.1		NA		<0.0002		0.021		4.3		<0.005		140		0.0021	F /	0.0058	F /
	MW808	10/21/2008	mg/L	<0.2		<0.02		<0.01		0.17		<0.002		150		<0.01		0.013		<0.01		0.96		NA		<0.005		65		1.2		NA		<0.0002		0.021		2.6		<0.005		57		0.005		0.044	
	MW808(DUP)	10/21/2008	mg/L	0.021	F /	<0.02		<0.01		0.17		<0.002		150		<0.01		0.014		<0.01		0.95		NA		0.0019	F /	65		1.2		NA		0.0001	F /	0.021		2.6		<0.005		56		0.0056		0.052	
	MW808	2/4/2009	mg/L	0.02	F /	<0.020		<0.010		0.27		<0.0020		190		<0.010		0.03		<0.010		2.8		NA		<0.0050		89		2.4		NA		<0.0002		0.054		2.9	/ J	<0.0050		120		0.005		<0.020	F / U
	MW808(DUP)	2/4/2009	mg/L	0.018	F /	<0.020		<0.010		0.25		<0.0020		180		<0.010		0.029		<0.010		2.7		NA		<0.0050		85		2.3		NA		<0.0002		0.052		2.7	/ J	<0.0050		120		0.0049	F /	<0.020	F / U
	MW808	5/4/2009	mg/L	<0.20		<0.020		<0.010		0.24		<0.0020		200		<0.010		0.0093		<0.010		0.1		NA		<0.0050		85		1.5		NA		<0.0002		0.014		5.8		<0.0050		200		<0.0050		<0.020	
	MW808(DUP)	5/4/2009	mg/L	<0.20		<0.020		<0.010		0.25		<0.0020		210		<0.010		0.01		<0.010		0.087	F /	NA		<0.0050		89		1.6		NA		<0.0002		0.015		6.3		<0.0050		220		<0.0050		<0.020	
	MW808	7/29/2009	mg/L	<0.2		<0.02		<0.01		0.19		<0.002		180		<0.01		0.018		<0.01		1.8		NA		0.0036	F / U	77		1.6		NA		<0.0002		0.019		4.5	/ J	<0.005		98		0.0038	F /	<0.02	
	MW808	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.2		<0.0020		150		<0.010		0.015		<0.010		4.3		NA		<0.0050		72		1.5		NA		<0.0002		0.025		5.2	/ J	<0.0050		84		0.0035	F /	<0.020	
	MW808	1/15/2010	mg/L	<0.20		0.0024	F / U	<0.010		0.18		<0.0020		130		<0.010		0.019		<0.010		2.2		NA		<0.0050		65		1.4		NA		<0.0002		0.026		5.4	/ J	<0.0050		96		0.0031	F /	<0.020	
	MW808	4/13/2010	mg/L	<0.20		<0.020		0.002	F /	0.19		<0.0020		140		<0.010		0.019		<0.010		**7.9**		NA		<0.0050		72		1.3		NA		<0.0002		0.03		5.4		<0.0050		53		0.0031	F /	<0.020	
	MW808	7/20/2010	mg/L	<0.20		<0.020		0.0042	F /	0.19		<0.0020		130		<0.010		0.018		<0.010		**7.8**		NA		0.0017	F /	74		1.1		NA		<0.0002		0.031		5.8		0.0013	F /	96		0.0032	F /	0.015	F / U
	MW808(DUP)	7/20/2010	mg/L	<0.20		<0.020		0.0038	F /	0.19		<0.0020		130		<0.010		0.018		<0.010		**7.9**		NA		0.0018	F /	74		1.1		NA		<0.0002		0.03		5.8		<0.0050		97		0.0035	F /	0.012	F / U
	MW808	10/29/2010	mg/L	0.029	F /	0.0035	F /	<0.010		0.16		0.00081	F / U	120		<0.010		0.0082		<0.010		1.1		NA		<0.0050		60		1.3		NA		<0.0002		0.018		5.2		<0.0050		85		<0.0050		<0.020	
	MW808	1/27/2011	mg/L	<0.20		<0.020		<0.010		0.17		<0.0020		130		<0.010		0.0058		<0.010		0.31		NA		<0.0050		68	/ J	2		NA		<0.0002		0.023		6.2		<0.0050		75	/ J	0.002	F /	<0.020	
	MW808(DUP)	1/27/2011	mg/L	<0.20		<0.020		<0.010		0.17		<0.0020		130		<0.010		0.0061		<0.010		0.4		NA		<0.0050		68	/ J	2		NA		<0.0002		0.023		6.3		<0.0050		75	/ J	0.0025	F /	<0.020	
	MW808	4/18/2011	mg/L	<0.20		0.0041	F /	<0.010		0.2		0.0012	F / U	180		<0.010		0.037		<0.010		4.5		NA		<0.0050		100		1.9		NA		<0.0002		0.036		6.2		<0.0050		74		<0.0050		0.015	F /
	MW808(DUP)	4/18/2011	mg/L	<0.20		0.0038	F /	<0.010		0.2		0.0012	F / U	180		<0.010		0.038		<0.010		4.7		NA		<0.0050		100		1.9		NA		<0.0002		0.036		6.2		<0.0050		77		<0.0050		0.015	F /
	MW808	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.17		0.001	F / U	150		<0.010		0.0067		<0.010		0.23		NA		<0.0050		61		1.2		NA		<0.0002		0.013		5.2		<0.0050		120		<0.0050		<0.020	
	MW808(DUP)	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.18		0.0011	F / U	160		<0.010		0.0072		0.0019	F /	0.23		NA		<0.0050		66		1.3		NA		<0.0002		0.013		5.6		0.00099	F /	120		<0.0050		<0.020	
	MW808	10/12/2011	mg/L	<0.20		<0.020		<0.010		0.17		0.00094	F /	140		<0.010		0.015		0.0018	F /	5		NA		<0.0050		67		1.2		NA		<0.0002		0.021		6.4		<0.0050		88		<0.0050		<0.020	
	MW808	2/29/2012	mg/L	<0.20		0.0033	F / U	<0.010		0.16		<0.0020		120		<0.010		0.0082		<0.010		1.7		NA		<0.0050		67		0.55		NA		<0.20		0.022		11	/ J	<0.0050		61		0.004	F /	0.0066	F /
	MW808	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.14		0.00081	F /	100		<0.010		0.016		0.0011	F /	2.6		NA		<0.0050		59	/ J	0.89		NA		<0.20	U / UJ	0.026		8.3		<0.0050		56	/ J	<0.0050		0.0069	F /
	MW808	7/18/2012	mg/L	<0.2		<0.02		<0.01		0.23		0.00099	F /	140		<0.01		0.022		0.0019	F /	4.2		NA		<0.005		77		1.1		NA			U / R	0.028		15		<0.005		85		<0.005		<0.02	
	MW808(DUP)	7/18/2012	mg/L	<0.2		<0.02		<0.01		0.23		0.0011	F /	140		<0.01		0.021		0.0017	F /	3.9		NA		<0.005		77		1.1		NA			U / R	0.028		16		<0.005		85		<0.005		<0.02	
	MW808	10/25/2012	mg/L	<0.2		0.0034	F / U	<0.01		0.22		<0.002		150		0.0010	F / U	0.021		<0.01		3		NA		<0.005		86		1.4		NA		<0.2		0.029		12		<0.005		80		0.0052		<0.02	
	MW809	5/15/2008	mg/L	<0.2		<0.02		<0.01		0.029		<0.002		39		<0.01		<0.005		<0.01		<0.15		NA		<0.005		31		0.0056	F /	NA		<0.0002		0.0027	F /	3.7		<0.005		18		<0.005		0.041	
	MW809	8/19/2008	mg/L	<0.2		<0.02		<0.01		0.028		<0.002		41		<0.01		<0.005		0.0015	F /	<0.15		NA		<0.005		33		0.003	F /	NA		<0.0002		<0.01		4.2		<0.005		20		0.0013	F /	0.0074	F /
	MW809	10/21/2008	mg/L	0.019	F /	<0.02		<0.01		0.032		<0.002		40		<0.01		<0.005		<0.01		<0.15		NA		0.0022	F /	32		0.027		NA		<0.002		<0.01		3.6		<0.005		20		0.0035	F /	0.024	
	MW809	2/5/2009	mg/L	<0.20		<0.020		<0.010		0.028		<0.0020		41		<0.010		0.0014	F /	<0.010		0.24		NA		<0.0050		32		0.025		NA		<0.0002		<0.010		3.7	/ J	<0.0050		20		0.0024	F /	<0.020	F / U
	MW809	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.037		<0.0020		44		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		34		0.0022	F /	NA		<0.0002		<0.010		3.9		<0.0050		25		<0.0050		<0.020	
	MW809	7/29/2009	mg/L	<0.2		<0.02		<0.01		0.032		<0.002		45		<0.01		0.00082	F /	<0.01		<0.1		NA		<0.005		35		0.0023	F /	NA		<0.0002		<0.01		3.5	/ J	<0.005		21		0.0028	F /	<0.02	
	MW809	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.032		<0.0020		43		<0.010		0.0022	F /	<0.010		<0.10		NA		<0.0050		34		0.023		NA		<0.0002		<0.010		3.2	/ J	<0.0050		21		0.0021	F /	<0.020	
	MW809(DUP)	10/29/2009	mg/L	<0.20		<0.020		<0.010		0.031		<0.0020		42		<0.010		<0.0050		<0.010		<0.10		NA		<0.0050		33		0.019		NA		<0.0002		<0.010		3.1	/ J	<0.0050		20		0.0019	F /	<0.020	
	MW809	1/15/2010	mg/L	<0.20		0.0026	F / U	<0.010		0.029		<0.0020		44		<0.010		0.0044	F /	<0.010		0.097	F /	NA		<0.0050		33		0.041		NA		<0.0002		0.0024	F /	3.5	/ J	0.0014	F /	20		0.0031	F /	<0.020	
	MW809	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.033		<0.0020		43		<0.010		<0.0050		<0.010		0.067	F /	NA		<0.0050		34		0.0091	F /	NA		<0.0002		<0.010		3.1		<0.0050		20		0.002	F /	<0.020	
	MW809	7/20/2010	mg/L	<0.20		<0.020		<0.010		0.033		<0.0020		45		<0.010		<0.0050		0.0017	F /	0.2	/ U	NA		<0.0050		34		0.034		NA		<0.0002		0.002	F /	2.8		0.0011	F /	21		0.0023	F /	0.013	F / U
	MW809	10/29/2010	mg/L	<0.20		<0.020		<0.010		0.029		0.00069	F / U	42		<0.010		<0.0050		<0.010		<0.20		NA		0.002	F /	31		0.0086	F /	NA		<0.0002		<0.010		3.1		<0.0050		21		<0.0050		<0.020	
	MW809(DUP)	10/29/2010	mg/L	<0.20		<0.020		<0.010		0.028		0.00052	F / U	41		<0.010		<0.0050		<0.010		0.047	F /	NA		0.002	F /	30		0.0085	F /	NA		<0.0002		<0.010		3		<0.0050		21		<0.0050		0.0045	F /
	MW809	1/27/2011	mg/L	<0.20		<0.020		<0.010		0.026		<0.0020		41		<0.010		<0.0050		<0.010		0.15	F /	NA		<0.0050		31	/ J	0.02		NA		<0.0002		<0.010		3.4		<0.0050		19	/ J	0.0017	F /	<0.020	
	MW809	4/19/2011	mg/L	<0.20		<0.020		<0.010		0.026		0.00091	F / U	45		<0.010		<0.0050		<0.010		0.66		NA		<0.0050		32		0.019		NA		<0.0002		<0.010		3.6		<0.0050		21		<0.0050		0.016	F /
	MW809	7/28/2011	mg/L	<0.20		<0.020		<0.010		0.029		0.00062	F / U	42		<0.010		<0.0050		<0.010		0.045	F /	NA		<0.0050		31		0.0016	F /	NA		<0.0002		<0.010		2.9		<0.0050		21		<0.0050		<0.020	
	MW809	10/12/2011	mg/L	<0.20		0.0033	F /	<0.010		0.029		0.00076	F /	41		<0.010		<0.0050		<0.010		0.08	F /	NA		<0.0050		30		0.0024	F /	NA		<0.0002		<0.010		2.6		<0.0050		20		<0.0050		<0.020	
	MW809(DUP)	10/12/2011	mg/L	<0.20		<0.020		<0.010		0.028		0.00081	F /	40		<0.010		<0.0050		0.0015	F /	<0.20		NA		<0.0050		30		0.0023	F /	NA		<0.0002		<0.010		2.5		<0.0050		20		<0.0050		<0.020	
	MW809	2/29/2012	mg/L	<0.20		0.0028	F / U	<0.010		0.031		<0.0020		41		<0.010		<0.0050		<0.010		<0.20		NA		<0.0050		31		0.0055	F /	NA		<0.20		<0.010		2.6	/ J	<0.0050		19		0.0022	F /	<0.020	
	MW809(DUP)	2/29/2012	mg/L	<0.20		0.0031	F / U	<0.010		0.031		<0.0020		40		<0.010		<0.0050		<0.010		<0.20		NA		0.0016	F / U	31		0.0059	F /	NA		<0.20		<0.010		2.6	/ J	<0.0050		19		0.0024	F /	<0.020	
	MW809	4/16/2012	mg/L	0.028	F /	<0.020		<0.010		0.028		0.00065	F /	38		<0.010		<0.0050		<0.010		0.094	F /	NA		<0.0050		29	/ J	0.0024	F /	NA		<0.20	U / UJ	0.0044	F /	2.4		<0.0050		19	/ J	<0.0050		0.0073	F /
	MW809	7/18/2012	mg/L	<0.2		<0.02		<0.01		0.029		0.00075	F /	43		<0.01		<0.005		0.0014	F /	<0.2		NA		<0.005		32		0.0018	F /	NA			U / R	<0.01		2.6		<0.005		20		<0.005		<0.02	
	MW809	10/25/2012	mg/L	<0.2		<0.02		<0.01		0.029		<0.002		43		<0.01		<0.005		<0.01		<0.2		NA		<0.005		33		0.0038	F /	NA		<0.2		<0.01		2.8		<0.005		19		0.0029	F /	<0.02	
	MW809(DUP)	10/25/2012	mg/L	<0.2		0.0027	F / U	<0.01		0.029		<0.002		43		0.0019	F / U	<0.005		<0.01		<0.2		NA		<0.005		33		0.0038	F /	NA		<0.2		<0.01		2.8		<0.005		19		0.0029	F /	<0.02	

Footnotes:
(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
An abbreviated list of analytes is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance

< = Result shows laboratory Method Reporting Limit for non-detected results
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate

TABLE A1-15

Summary of Analytical Results - Volatile Organic Compounds
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M13	***Upgradient***																																							
	MW806	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW806	8/19/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW806	10/21/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW806	2/4/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	7/29/2009	<5		<1		<5	U / UJ	<1		<1		<1		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	MW806	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	1/15/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	4/14/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	7/21/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW806	1/27/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW806	4/19/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.6	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW806	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW806	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW806	2/29/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW806	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW806	7/17/2012		U / R	<1		<5		<1			U / R	<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW806	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW807	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW807(DUP)	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW807	8/19/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW807(DUP)	8/19/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW807	10/21/2008	<10		<1		<5		<1		<1		1.3		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW807	2/4/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		1.2		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	1.5		<1.0		0.79	F /	NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	7/29/2009	<5		<1		<5	U / UJ	<1		<1		1.5		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	MW807	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	1.5		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	1/15/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		1.5		<1.0		0.76	F /	NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	4/14/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		1.6		<1.0		0.66	F /	NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	7/21/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	1.6		<1.0		0.85	F /	NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		1.7		<1.0		0.81	F /	NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW807	1/27/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW807	4/19/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	1.6		<1.0		0.94	F /	NA		<1.0		2.6	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW807	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		1.6		<1.0		0.76	F /	NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW807	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	1.7		<1.0		0.95	F /	NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW807	2/29/2012	<5.0		<1.0		2.4	F /	<1.0		<1.0	U / UJ	1.4		<1.0		0.79	F /	NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW807	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW807	7/17/2012		U / R	<1		<5		<1			U / R	1.5		<1		1.1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW807	10/24/2012	<5		<1		<5		<1		<1		1.5		<1		1		NA		<1		<3		<5		<1		<1		<1		<1		0.23	F /	<1		<1	
	Downgradient																																							
	AEHA14R	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	AEHA14R	8/20/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	AEHA14R	10/22/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	AEHA14R	2/5/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	7/29/2009	<5		<1		<5	U / UJ	<1		<1		<1		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	AEHA14R	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	1/14/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	4/13/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	7/21/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		0.51	F /	<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	10/29/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA14R	1/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	AEHA14R	4/18/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		4.4	/ U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	AEHA14R	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	AEHA14R	10/13/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		0.51	F /	<1.0		<1.0		<1.0		<1.0		<1.0	
	AEHA14R	3/1/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0	

TABLE A1-15

Summary of Analytical Results - Volatile Organic Compounds
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M13	***Downgradient***																																							
	AEHA15	5/20/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	AEHA15	8/20/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	AEHA15	10/22/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	AEHA15	2/5/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	7/29/2009	<5		<1		<5	U / UJ	<1		<1		<1		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	AEHA15(DUP)	7/29/2009	<5		<1		<5	U / UJ	<1		<1		<1		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	AEHA15	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	1/14/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	4/14/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	7/21/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	10/29/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	AEHA15	1/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	AEHA15	4/18/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.7	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	AEHA15	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	AEHA15	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	AEHA15	3/1/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0	
	MW126R	5/20/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW126R	8/20/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW126R	10/22/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW126R	2/5/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		1.2	/ J	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	7/28/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	1/14/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	4/14/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R(DUP)	4/14/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	7/20/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW126R	1/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW126R	4/19/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.5	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW126R	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW126R	10/13/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW126R	2/29/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW126R	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		0.23	F /	<1.0		<1.0	
	MW126R	7/17/2012		U / R	<1		<5		<1			U / R	<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW126R	10/25/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW362	5/13/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW362	8/20/2008	5.8	F /	<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW362	10/22/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW362	2/5/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		1.7	/ J	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	7/28/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	1/14/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362(DUP)	1/14/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	4/14/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	7/20/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		0.43	F /	<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW362	1/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW362	4/19/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.5	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW362	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW362	10/13/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW362	2/29/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW362	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW362(DUP)	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW362	7/17/2012		U / R	<1		<5		<1			U / R	<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW362	10/25/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	

TABLE A1-15

Summary of Analytical Results - Volatile Organic Compounds
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M13	***Downgradient***																																							
	MW808	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW808	8/19/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW808	10/21/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW808(DUP)	10/21/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW808	2/4/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808(DUP)	2/4/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808(DUP)	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	7/29/2009	<5		<1		<5	U / UJ	<1		<1		<1		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	MW808	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	1/15/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	7/20/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808(DUP)	7/20/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	10/29/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW808	1/27/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW808(DUP)	1/27/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.8	F /	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW808	4/18/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.5	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808(DUP)	4/18/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.7	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808(DUP)	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808	2/29/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW808	7/18/2012		U / R	<1		<5		<1			U / R	<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW808(DUP)	7/18/2012		U / R	<1		<5		<1			U / R	<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW808	10/25/2012	22		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW809	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW809	8/19/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW809	10/21/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW809	2/5/2009	<5.0	U / UJ	<1.0	U / UJ	<5.0	U / UJ	<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		1.1	/ J	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	7/29/2009	<5		<1		<5	U / UJ	<1		<1		<1		<1		<1		NA		<1		<3		<5	U / UJ	<1		<1		<1		<1		<1		<1		<2	
	MW809	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809(DUP)	10/29/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	1/15/2010	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	7/20/2010	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	10/29/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809(DUP)	10/29/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW809	1/27/2011	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.4	F /	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0	U / UJ	<2.0	
	MW809	4/19/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		2.6	F / U	<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	

TABLE A1-15

Summary of Analytical Results - Volatile Organic Compounds
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***																																					
	MW809	7/28/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW809	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW809(DUP)	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW809	2/29/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW809(DUP)	2/29/2012	<5.0		<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW809	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW809	7/18/2012		U / R	<1		<5		<1			U / R	<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1	
	MW809	10/25/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1	
	MW809(DUP)	10/25/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

An abbreviated list of compounds is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = micrograms per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
cis-1,2-DCE = cis-1,2-Dichloroethene
MethCl = Methylene Chloride
MEK = Methyl Ethyl Ketone (2-butanone)
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
VC = Vinyl chloride

TABLE A1-16

Summary of Analytical Results - Semivolatile Organic Compounds
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			Compound	2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
			Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
			Project Action Limit[1]	0.42		0.42		NS		51		NS		NS	
			Surface Water RG	330		150		68		8000		12		NS	
Site	**Well**	**Date**		**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Upgradient***														
	MW806	5/15/2008		<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW806	8/19/2008		<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW806	10/21/2008		<1		<0.5		<1		<1.5		<0.5		<5	
	MW806	2/4/2009		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	5/5/2009		<1.3		<0.47		<0.93		<0.93		<0.47		8.2	
	MW806	7/29/2009		<1.3	U / UJ	<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	10/28/2009		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	1/15/2010		<1.3		0.23	F /	<0.94		<0.94		<0.47		<4.7	
	MW806	4/14/2010		<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW806	7/21/2010		<1.3		<0.47		0.64	F /	<0.93		<0.47		<4.7	
	MW806	10/28/2010		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	1/27/2011		<1.4		<0.50		<1.0		<1.0		<0.50	U / UJ	<5.0	
	MW806	4/19/2011		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	7/28/2011		<1.4		<0.51		<1.0		<1.0		<0.51		<5.1	
	MW806	10/12/2011		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	2/29/2012		<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW806	4/16/2012		<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW806	7/17/2012		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW806	10/24/2012		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	5/15/2008		<0.99		<0.5		<0.99		<1.5		<0.5		<5	
	MW807(DUP)	5/15/2008		<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW807	8/19/2008		<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW807(DUP)	8/19/2008		<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW807	10/21/2008		<0.93		<0.47		<0.93		<1.4		<0.47		<4.7	
	MW807	2/4/2009		<1.3		<0.47		0.49	F /	<0.93		1.4		<4.7	
	MW807	5/5/2009		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	7/29/2009		<1.3	U / UJ	<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	10/28/2009		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	1/15/2010		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	4/14/2010		<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW807	7/21/2010		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	10/28/2010		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	1/27/2011		<1.4		<0.50		<1.0		<1.0		<0.50	U / UJ	<5.0	
	MW807	4/19/2011		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	7/28/2011		<1.4	U / UJ	<0.49	U / UJ	<0.98	U / UJ	<0.98	U / UJ	<0.49	U / UJ	<4.9	
	MW807	10/12/2011		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	2/29/2012		<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW807	4/16/2012		<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW807	7/17/2012		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW807	10/24/2012		<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	

TABLE A1-16

Summary of Analytical Results - Semivolatile Organic Compounds
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	Compound		2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		0.42		0.42		NS		51		NS		NS	
	Surface Water RG		330		150		68		8000		12		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***													
	AEHA14R	5/15/2008	<1		<0.5		<1		<1.5		<0.5		<5	
	AEHA14R	8/20/2008	<0.96		<0.48		<0.96		<1.4		<0.48		<4.8	
	AEHA14R	10/22/2008	<0.99		<0.5		<0.99		<1.5		<0.5		<5	
	AEHA14R	2/5/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA14R	5/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA14R	7/29/2009	<1.3	U / UJ	<0.47		<0.94	U / UJ	<0.94	U / UJ	<0.47	U / UJ	<4.7	
	AEHA14R	10/29/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA14R	1/14/2010	<1.3		<0.47		<0.93		<0.93		0.16	F /	<4.7	
	AEHA14R	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	AEHA14R	7/21/2010	<1.3		<0.47		4.8		<0.93		<0.47		<4.7	
	AEHA14R	10/29/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA14R	1/28/2011	<1.5		<0.54		0.18	F /	<1.1		<0.54		<5.4	
	AEHA14R	4/18/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA14R	7/28/2011		U / R		U / R		U / R	<1.1	U / UJ		U / R	<5.3	
	AEHA14R	10/13/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA14R	3/1/2012		U / R		U / R	0.32	F / J		U / R		U / R		U / R
	AEHA15	5/20/2008	<1.1		<0.53		<1.1		<1.6		<0.53		<5.3	
	AEHA15	8/20/2008	<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	AEHA15	10/22/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	AEHA15	2/5/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA15	5/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA15	7/29/2009	<1.4	U / UJ	<0.5		0.44	F /	<0.99		<0.5		<5	
	AEHA15(DUP)	7/29/2009	<1.4	U / UJ	<0.5		0.4	F /	<1		<0.5		<5	
	AEHA15	10/29/2009	<1.4		<0.50		<1.0		<1.0		<0.50		<5.0	
	AEHA15	1/14/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA15	4/14/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	AEHA15	7/21/2010	<1.5		<0.54		8.1		<1.1		0.26	F /	<5.4	
	AEHA15	10/29/2010	<1.3		<0.48		<0.95		<0.95		<0.48		<4.8	
	AEHA15	1/28/2011	<1.6		<0.58		0.21	F /	<1.2		<0.58		<5.8	
	AEHA15	4/18/2011	<1.3		<0.48		<0.95		<0.95		<0.48		<4.8	
	AEHA15	7/28/2011	<1.5		<0.53		<1.1		<1.1		<0.53		<5.3	
	AEHA15	10/12/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	AEHA15	3/1/2012	<1.5		<0.53		<1.1		<1.1		<0.53	U / UJ	<5.3	
	MW126R	5/20/2008	<0.93		<0.47		<0.93		<1.4		<0.47		<4.7	
	MW126R	8/20/2008	<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW126R	10/22/2008	<0.99		<0.5		<0.99		<1.5		<0.5		<5	
	MW126R	2/5/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	5/5/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	7/28/2009	<1.3	U / UJ	<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	10/29/2009	<1.3		<0.47		<0.94		<0.94		<0.47		<4.7	
	MW126R	1/14/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	4/14/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW126R(DUP)	4/14/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW126R	7/20/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	1/28/2011	<1.4		<0.52		<1.0		<1.0		<0.52		<5.2	
	MW126R	4/19/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	7/28/2011	<1.4		<0.50		<0.99		<0.99		<0.50		<5.0	
	MW126R	10/13/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	2/29/2012	<1.3		<0.48		<0.95		<0.95		<0.48	U / UJ	<4.8	
	MW126R	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW126R	7/17/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW126R	10/25/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	

TABLE A1-16

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	Compound		2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		0.42		0.42		NS		51		NS		NS	
	Surface Water RG		330		150		68		8000		12		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***													
	MW362	5/13/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	MW362	8/20/2008	<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW362	10/22/2008	<0.97		<0.49		<0.97		<1.5		<0.49		<4.9	
	MW362	2/5/2009	**2.2**		0.2	F /	<0.93		<0.93		<0.47		<4.7	
	MW362	5/5/2009	<1.3		0.19	F /	<0.93		<0.93		<0.47		<4.7	
	MW362	7/28/2009	**1.3**	F / J	<0.47		<0.93		<0.93		<0.47		<4.7	
	MW362	10/29/2009	**2.3**		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW362	1/14/2010	**3.8**		0.32	F /	<0.93		<0.93		<0.47		<4.7	
	MW362(DUP)	1/14/2010	**3.6**		0.35	F /	<0.93		<0.93		<0.47		<4.7	
	MW362	4/14/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW362	7/20/2010	**2.2**		**0.55**		<0.93		<0.93		<0.47		<4.7	
	MW362	10/28/2010	**5.7**		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW362	1/28/2011	**7.1**		<0.52		0.17	F /	<1.0		<0.52		<5.2	
	MW362	4/19/2011	**1.7**		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW362	7/28/2011	**0.95**	F /	0.2	F /	<1.1		<1.1		<0.54		<5.4	
	MW362	10/13/2011	**1.9**		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW362	2/29/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW362	4/16/2012	**3.3**		0.25	F /	<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW362	4/16/2012	**2.6**		0.29	F /	<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW362	7/17/2012	**2.8**		0.29	F /	<0.93		<0.93		<0.47		<4.7	
	MW362	10/25/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	5/15/2008	<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW808	8/19/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	MW808	10/21/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	MW808(DUP)	10/21/2008	<0.99		<0.5		<0.99		<1.5		<0.5		<5	
	MW808	2/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808(DUP)	2/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	5/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808(DUP)	5/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	7/29/2009	<1.3	U / UJ	<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	10/29/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	1/15/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW808	7/20/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808(DUP)	7/20/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	10/29/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	1/27/2011	<1.5		<0.54		<1.1		<1.1		<0.54	U / UJ	<5.4	
	MW808(DUP)	1/27/2011	<1.4		<0.51		<1.0		<1.0		<0.51	U / UJ	<5.1	
	MW808	4/18/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808(DUP)	4/18/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	7/28/2011		U / R		U / R		U / R		U / R		U / R		U / R
	MW808(DUP)	7/28/2011		U / R		U / R		U / R		U / R		U / R		U / R
	MW808	10/12/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	2/29/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW808	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW808	7/18/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	7/18/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW808	10/25/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	

TABLE A1-16

Summary of Analytical Results - Semivolatile Organic Compounds
Groundwater Remediation Unit 2
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	Compound		2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		0.42		0.42		NS		51		NS		NS	
	Surface Water RG		330		150		68		8000		12		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***													
	MW809	5/15/2008	<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW809	8/19/2008	<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW809	10/21/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	MW809	2/5/2009	<1.3		<0.47		<0.93		<0.93		0.16	F /	<4.7	
	MW809	5/5/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	
	MW809	7/29/2009	<1.3	U / UJ	<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	10/29/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809(DUP)	10/29/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	1/15/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW809	7/20/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	10/29/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809(DUP)	10/29/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	1/27/2011	<1.4		<0.51		<1.0		<1.0		<0.51	U / UJ	<5.1	
	MW809	4/19/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	7/28/2011	<1.3	U / UJ	<0.47	U / UJ	<0.93	U / UJ	<0.93	U / UJ	<0.47	U / UJ	<4.7	
	MW809	10/12/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809(DUP)	10/12/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	2/29/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW809(DUP)	2/29/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW809	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW809	7/18/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809	10/25/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW809(DUP)	10/25/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.
Only data collected since 2003 are shown.
µg/L = microgram per liter
NS = No standard
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
R = Rejected data, unusable
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
NB = Nitrobenzene

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M1	***In-Plume***					
	MW107	5/19/2003	NA		**35,000**	/ J
	MW107(DUP)	5/19/2003	NA		**57,000**	/ J
	MW107	10/21/2003		/ R	**38,000**	/ J
	MW107(DUP)	10/21/2003		/ R	**35,000**	/ J
	MW107	5/17/2004	NA		**45,000**	
	MW107(DUP)	5/17/2004	NA		**31,000**	
	MW107	10/18/2004	NA		**34,000**	
	MW107(DUP)	10/18/2004	NA		**31,000**	
	MW107	7/12/2005	NA		**36,000**	
	MW107	10/13/2005	NA		**35,000**	
	MW107	4/28/2006	NA		**24,000**	
	MW107	10/16/2006	NA		**53,000**	
	MW107	4/18/2007	NA		**26,000**	
	MW107	10/4/2007	NA		**38,000**	
	MW107	4/30/2008	NA		**21,000**	
	MW107	10/8/2008	NA		**12,000**	
	MW107	5/2/2009	NA		**49,000**	
	MW107	10/29/2009	NA		**34,000**	
	MW107	4/12/2010	NA		**30,000**	
	MW107	10/31/2010	NA		**26,000**	
	MW107	4/20/2011	NA		**26,000**	
	MW107	10/15/2011	NA		**23,000**	
	MW107	4/12/2012	NA		**26,000**	
	MW107	10/25/2012	NA		**22,000**	
	MW231	5/19/2003	NA		**27,000**	/ J
	MW231	10/22/2003		/ R	**30,000**	/ J
	MW231	5/18/2004	NA		**32,000**	
	MW231	10/18/2004	NA		**31,000**	
	MW231	7/12/2005	NA		**36,000**	
	MW231	10/14/2005	NA		**31,000**	
	MW231	4/28/2006	NA		**34,000**	
	MW231	10/16/2006	NA		**41,000**	
	MW231	4/18/2007	NA		**33,000**	
	MW231(DUP)	4/18/2007	NA		**32,000**	
	MW231	10/4/2007	NA		**38,000**	
	MW231	4/30/2008	NA		**32,000**	
	MW231	10/8/2008	8.1		**35,000**	
	MW231	5/2/2009	NA		**41,000**	
	MW231	10/29/2009	NA		**38,000**	
	MW231	4/9/2010	NA		**41,000**	
	MW231	10/31/2010	NA		**32,000**	
	MW231	4/20/2011	NA		**34,000**	
	MW231	10/15/2011	NA		**32,000**	
	MW231(DUP)	10/15/2011	NA		**33,000**	
	MW231	4/12/2012	NA		**35,000**	
	MW231	10/25/2012	NA		**36,000**	
	MW640	5/20/2003	NA		**3,100**	/ J
	MW640	10/22/2003		J / R	**2,100**	/ J
	MW640	5/17/2004	NA		**2,200**	
	MW640	10/19/2004	NA		**3,000**	
	MW640	7/12/2005	NA		<5	
	MW640	10/12/2005	NA		**3,100**	
	MW640	4/28/2006	NA		**4,400**	
	MW640	10/12/2006	NA		**6,100**	
	MW640	4/23/2007	NA		**2,900**	
	MW640	10/2/2007	NA		**1,500**	
	MW640	4/30/2008	NA		**4,100**	
	MW640	10/8/2008	NA		**2,400**	
	MW640(DUP)	10/8/2008	NA		**2,700**	
	MW640	5/2/2009	NA		**5,000**	
	MW640	10/29/2009	NA		**5,000**	
	MW640	4/12/2010	NA		**5,200**	
	MW640	10/31/2010	NA		**5,000**	
	MW640	4/19/2011	NA		**5,400**	
	MW640	10/15/2011	NA		**5,100**	
	MW640	4/12/2012	NA		**5,200**	
	MW640	10/25/2012	NA		**4,300**	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M1	***In-Plume***					
	MW641	5/16/2003	NA		**1,500**	
	MW641	10/22/2003		J / R	**1,100**	/ J
	MW641	5/18/2004	NA		**760**	
	MW641	10/19/2004	NA		**880**	
	MW641	7/12/2005	NA		**560**	
	MW641(DUP)	7/12/2005	NA		**590**	
	MW641	10/12/2005	NA		**1,300**	
	MW641	4/28/2006	NA		**670**	
	MW641(DUP)	4/28/2006	NA		**680**	
	MW641	10/12/2006	NA		**880**	
	MW641(DUP)	10/12/2006	NA		**870**	
	MW641	4/20/2007	NA		**900**	
	MW641	10/2/2007	NA		**990**	
	MW641	4/30/2008	NA		**940**	
	MW641(DUP)	4/30/2008	NA		**930**	
	MW641	10/8/2008	NA		**1,000**	
	MW641	5/2/2009	NA		**820**	
	MW641	10/29/2009	NA		**910**	
	MW641	4/12/2010	NA		**920**	
	MW641	10/31/2010	NA		**1,300**	
	MW641	4/20/2011	NA		**670**	
	MW641	10/17/2011	NA		**1,100**	
	MW641	4/12/2012	NA		**640**	
	MW641	4/12/2012	NA		**640**	
	MW641	10/25/2012	NA		**1,100**	
	MW642	5/19/2003	NA		**660**	/ J
	MW642	10/22/2003		U / R	**640**	/ J
	MW642	5/18/2004	NA		**600**	
	MW642	10/19/2004	NA		**470**	
	MW642	7/11/2005	NA		390	
	MW642	10/12/2005	NA		**410**	
	MW642	4/28/2006	NA		400	
	MW642	10/16/2006	NA		**440**	
	MW642	4/19/2007	NA		**450**	
	MW642	10/8/2007	NA		**450**	
	MW642	5/7/2008	NA		380	
	MW642	10/9/2008	NA		**430**	
	MW642	5/2/2009	NA		**440**	
	MW642	10/29/2009	NA		**430**	
	MW642	4/12/2010	NA		**430**	
	MW642(DUP)	4/12/2010	NA		**450**	
	MW642	10/31/2010	NA		**460**	
	MW642	4/20/2011	NA		**430**	
	MW642(DUP)	4/20/2011	NA		**500**	
	MW642	10/17/2011	NA		**410**	
	MW642	4/12/2012	NA		**420**	
	MW642(DUP)	4/12/2012	NA		**420**	
	MW642	10/25/2012	NA		390	
	MW642(DUP)	10/25/2012	NA		400	
	Early Warning					
	MW643	5/15/2003	NA		270	
	MW643	10/20/2003	<0.1		180	
	MW643	5/18/2004	NA		140	
	MW643	10/19/2004	NA		120	
	MW643	7/11/2005	NA		150	
	MW643	10/12/2005	NA		210	
	MW643	4/27/2006	NA		340	
	MW643	10/16/2006	NA		270	
	MW643	4/18/2007	NA		270	
	MW643	10/3/2007	NA		150	
	MW643	4/29/2008	NA		130	
	MW643	10/8/2008	NA		93	
	MW643	5/2/2009	NA		110	
	MW643	10/28/2009	NA		53	
	MW643(DUP)	10/28/2009	NA		52	
	MW643	4/12/2010	NA		59	
	MW643	11/1/2010	NA		25	
	MW643	4/18/2011	NA		54	
	MW643	10/15/2011	NA		38	
	MW643	4/13/2012	NA		58	
	MW643	10/26/2012	NA		160	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M1	***Early Warning***					
	MW644	5/16/2003	NA		310	
	MW644(DUP)	5/16/2003	NA		**560**	
	MW644	10/20/2003	0.2		330	
	MW644	5/18/2004	NA		340	
	MW644	10/19/2004	NA		340	
	MW644	7/11/2005	NA		210	
	MW644	10/12/2005	NA		200	
	MW644	4/27/2006	NA		320	
	MW644	10/16/2006	NA		290	
	MW644	4/18/2007	NA		300	
	MW644	10/3/2007	NA		310	
	MW644	4/29/2008	NA		240	
	MW644(DUP)	4/29/2008	NA		240	
	MW644	10/8/2008	NA		95	
	MW644	5/2/2009	NA		240	
	MW644	10/28/2009	NA		120	/ U
	MW644	4/12/2010	NA		140	
	MW644	11/1/2010	NA		170	
	MW644	4/18/2011	NA		170	
	MW644	10/15/2011	NA		180	
	MW644	4/13/2012	NA		160	
	MW644	10/26/2012	NA		86	
	Compliance					
	MW645	5/15/2003	NA		190	
	MW645	10/20/2003	0.15		240	
	MW645	5/18/2004	NA		210	
	MW645	10/19/2004	NA		190	
	MW645	7/11/2005	NA		140	
	MW645	10/12/2005	NA		150	
	MW645	4/27/2006	NA		210	
	MW645	10/16/2006	NA		170	
	MW645	4/18/2007	NA		150	
	MW645	10/3/2007	NA		150	
	MW645	4/29/2008	NA		94	
	MW645	10/8/2008	NA		100	
	MW645	5/2/2009	NA		65	
	MW645	10/28/2009	NA		65	
	MW645	4/12/2010	NA		57	
	MW645	11/1/2010	NA		70	
	MW645	4/18/2011	NA		90	
	MW645	10/15/2011	NA		88	
	MW645	4/13/2012	NA		67	
	MW645	10/25/2012	NA		90	
	MW646	5/15/2003	NA		80	
	MW646	10/20/2003	0.18		240	
	MW646	5/18/2004	NA		180	
	MW646	10/19/2004	NA		190	
	MW646	7/11/2005	NA		150	
	MW646	10/12/2005	NA		150	
	MW646	4/27/2006	NA		200	
	MW646	10/16/2006	NA		180	
	MW646	4/18/2007	NA		170	
	MW646	10/3/2007	NA		150	
	MW646	4/29/2008	NA		140	
	MW646	10/8/2008	NA		100	
	MW646	5/2/2009	NA		130	
	MW646	10/28/2009	NA		100	/ J
	MW646	4/12/2010	NA		190	
	MW646	11/1/2010	NA		150	
	MW646	4/19/2011	NA		120	
	MW646	10/15/2011	NA		120	
	MW646	4/13/2012	NA		110	
	MW646	10/25/2012	NA		110	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
Groundwater Remediation Unit 2
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M1	***Compliance***					
	MW648	5/19/2003	NA		50	/ J
	MW648	10/20/2003	0.072	J /	34	
	MW648	5/17/2004	NA		47	
	MW648	10/18/2004	NA		25	
	MW648	7/12/2005	NA		<5	
	MW648	10/12/2005	NA		33	
	MW648	4/28/2006	NA		28	
	MW648	10/12/2006	NA		34	
	MW648	4/23/2007	NA		24	
	MW648	10/3/2007	NA		30	
	MW648	4/30/2008	NA		120	
	MW648	10/8/2008	NA		28	
	MW648	10/28/2009	NA		10	
	MW648	4/12/2010	NA		10	
	MW648	11/1/2010	NA		10	
	MW648	4/18/2011	NA		37	
	MW648	10/15/2011	NA		7.5	
	MW648	4/12/2012	NA		34	
	MW648	10/25/2012	NA		14	
	MW649	5/20/2003	NA		210	/ J
	MW649	10/22/2003		/ R	**510**	/ J
	MW649(DUP)	10/22/2003		/ R	**500**	/ J
	MW649	5/18/2004	NA		160	
	MW649(DUP)	5/18/2004	NA		160	
	MW649	10/18/2004	NA		300	
	MW649(DUP)	10/18/2004	NA		300	
	MW649	7/11/2005	NA		230	
	MW649	10/13/2005	NA		320	
	MW649	4/27/2006	NA		180	
	MW649	10/17/2006	NA		250	
	MW649	4/18/2007	NA		110	
	MW649	10/8/2007	NA		220	
	MW649	4/29/2008	NA		100	
	MW649	10/8/2008	NA		120	
	MW649(DUP)	10/8/2008	NA		120	
	MW649	10/29/2009	NA		100	
	MW649	4/12/2010	NA		57	
	MW649	11/1/2010	NA		240	
	MW649	4/20/2011	NA		86	
	MW649	10/17/2011	NA		68	
	MW649	4/13/2012	NA		64	
	MW649	10/25/2012	NA		120	
	SW709	5/2/2009	NA		33	
	SW709	10/26/2009	NA		39	
	SW709	4/12/2010	NA		43	
	SW709	11/1/2010	NA		86	
	SW709	4/18/2011	NA		54	
	SW709	10/15/2011	NA		47	
	SW709	4/13/2012	NA		60	
	SW709	10/26/2012	NA		180	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
Groundwater Remediation Unit 2
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Joliet Army Ammunition Plant

	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M8	***In-Plume***					
	MW148RR	10/21/2003	0.44		**460**	
	MW148RR(DUP)	10/21/2003	0.45		**470**	
	MW148RR	5/20/2004	NA		**440**	
	MW148RR(DUP)	5/20/2004	NA		**430**	
	MW148RR	10/20/2004	NA		**480**	
	MW148RR(DUP)	10/20/2004	NA		**450**	
	MW148RR	7/21/2005	NA		**430**	
	MW148RR	5/4/2006	NA		**460**	
	MW148RR(DUP)	5/4/2006	NA		**450**	
	MW148RR	5/1/2007	NA		320	
	MW148RR	5/19/2008	NA		290	
	MW148RR	10/22/2008	0.047	F /	**410**	
	MW148RR	5/6/2009	NA		360	/ J
	MW148RR(DUP)	5/6/2009	NA		350	/ J
	MW148RR	10/23/2009	NA		370	/ J
	MW148RR(DUP)	10/23/2009	NA		350	/ J
	MW148RR	4/7/2010	NA		380	
	MW148RR(DUP)	4/7/2010	NA		390	
	MW148RR	11/1/2010	NA		350	
	MW148RR	4/21/2011	NA		360	
	MW148RR	10/17/2011	NA		360	
M9	***In-Plume***					
	MW330	10/21/2003		J / R	**500**	/ J
	MW330	5/21/2004	NA		**570**	
	MW330	10/21/2004	NA		**440**	
	MW330	10/19/2005	NA		340	
	MW330	5/4/2006	NA		**510**	
	MW330	10/12/2006	NA		**560**	
	MW330	4/30/2007	NA		**570**	
	MW330(DUP)	4/30/2007	NA		370	
	MW330	10/16/2007	NA		**540**	
	MW330	5/19/2008	NA		**570**	
	MW330	5/6/2009	NA		**530**	/ J
	MW330	10/23/2009	NA		**410**	/ J
	MW330	4/9/2010	NA		**410**	
	MW330	11/3/2010	NA		**460**	
	MW330	4/20/2011	NA		**420**	
	MW330	10/18/2011	NA		**440**	
	MW330	4/17/2012	NA		**430**	
	MW330	10/23/2012	NA		**440**	
M13	***Upgradient***					
	MW806	5/15/2008	0.18		86	
	MW806	8/19/2008	<0.1		59	
	MW806	10/21/2008	0.093	F /	85	
	MW806	2/4/2009	0.49	/ J	75	
	MW806	5/5/2009	<0.10	/ U	70	
	MW806	7/29/2009	0.18		74	
	MW806	10/28/2009	0.12	/ J	63	/ J
	MW806	1/15/2010	0.34		69	
	MW806	4/14/2010	0.57		77	
	MW806	7/21/2010	0.092	F /	69	
	MW806	10/28/2010	0.055	F / J	80	
	MW806	1/27/2011	0.37		70	/ J
	MW806	4/19/2011	0.34		76	
	MW806	7/28/2011	0.16	/ J	79	
	MW806	10/12/2011	<0.10	U / UJ	66	
	MW806	2/29/2012	0.39		79	
	MW806	4/16/2012	0.39	/ J	80	
	MW806	7/17/2012		/ R	76	
	MW806	10/24/2012	0.13	F /	71	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Upgradient***					
	MW807	5/15/2008	<0.1		190	
	MW807(DUP)	5/15/2008	0.029	F /	190	
	MW807	8/19/2008	1.1		54	
	MW807(DUP)	8/19/2008	<0.1		55	
	MW807	10/21/2008	0.17		240	
	MW807	2/4/2009	<0.10	U / UJ	210	
	MW807	5/5/2009	<1.0	U / UJ	200	
	MW807	7/29/2009	<0.1		220	
	MW807	10/28/2009	<2.0		190	/ J
	MW807	1/15/2010	<2.0		210	
	MW807	4/14/2010	<2.0		200	
	MW807	7/21/2010	<2.0		220	
	MW807	10/28/2010	0.22	/ J	230	
	MW807	1/27/2011	<1.0		220	/ J
	MW807	4/19/2011	<1.0		230	
	MW807	7/28/2011		U / R	230	
	MW807	10/12/2011	<1.0	U / UJ	230	
	MW807	2/29/2012	<1.0		230	
	MW807	4/16/2012	<1.0	U / UJ	230	
	MW807	7/17/2012		U / R	230	
	MW807	10/24/2012	<2		230	
	Downgradient					
	AEHA14R	5/15/2008	3.4		160	
	AEHA14R	8/20/2008	3.5		170	
	AEHA14R	10/22/2008	2.9		180	
	AEHA14R	2/5/2009	3.7	/ J	170	
	AEHA14R	5/4/2009	3.5	/ J	210	
	AEHA14R	7/29/2009	3.1		170	
	AEHA14R	10/29/2009	1.2	/ J	120	/ J
	AEHA14R	1/14/2010	1.2		97	
	AEHA14R	4/13/2010	1.9		81	
	AEHA14R	7/21/2010	1.8		84	
	AEHA14R	10/29/2010	1.1		110	
	AEHA14R	1/28/2011	2.4		140	
	AEHA14R	4/18/2011	4.1		300	
	AEHA14R	7/28/2011	1.9		230	
	AEHA14R	10/13/2011	1		130	
	AEHA14R	3/1/2012	1.7		140	
	AEHA15	5/20/2008	0.22		17	
	AEHA15	8/20/2008	3.3		180	
	AEHA15	10/22/2008	0.17		16	
	AEHA15	2/5/2009	<0.10	/ UJ	10	
	AEHA15	5/4/2009	0.31	/ J	12	/ J
	AEHA15	7/29/2009	0.074	F /	11	
	AEHA15(DUP)	7/29/2009	0.12		11	
	AEHA15	10/29/2009	<0.10		0.32	/ UJ
	AEHA15	1/14/2010	<0.10		9.8	
	AEHA15	4/14/2010	0.31		11	
	AEHA15	7/21/2010	0.087	F /	9.7	
	AEHA15	10/29/2010	0.85		16	/ U
	AEHA15	1/28/2011	<0.10		19	
	AEHA15	4/18/2011	0.31		12	
	AEHA15	7/28/2011	0.15	/ U	13	
	AEHA15	10/12/2011	0.63		11	
	AEHA15	3/1/2012	0.13		12	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
Groundwater Remediation Unit 2
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***					
	MW126R	2/4/2004	NA		84	
	MW126R	5/20/2008	0.047	F /	63	
	MW126R	8/20/2008	<0.1		<5	
	MW126R	10/22/2008	0.064	F /	62	
	MW126R	2/5/2009	<0.10	/ UJ	53	
	MW126R	5/5/2009	0.15	/ J	53	/ J
	MW126R	7/28/2009	0.12		53	
	MW126R	10/29/2009	0.95	/ J	79	/ J
	MW126R	1/14/2010	<2.0		57	
	MW126R	4/14/2010	0.83		83	
	MW126R(DUP)	4/14/2010	0.87		84	
	MW126R	7/20/2010	0.39		51	
	MW126R	10/28/2010	0.98	/ J	60	
	MW126R	1/28/2011	0.18		61	
	MW126R	4/19/2011	0.19		57	
	MW126R	7/28/2011	0.13	/ J	53	
	MW126R	10/13/2011	0.57		49	
	MW126R	2/29/2012	0.12		53	
	MW126R	4/16/2012	0.13		52	
	MW126R	7/17/2012		/ R	53	
	MW126R	10/25/2012	0.16	F /	55	
	MW362	2/3/2004	0.11		230	
	MW362	5/13/2008	0.079	F /	260	
	MW362	8/20/2008	<0.1		<5	
	MW362	10/22/2008	0.032	F /	310	
	MW362	2/5/2009	<0.10		240	
	MW362	5/5/2009	<1.0	U / UJ	240	
	MW362	7/28/2009	<0.10		260	
	MW362	10/29/2009	<2.0		360	
	MW362	1/14/2010	<2.0		230	
	MW362(DUP)	1/14/2010	<2.0		220	
	MW362	4/14/2010	<2.0		210	
	MW362	7/20/2010	<2.0		220	/ J
	MW362	10/28/2010	0.21	/ J	250	
	MW362	1/28/2011	<2.0		240	
	MW362	4/19/2011	<1.0		250	
	MW362	7/28/2011		U / R	260	
	MW362	10/13/2011	<1.0		260	
	MW362	2/29/2012	<1.0		280	
	MW362	4/16/2012	<1.0		270	
	MW362	4/16/2012	<1.0	U / UJ	270	
	MW362	7/17/2012		U / R	270	
	MW362	10/25/2012	<2		250	
	MW808	5/15/2008	0.4		140	
	MW808	8/19/2008	<0.1		130	
	MW808	10/21/2008	0.14		100	
	MW808(DUP)	10/21/2008	0.18		99	
	MW808	2/4/2009	<0.10	U / UJ	150	
	MW808(DUP)	2/4/2009	<0.10		150	
	MW808	5/4/2009	0.33	/ J	190	
	MW808(DUP)	5/4/2009	2	/ J	180	
	MW808	7/29/2009	<0.1		380	
	MW808	10/29/2009	<0.10		140	/ J
	MW808	1/15/2010	<0.10		94	
	MW808	4/13/2010	<0.10		64	
	MW808	7/20/2010	<0.10		63	
	MW808(DUP)	7/20/2010	<0.10		65	
	MW808	10/29/2010	0.15		92	
	MW808	1/27/2011	<0.10		81	/ J
	MW808(DUP)	1/27/2011	0.58	F / U	87	/ J
	MW808	4/18/2011	<0.10		230	
	MW808(DUP)	4/18/2011	<0.10		220	
	MW808	7/28/2011	0.98		120	
	MW808(DUP)	7/28/2011	0.84	/ J	120	
	MW808	10/12/2011	<1.0	U / UJ	160	
	MW808	2/29/2012	<0.10		99	
	MW808	4/16/2012	<0.10		88	
	MW808	7/18/2012	<0.1		160	
	MW808	7/18/2012	<0.1		160	
	MW808	10/25/2012	<2		140	

TABLE A1-17

Summary of Analytical Results - Indicator Parameters
Groundwater Remediation Unit 2
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Downgradient***					
	MW809	5/15/2008	<0.1		6.1	
	MW809	8/19/2008	0.21		9.5	
	MW809	10/21/2008	0.16		12	
	MW809	2/5/2009	<0.10	U / UJ	9.9	
	MW809	5/5/2009	0.27	/ J	9.2	/ J
	MW809	7/29/2009	0.23		11	
	MW809	10/29/2009	0.09	F / J	8.9	/ J
	MW809(DUP)	10/29/2009	0.13	/ J	8.9	/ J
	MW809	1/15/2010	<0.10		9.5	
	MW809	4/13/2010	0.12		8	
	MW809	7/20/2010	0.11		9.9	
	MW809	10/29/2010	0.053	F /	10	
	MW809(DUP)	10/29/2010	0.053	F /	12	/ U
	MW809	1/27/2011	<0.10		9.4	/ J
	MW809	4/19/2011	0.067	F /	7.3	
	MW809	7/28/2011	0.14	/ U	7.7	
	MW809	10/12/2011	0.13	/ J	6.3	
	MW809(DUP)	10/12/2011	0.12	/ J	6.5	
	MW809	2/29/2012	<0.10		5.9	
	MW809	2/29/2012	<0.10		5.9	
	MW809	4/16/2012	0.13	/ J	5.4	
	MW809	7/18/2012	0.15		7.5	
	MW809	10/25/2012	0.14	F /	8.3	
	MW809	10/25/2012	0.11	F /	8.1	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG})obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

Only data collected since 2001 are shown.
mg/L = milligrams per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
R = Rejected data, unusable
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate

Table A1-18

Summary of Groundwater Trends - Estimated Cleanup Times
Groundwater Remediation Unit 2
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Site	Critical Monitoring Well	Critical Compound	Initial [1] Concentration (µg/L)	Date of Initial Concentration	Final Concentration (µg/L) (Remediation Goal - RG)	Record of Decision Estimated Clean-Up time for Site (yrs)	R^2 Value[2]	Estimated Clean-Up Time (yrs)	Estimated Clean-Up Date (yr)	Source Removal Completion Date
M1	MW107	Sulfate	49,000	2009	400	NC	0.0042	*	*	2008
	MW231	Sulfate	41,000	2010	400		0.0222	**421**	2433	2008
	MW640	Sulfate	5,400	2011	400		0.2221	*	*	2008
	MW641	Sulfate	1,300	2010	400		0.004	**106**	2118	2008
	MW642	Sulfate	460	2010	400		0.0054	**46**	2058	2008
M6	MW212R	2,4,6-TNT	1,000	2005	9.5	50	0.0381	**19**	2031	2005
	MW652	2,4,6-TNT	3,400	2005	9.5		0.0705	**74**	2086	2005
		2,4-DNT	10,000	2005	0.42		0.0031	*	*	2005
		2,6-DNT	5,400	2005	0.42		0.0275	**252**	2264	2005
		2-NT	98,000	2005	5,100		0.0396	**33**	2045	2005
M8	MW330	Sulfate	570	2008	400		0.1117	**15**	2027	1999[3]
M13	MW362	2,4-DNT	7.5	2011	0.42	NC	0.3518	**4**	2016	2008

Note:
Bolded value represents the estimated cleanup time for the associated site.
Estimated clean-up times are approximate and based on constant contamination reduction rates for a specific compound at a specific point within the aquifer.
RG = Remediation Goal
µg/L = micrograms per liter (milligrams per liter {mg/L} for sulfate).
yr(s) = year(s)
* = Trend curve indicates increasing concentrations. An estimated clean-up time or corresponding date could not be calculated.
NC = Not calculated

2,4,6-TNT = 2,4,6-Trinitrotoluene
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
2-NT = 2-Nitrotoluene

Footnote:
(1) Initial concentration is the maximum observed concentration during the timeframe included.
(2) The R^2 value represents an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables. Shaded analysis results with and R^2 value less than 0.1 are unreliable.
(3) RA activities estimated completed in 1999 priot to land tranfer in 2000.

RJR/tjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Tables\Table A1-18 - GRU2 Calculated Clean-Up Times_2012.xlsxEst. Cleanup Time - GRU2

TABLE A1-19

Summary of Mann-Kendall Trend Analyses - Sulfate
Groundwater Remediation Unit 2
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		Trend Analysis Test	Sulfate
Site M1			
MW107	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		**DECREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW231	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW640	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
MW641	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
MW642	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		**DECREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW643	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
MW644	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
MW645	Trend ≥ 80% Confidence Level	Mann-Kendall	**INCREASING**
	Trend ≥ 90% Confidence Level		**INCREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW646	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW648	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
MW649	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
SW709	Trend ≥ 80% Confidence Level	Mann-Kendall	**INCREASING**
	Trend ≥ 90% Confidence Level		**INCREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MFG (Site M9)			
MW330	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**

Notes

For results that were not detected above the reporting limit, 1/2 of the reporting limit was used for the Mann-Kendall trend analysis, as applicable.

CV = coefficient of variation

MFG = manufacturing

NA = not analyzed

TABLE A1-20

Summary of Mann-Kendall Trend Analyses - Explosives
Groundwater Remediation Unit 2
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		Trend Analysis Test	2,4-DNT	2,6-DNT	2-NT	1,3,5-TNB	2,4,6-TNT	RDX
MFG Area (Site M6)								
MW212R	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	No Trend	**INCREASING**	NA	No Trend	NA
	Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	NA	No Trend	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV<=1 STABLE**	**CV<=1 STABLE**	NA	NA	**CV>1 NOT-STABLE**	NA
MW313	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	No Trend	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		No Trend	No Trend	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV>1 NOT-STABLE**	**CV>1 NOT-STABLE**	NA	NA	NA	NA
MW318	Trend ≥ 80% Confidence Level	Mann-Kendall	NA	**INCREASING**	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		NA	**INCREASING**	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
MW319	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	No Trend	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		No Trend	No Trend	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV>1 NOT-STABLE**	**CV>1 NOT-STABLE**	NA	NA	NA	NA
MW652	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	**INCREASING**	No Trend	NA	No Trend	NA
	Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	NA	No Trend	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV<=1 STABLE**	NA	**CV<=1 STABLE**	NA	**CV<=1 STABLE**	NA
MW654	Trend ≥ 80% Confidence Level	Mann-Kendall	**INCREASING**	**INCREASING**	NA	NA	NA	No Trend
	Trend ≥ 90% Confidence Level		No Trend	No Trend	NA	NA	NA	No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	**CV<=1 STABLE**
MFG Area (Site M7)								
MW124R	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**	NA	NA	NA	**DECREASING**	NA
	Trend ≥ 90% Confidence Level		**DECREASING**	NA	NA	NA	**DECREASING**	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
MFG Area (Site M13)								
MW126R	Trend ≥ 80% Confidence Level	Mann-Kendall	**INCREASING**	**INCREASING**	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		**INCREASING**	**INCREASING**	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	NA	NA	NA
MW362	Trend ≥ 80% Confidence Level	Mann-Kendall	**INCREASING**	No Trend	NA	NA	NA	**INCREASING**
	Trend ≥ 90% Confidence Level		No Trend	No Trend	NA	NA	NA	**INCREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA	**CV<=1 STABLE**	NA	NA	NA	NA
MW806	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	No Trend	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		No Trend	No Trend	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV>1 NOT-STABLE**	**CV<=1 STABLE**	NA	NA	NA	NA
MFG Area (Site OAs)								
MW117	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	NA	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		No Trend	NA	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV>1 NOT-STABLE**	NA	NA	NA	NA	NA
MW118	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend	NA	NA	NA	NA	NA
	Trend ≥ 90% Confidence Level		No Trend	NA	NA	NA	NA	NA
	Stability Test, If No Trend Exists at 80% Confidence Level		**CV>1 NOT-STABLE**	NA	NA	NA	NA	NA

Notes

For results that were not detected above the reporting limit, 1/2 of the reporting limit was used for the Mann-Kendall trend analysis, as applicable.

1,3,5-TNB = 1,3,5-Trinitrobenzene

2,4,6-TNT = 2,4,6=Trinitrotoluene

2,4-DNT = 2,4-Dinitrotoluene

2,6-DNT = 2,6-Dinitrotoluene

2-NT = 2-Nitrotoluene

CV = Coefficient of variation

MFG = Manufacturing

NA = Not analyzed

RDX = Royal Demolition Explosive

Table A1-21

Monitoring Well Information Table
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
M1	MW104	15019989.44	1318790.51	549.10	546.20	7.0	27.0	30.0	27.00	519.20	1981	OVB	20.0	4.0
	MW105	15020111.69	1320854.13	555.00	552.50	7.0	27.0	29.9	24.00	528.50	1981	COMBO	20.0	4.0
	MW106	15020948.76	1318761.26	542.00	539.70	10.0	30.0	32.0	21.00	518.70	1981	COMBO	20.0	4.0
	MW107	15021094.20	1320422.28	552.40	549.10	5.5	25.5	27.4	17.00	532.10	1981	COMBO	20.0	4.0
	MW201	15020020.57	1318931.61	546.15	544.01	46.5	66.5	70.5	24.00	520.01	1988	BRK	20.0	4.0
	MW231	15020828.13	1319861.02	550.33	548.47	6.0	16.0	15.7	16.00	532.47	1988	OVB	10.0	4.0
	MW347	15020481.00	1319594.96	551.73	549.84	14.4	24.4	27.0	18.50	531.34	1991	COMBO	10.0	4.0
	MW351	15021257.77	1319798.88	548.38	545.68	9.5	19.5	22.7	22.50	523.18	1991	OVB	10.0	4.0
	MW640	15021244.24	1319804.02	548.12	545.40	29.0	39.0	40.0	23.00	522.40	1999	BRK	10.0	4.0
	MW641	15021873.45	1319350.19	544.50	541.98	7.0	17.0	17.2	29.00	516.08	1999	OVB	10.0	4.0
	MW642	15021874.37	1319339.91	544.47	541.95	29.0	39.0	40.0	29.00	516.08	1999	OVB	10.0	4.0
	MW643	15022117.67	1318719.85	540.03	537.55	4.3	7.2	7.8	7.25	530.30	2001	OVB	2.9	4.0
	MW644	15022128.91	1318718.61	540.23	537.55	10.8	20.4	21.0	7.25	530.30	2001	BRK	9.6	4.0
	MW645	15022269.11	1318648.69	541.47	538.90	7.5	11.5	12.0	10.50	528.40	2001	OVB	4.0	4.0
	MW646	15022257.26	1318650.53	541.48	539.09	12.3	21.9	22.5	10.50	528.59	2001	BRK	9.6	4.0
	MW647	15022572.85	1318012.98	538.40	535.96	7.3	16.9	17.5	6.00	529.96	2001	OVB	9.6	4.0
	MW648	15022428.25	1319438.13	546.77	544.17	7.3	16.8	17.4	13.50	530.67	2001	OVB	9.6	4.0
	MW649	15021299.49	1318723.15	543.10	540.49	7.0	16.6	17.2	7.50	532.99	2001	OVB	9.6	4.0
M4	MW115	15032589.49	1318485.27	533.40	530.80	7.2	27.2	UNKNOWN	2.00	528.80	1981	BRK	20.0	4.0
	MW157	15032947.33	1319827.02	535.02	531.37	3.7	10.2	UNKNOWN	11.00	520.37	1982	COMBO	6.5	2.0
	MW158	15032970.89	1319820.01	534.40	531.58	9.0	29.5	31.9	5.00	526.58	1982	BRK	20.5	3.0
M5	MW114R	15031315.26	1323651.56	556.80	554.9	6.5	21.5	22.0	15.00	539.90	2001	COMBO	15.0	4.0
	MW127R	15032537.25	1326273.84	596.04	592.9	30.0	45.0	46.0	40.00	552.90	2001	COMBO	15.0	4.0
	MW207R	15032188.92	1323779.72	560.21	557.5	7.0	17.0	18.0	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
	MW354R	15031780.18	1323424.19	559.61	557.6	7.0	17.0	18.0	19.00	538.60	2001	COMBO	10.0	4.0
	MW355R	15030827.10	1323676.76	558.12	555.7	10.0	20.0	22.0	15.00	540.70	2001	COMBO	10.0	4.0
	MW356R	15031372.45	1322053.98	558.08	556.1	24.5	34.5	35.0	20.00	536.10	2001	BRK	10.0	4.0
M6	MW117	15036450.18	1318407.67	529.10	526.90	7.7	27.7	UNKNOWN	12.00	514.90	1981	COMBO	20.0	4.0
	MW122	15038443.33	1321304.96	540.10	537.40	7.0	27.0	UNKNOWN	6.50	530.90	1981	BRK	20.0	4.0
	MW123R	15035314.93	1320626.07	537.22	534.9	15.0	30.0	32.0	10.00	524.90	2001	BRK	15.0	4.0
	MW125R	15037201.55	1322981.58	567.69	565.1	12.0	32.0	33.0	26.00	539.10	2001	COMBO	20.0	4.0
	MW160	15034274.88	1321203.86	542.29	538.20	3.3	6.3	10.4	6.00	532.20	1982	OVB	3.0	2.0
	MW162R	15035325.72	1320625.78	540.19	537.7	4.5	9.5	10.0	UNKNOWN	UNKNOWN	2001	OVB	5.0	4.0
	MW164	15037035.66	1321868.53	545.21	541.69	3.0	6.0	9.7	6.00	535.69	1982	OVB	3.0	4.0
	MW165	15037644.18	1321700.33	544.01	540.31	2.8	5.3	9.0	5.00	535.31	1982	OVB	2.5	4.0
	MW166R	15039129.45	1322674.99	558.21	555.6	10.0	20.0	21.0	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
	MW208	15035028.45	1320126.91	538.38	535.10	12.0	27.0	30.1	4.00	531.10	1988	BRK	15.0	4.0
	MW209	15037473.35	1320271.28	537.75	534.89	19.5	34.5	UNKNOWN	11.10	523.79	1988	BRK	15.0	4.0
	MW210R	15035465.00	1322154.00	565.83	564.30	10.7	20.0	20.0	UNKNOWN	UNKNOWN	1998	OVB	10.0	4.0
	MW212R	15035415.00	1321862.00	567.74	565.30	9.5	19.5	21.0	UNKNOWN	UNKNOWN	1998	OVB	10.0	4.0
	MW213R	15035462.00	1322159.00	566.49	564.30	38.0	53.0	54.0	30.50	533.80	1998	BRK	15.0	4.0
	MW215R	15035410.00	1321863.00	567.27	565.30	38.5	53.5	54.5	30.00	535.30	1998	BRK	15.0	4.0
	MW307	15033821.00	1321855.79	563.56	561.45	17.0	27.0	31.7	UNKNOWN	UNKNOWN	1991	OVB	10.0	4.0
	MW308	15033810.75	1321837.62	563.84	561.38	50.5	65.5	71.8	35.00	526.38	1991	BRK	15.0	4.0
	MW309	15034826.80	1321825.25	565.59	563.43	12.7	27.7	30.6	30.00	533.43	1991	OVB	15.0	4.0
	MW310R	15034823.00	1321824.00	565.17	563.00	44.5	59.5	60.0	31.00	532.00	1998	BRK	15.0	4.0
	MW311	15038100.41	1322342.54	548.85	546.36	14.0	24.0	26.4	7.00	539.36	1991	BRK	10.0	4.0
	MW312	15038100.56	1322332.55	548.59	545.96	40.0	55.0	58.1	7.00	538.96	1991	BRK	15.0	4.0
	MW313	15037051.68	1321933.96	551.07	549.20	25.0	40.0	40.9	12.00	537.20	1991	BRK	15.0	4.0
	MW314	15034383.61	1321451.49	542.32	539.53	9.7	14.7	17.8	7.20	532.33	1991	BRK	5.0	4.0
	MW315	15034394.61	1321451.65	541.60	538.91	29.7	44.7	47.9	6.50	532.41	1991	BRK	15.0	4.0
	MW316	15036232.25	1321257.09	542.89	540.49	13.0	18.0	20.9	7.50	532.99	1991	BRK	5.0	4.0
	MW317	15036222.43	1321257.70	542.96	540.71	34.0	49.0	UNKNOWN	8.00	532.71	1991	BRK	15.0	4.0
	MW318	15037189.67	1321488.64	547.67	545.23	11.8	21.8	24.2	11.50	533.73	1991	BRK	10.0	4.0
	MW319	15037202.65	1321489.84	548.10	545.49	40.0	55.0	57.0	12.00	533.49	1991	BRK	15.0	4.0
	MW320R	15039129.65	1322656.01	557.09	554.6	30.5	45.5	46.0	UNKNOWN	UNKNOWN	2001	OVB	15.0	4.0
	MW650	15037950.23	1322587.98	566.45	563.83	12.0	22.0	22.5	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
	MW651	15037939.17	1322583.70	566.88	563.83	36.0	46.0	47.0	23.00	560.83	1999	BRK	10.0	4.0
	MW652	15037004.90	1322243.13	565.03	561.93	11.0	21.0	22.0	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
	MW653	15036994.58	1322239.14	564.60	561.93	36.0	46.0	47.0	25.00	536.93	1999	BRK	10.0	4.0
	MW654	15037070.77	1321976.938.79	551.15	548.49	13.0	23.0	24.0	10.50	539.00	1999	BRK	10.0	4.0
	MW655	15034232.30	1320633.23	540.19	537.71	UNKNOWN	UNKNOWN	UNKNOWN	5.00	532.70	1999	BRK	UNKNOWN	4.0
	MW662	15039862.64	1321841.47	547.56	UNKNOWN	6.0	16.0	18.0	20.00	UNKNOWN	2001	OVB	10.0	4.0
	MW663	15039854.92	1321841.41	547.86	UNKNOWN	30.0	40.0	41.0	20.00	UNKNOWN	2001	BRK	10.0	4.0
	MW664	15040136.57	1322326.42	547.43	UNKNOWN	5.0	10.0	10.5	10.00	UNKNOWN	2001	OVB	5.0	4.0
	MW665	15040145.71	1322327.45	546.98	UNKNOWN	28.0	38.0	40.0	10.00	UNKNOWN	2001	BRK	10.0	4.0

Table A1-21

Monitoring Well Information Table
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Site	Well ID	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
M7	MW124R	15033133.00	1320756.00	537.25	534.70	6.0	16.0	16.0	5.00	UNKNOWN	1998	BRK	10.0	4.0
	MW156	15032408.65	1321713.49	541.35	537.45	1.7	5.2	UNKNOWN	5.30	532.15	1982	OVB	3.5	4.0
	MW159	15033457.92	1320537.11	537.80	533.54	4.4	9.4	12.8	5.70	527.84	1982	COMBO	5.0	4.0
	MW216	15033525.60	1320650.62	538.03	536.51	5.0	10.0	36.7	11.00	525.51	1988	OVB	5.0	4.0
	MW217	15033449.66	1320652.62	538.97	536.90	19.5	34.5	12.0	13.40	523.50	1988	BRK	15.0	4.0
	MW321	15033167.53	1321626.52	545.55	542.93	13.5	23.5	26.6	9.50	533.43	1991	BRK	10.0	4.0
	MW322	15033161.04	1321640.23	544.54	542.26	34.5	49.5	51.5	9.00	533.26	1991	BRK	15.0	4.0
	MW660	15032597.24	1320677.38	539.73	537.08	7.0	12.0	12.6	UNKNOWN	UNKNOWN	1999	OVB	5.0	4.0
	MW661	15032587.16	1320679.22	539.57	537.09	20.0	30.0	30.0	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
M8	MW147R	15037926.87	1323318.04	567.82	564.0	6.5	21.5	22.0	UNKNOWN	UNKNOWN	2001	OVB	15.0	4.0
	MW148R	15038954.52	1323542.19	561.59	560.7	8.0	23.0	23.5	18.00	542.70	2001	COMBO	15.0	4.0
	MW323R	15036514.75	1323739.67	566.00	563.5	8.0	18.0	18.5	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
	MW324R	15038125.44	1323502.88	566.23	562.7	9.5	19.5	20.0	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
	MW325R	15036105.38	1322633.31	569.62	566.9	7.0	17.0	18.0	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
	MW327R	15035974.93	1324366.55	565.27	562.57	13.5	18.5	19.0	17.00	UNKNOWN	2001	COMBO	5.0	4.0
	MW121	15040140.83	1323725.54	575.75	572.50	10.0	30.0	14.2	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
	MW328	15040352.78	1323793.00	582.93	580.72	18.0	28.0	19.7	UNKNOWN	UNKNOWN	1991	OVB	10.0	4.0
	MW330	15040218.36	1323970.19	580.33	578.20	15.0	25.0	17.0	UNKNOWN	UNKNOWN	1991	OVB	10.0	4.0
Other Areas	MW116	15034538.62	1318460.26	535.20	532.60	7.0	27.0	UNKNOWN	5.00	527.60	1981	BRK	20.0	4.0
	MW118	15039343.51	1318362.19	534.00	531.20	8.0	23.0	UNKNOWN	2.50	528.70	1981	BRK	15.0	4.0
	MW119	15040962.12	1320127.86	538.90	535.50	3.3	23.3	UNKNOWN	6.00	529.50	1981	BRK	20.0	4.0
M13	AEHA 14R	15034927.28	1322519.89	569.73	567.03	16.5	26.5	27.0	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
	AEHA 15	15034695.41	1322493.87	570.38	567.32	UNKNOWN	UNKNOWN	36.5	UNKNOWN	UNKNOWN	UNKNOWN	OVB	UNKNOWN	2.0
	MW126R	15034092.63	1323332.31	562.41	563.00	11.0	21.0	22.0	UNKNOWN	UNKNOWN	2004	OVB	10.0	4.0
	MW350	15032810.11	1321811.02	554.34	552.34	12.5	22.5	24.8	19.00	533.34	1991	COMBO	10.0	4.0
	MW362	15034100.64	1323339.44	562.46	562.78	28.0	33.0	34.0	29.50	533.28	2004	BRK	5.0	4.0
	MW363	15032768.31	1322536.05	570.03	567.66	21.0	31.0	32.0	31.50	536.16	2004	OVB	10.0	4.0
	MW364	15032775.38	1322527.16	569.82	567.69	37.0	42.0	42.5	31.50	536.19	2004	BRK	5.0	4.0
	MW806	15034807.20	1323337.90	565.53	UNKNOWN	15.0	25.0	25.0	29.00	UNKNOWN	2008	OVB	10.0	4.0
	MW807	15034817.40	1323338.10	565.79	UNKNOWN	35.0	45.0	45.0	29.00	UNKNOWN	2008	BRK	10.0	4.0
	MW808	15034539.90	1322493.10	569.23	UNKNOWN	15.0	25.0	25.0	30.00	UNKNOWN	2008	OVB	10.0	4.0
	MW809	15034530.20	1322492.90	569.18	UNKNOWN	35.0	45.0	45.0	30.00	UNKNOWN	2008	BRK	10.0	4.0

Notes:
Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)
UNKOWN = Indicate data not presented on borelogs or provided in RI/FS documentation.
NM = Water level not measured.
BRK = Bedrock
OVB = Overburden
COMBO = Combination Overburden and Bedrock Well
MSL = Feet relative to mean seal level
BGS = Feet below ground surface
ID = Identification
TOC = Top of Casing

Table A1-22

Summary of Groundwater Elevations
Groundwater Remediation Unit 2
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Site	Well ID	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Water February 2009 (TOC)	Water Elevation February 2009 (MSL)	Depth to Water April 2009 (TOC)	Water Elevation April 2009 (MSL)	Depth to Water July 2009 (TOC)	Water Elevation July 2009 (MSL)	Depth to Water October 2009 (TOC)	Water Elevation October 2009 (MSL)	Depth to Water January 2010 (TOC)	Water Elevation January 2010 (MSL)	Depth to Water April 2010 (TOC)	Water Elevation April 2010 (MSL)	Depth to Water July 2010 (TOC)	Water Elevation July 2010 (MSL)	Depth to Water October 2010 (TOC)	Water Elevation October 2010 (MSL)
M1	MW104	549.10	546.20	**NM**	**NM**	4.49	544.61	**NM**	**NM**	6.63	542.47	**NM**	**NM**	5.43	543.67	**NM**	**NM**	8.89	540.21
	MW105	555.00	552.50	**NM**	**NM**	3.72	551.28	**NM**	**NM**	6.69	548.31	**NM**	**NM**	4.61	550.39	**NM**	**NM**	9.99	545.01
	MW106	542.00	539.70	**NM**	**NM**	1.92	540.08	**NM**	**NM**	4.38	537.62	**NM**	**NM**	3.05	538.95	**NM**	**NM**	6.90	535.10
	MW107	552.40	549.10	**NM**	**NM**	4.27	548.13	**NM**	**NM**	7.02	545.38	**NM**	**NM**	4.71	547.69	**NM**	**NM**	8.71	543.69
	MW201	546.15	544.01	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	3.71	542.44	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	6.10	540.05
	MW231	550.33	548.47	**NM**	**NM**	3.56	546.77	**NM**	**NM**	5.01	545.32	**NM**	**NM**	3.40	546.93	**NM**	**NM**	6.18	544.15
	MW347	551.73	549.84	**NM**	**NM**	3.42	548.31	**NM**	**NM**	4.81	546.92	**NM**	**NM**	4.25	547.48	**NM**	**NM**	5.02	546.71
	MW351	548.38	545.68	**NM**	**NM**	2.83	545.55	**NM**	**NM**	5.46	542.92	**NM**	**NM**	4.04	544.34	**NM**	**NM**	7.00	541.38
	MW640	548.12	545.40	**NM**	**NM**	2.65	545.47	**NM**	**NM**	4.00	544.12	**NM**	**NM**	3.39	544.73	**NM**	**NM**	6.37	541.75
	MW641	544.50	541.98	**NM**	**NM**	0.93	543.57	**NM**	**NM**	2.79	541.71	**NM**	**NM**	1.65	542.85	**NM**	**NM**	4.16	540.34
	MW642	544.47	541.95	**NM**	**NM**	1.34	543.13	**NM**	**NM**	3.30	541.17	**NM**	**NM**	2.10	542.37	**NM**	**NM**	4.62	539.85
	MW643	540.03	537.55	**NM**	**NM**	3.21	536.82	**NM**	**NM**	6.12	533.91	**NM**	**NM**	5.59	534.44	**NM**	**NM**	6.49	533.54
	MW644	540.23	537.55	**NM**	**NM**	3.33	536.90	**NM**	**NM**	6.31	533.92	**NM**	**NM**	5.69	534.54	**NM**	**NM**	6.67	533.56
	MW645	541.47	538.90	**NM**	**NM**	4.17	537.30	**NM**	**NM**	8.98	532.59	**NM**	**NM**	7.75	533.72	**NM**	**NM**	8.98	532.59
	MW646	541.48	539.09	**NM**	**NM**	3.96	537.52	**NM**	**NM**	8.84	532.64	**NM**	**NM**	7.73	533.75	**NM**	**NM**	8.80	532.68
	MW647	538.40	535.96	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	6.79	531.61	**NM**	**NM**	4.68	533.72	**NM**	**NM**	8.75	529.65
	MW648	546.77	544.17	**NM**	**NM**	3.41	543.36	**NM**	**NM**	6.15	540.62	**NM**	**NM**	5.30	541.47	**NM**	**NM**	7.56	539.21
	MW649	543.10	540.49	**NM**	**NM**	4.07	539.03	**NM**	**NM**	7.22	535.88	**NM**	**NM**	6.21	536.89	**NM**	**NM**	9.02	534.08
M4	MW115	533.40	530.80	**NM**	**NM**	4.84	528.56	**NM**	**NM**	6.45	526.95	**NM**	**NM**	5.35	528.05	**NM**	**NM**	10.38	523.02
	MW157	535.02	531.37	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	4.21	530.81	**NM**	**NM**	4.08	530.94	**NM**	**NM**	4.76	530.26
	MW158	534.40	531.58	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	3.94	530.46	**NM**	**NM**	3.38	531.02	**NM**	**NM**	5.73	528.67
M5	MW114R	556.80	554.9	**NM**	**NM**	9.50	547.30	**NM**	**NM**	10.89	545.91	**NM**	**NM**	10.45	546.35	**NM**	**NM**	10.76	546.04
	MW127R	596.04	592.9	**NM**	**NM**	40.81	555.23	**NM**	**NM**	41.64	554.40	**NM**	**NM**	41.22	554.82	**NM**	**NM**	41.61	554.43
	MW207R	560.21	557.5	**NM**	**NM**	10.99	549.22	**NM**	**NM**	11.17	549.04	**NM**	**NM**	11.54	548.67	**NM**	**NM**	12.51	547.70
	MW354R	559.61	557.6	**NM**	**NM**	12.29	547.32	**NM**	**NM**	14.31	545.30	**NM**	**NM**	13.69	545.92	**NM**	**NM**	14.00	545.61
	MW355R	558.12	555.7	**NM**	**NM**	11.40	546.72	**NM**	**NM**	12.25	545.87	**NM**	**NM**	11.78	546.34	**NM**	**NM**	12.01	546.11
	MW356R	558.08	556.1	**NM**	**NM**	14.22	543.86	**NM**	**NM**	18.19	539.89	**NM**	**NM**	17.13	540.95	**NM**	**NM**	17.45	540.63
M6	MW117	529.10	526.90	**NM**	**NM**	3.71	525.39	**NM**	**NM**	4.22	524.88	**NM**	**NM**	4.03	525.07	**NM**	**NM**	6.38	522.72
	MW122	540.10	537.40	**NM**	**NM**	3.25	536.85	**NM**	**NM**	4.33	535.77	**NM**	**NM**	4.06	536.04	**NM**	**NM**	6.18	533.92
	MW123R	537.22	534.9	**NM**	**NM**	4.70	532.52	**NM**	**NM**	5.42	531.80	**NM**	**NM**	5.29	531.93	**NM**	**NM**	6.39	530.83
	MW125R	567.69	565.1	**NM**	**NM**	13.81	553.88	**NM**	**NM**	14.15	553.54	**NM**	**NM**	13.73	553.96	**NM**	**NM**	15.06	552.63
	MW160	542.29	538.20	**NM**	**NM**	6.64	535.65	**NM**	**NM**	6.38	535.91	**NM**	**NM**	6.46	535.83	**NM**	**NM**	7.07	535.22
	MW162R	540.19	537.7	**NM**	**NM**	4.28	535.91	**NM**	**NM**	5.38	534.81	**NM**	**NM**	5.11	535.08	**NM**	**NM**	6.31	533.88
	MW164	545.21	541.69	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	6.81	538.40	**NM**	**NM**	5.95	539.26	**NM**	**NM**	9.57	535.64
	MW165	544.01	540.31	**NM**	**NM**	3.60	540.41	**NM**	**NM**	5.95	538.06	**NM**	**NM**	5.16	538.85	**NM**	**NM**	**DRY**	**DRY**
	MW166R	558.21	555.6	**NM**	**NM**	13.00	545.21	**NM**	**NM**	13.58	544.63	**NM**	**NM**	13.20	545.01	**NM**	**NM**	14.68	543.53
	MW208	538.38	535.10	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	4.70	533.68	**NM**	**NM**	4.11	534.27	**NM**	**NM**	7.58	530.80
	MW209	537.75	534.89	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	3.86	533.89	**NM**	**NM**	3.18	534.57	**NM**	**NM**	7.17	530.58
	MW210R	565.83	564.30	**NM**	**NM**	10.04	555.79	**NM**	**NM**	11.34	554.49	**NM**	**NM**	10.55	555.28	**NM**	**NM**	13.29	552.54
	MW212R	567.74	565.30	**NM**	**NM**	14.19	553.55	**NM**	**NM**	15.20	552.54	**NM**	**NM**	14.68	553.06	**NM**	**NM**	15.65	552.09
	MW213R	566.49	564.30	**NM**	**NM**	18.81	547.68	**NM**	**NM**	19.06	547.43	**NM**	**NM**	19.03	547.46	**NM**	**NM**	20.14	546.35
	MW215R	567.27	565.30	**NM**	**NM**	20.45	546.82	**NM**	**NM**	20.70	546.57	**NM**	**NM**	20.65	546.62	**NM**	**NM**	21.87	545.40
	MW307	563.56	561.45	**NM**	**NM**	19.41	544.15	**NM**	**NM**	19.73	543.83	**NM**	**NM**	19.52	544.04	**NM**	**NM**	19.87	543.69
	MW308	563.84	561.38	**NM**	**NM**	27.92	535.92	**NM**	**NM**	28.46	535.38	**NM**	**NM**	27.99	535.85	**NM**	**NM**	30.42	533.42
	MW309	565.59	563.43	**NM**	**NM**	10.57	555.02	**NM**	**NM**	11.75	553.84	**NM**	**NM**	11.11	554.48	**NM**	**NM**	12.95	552.64
	MW310R	565.17	563.00	**NM**	**NM**	21.45	543.72	**NM**	**NM**	21.77	543.40	**NM**	**NM**	21.71	543.46	**NM**	**NM**	23.05	542.12
	MW311	548.85	546.36	**NM**	**NM**	0.33	548.52	**NM**	**NM**	1.13	547.72	**NM**	**NM**	1.04	547.81	**NM**	**NM**	2.10	546.75
	MW312	548.59	545.96	**NM**	**NM**	0.10	548.49	**NM**	**NM**	0.87	547.72	**NM**	**NM**	0.77	547.82	**NM**	**NM**	1.83	546.76
	MW313	551.07	549.20	**NM**	**NM**	11.56	539.51	**NM**	**NM**	12.54	538.53	**NM**	**NM**	11.68	539.39	**NM**	**NM**	15.11	535.96
	MW314	542.32	539.53	**NM**	**NM**	6.42	535.90	**NM**	**NM**	6.68	535.64	**NM**	**NM**	6.45	535.87	**NM**	**NM**	7.45	534.87
	MW315	541.60	538.91	**NM**	**NM**	5.77	535.83	**NM**	**NM**	6.03	535.57	**NM**	**NM**	5.82	535.78	**NM**	**NM**	6.96	534.64
	MW316	542.89	540.49	**NM**	**NM**	5.80	537.09	**NM**	**NM**	6.24	536.65	**NM**	**NM**	6.11	536.78	**NM**	**NM**	7.89	535.00
	MW317	542.96	540.71	**NM**	**NM**	6.32	536.64	**NM**	**NM**	6.77	536.19	**NM**	**NM**	6.62	536.34	**NM**	**NM**	8.12	534.84
	MW318	547.67	545.23	**NM**	**NM**	9.16	538.51	**NM**	**NM**	10.22	537.45	**NM**	**NM**	9.70	537.97	**NM**	**NM**	12.67	535.00
	MW319	548.10	545.49	**NM**	**NM**	9.48	538.62	**NM**	**NM**	10.56	537.54	**NM**	**NM**	10.04	538.06	**NM**	**NM**	12.97	535.13
	MW320R	557.09	554.6	**NM**	**NM**	11.74	545.35	**NM**	**NM**	12.32	544.77	**NM**	**NM**	11.94	545.15	**NM**	**NM**	13.49	543.60
	MW650	566.45	563.83	**NM**	**NM**	9.56	556.89	**NM**	**NM**	11.39	555.06	**NM**	**NM**	10.51	555.94	**NM**	**NM**	12.20	554.25
	MW651	566.88	563.83	**NM**	**NM**	17.84	549.04	**NM**	**NM**	18.15	548.73	**NM**	**NM**	17.98	548.90	**NM**	**NM**	19.01	547.87
	MW652	565.03	561.93	**NM**	**NM**	10.40	554.63	**NM**	**NM**	11.86	553.17	**NM**	**NM**	11.10	553.93	**NM**	**NM**	12.70	552.33
	MW653	564.60	561.93	**NM**	**NM**	16.83	547.77	**NM**	**NM**	16.94	547.66	**NM**	**NM**	17.13	547.47	**NM**	**NM**	18.24	546.36
	MW654	551.15	548.49	**NM**	**NM**	11.81	539.34	**NM**	**NM**	12.81	538.34	**NM**	**NM**	11.92	539.23	**NM**	**NM**	15.38	535.77
	MW655	540.19	537.71	**NM**	**NM**	6.38	533.81	**NM**	**NM**	7.08	533.11	**NM**	**NM**	6.98	533.21	**NM**	**NM**	8.93	531.26
	MW662	547.56	**UNKNOWN**	**NM**	**NM**	5.65	541.91	**NM**	**NM**	7.86	539.70	**NM**	**NM**	7.27	540.29	**NM**	**NM**	8.55	539.01
	MW663	547.86	**UNKNOWN**	**NM**	**NM**	6.02	541.84	**NM**	**NM**	8.03	539.83	**NM**	**NM**	7.50	540.36	**NM**	**NM**	8.78	539.08
	MW664	547.43	**UNKNOWN**	**NM**	**NM**	5.14	542.29	**NM**	**NM**	7.25	540.18	**NM**	**NM**	6.79	540.64	**NM**	**NM**	7.62	539.81
	MW665	546.98	**UNKNOWN**	**NM**	**NM**	3.01	543.97	**NM**	**NM**	4.20	542.78	**NM**	**NM**	4.14	542.84	**NM**	**NM**	5.17	541.81

Table A1-22

Summary of Groundwater Elevations
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Water February 2009 (TOC)	Water Elevation February 2009 (MSL)	Depth to Water April 2009 (TOC)	Water Elevation April 2009 (MSL)	Depth to Water July 2009 (TOC)	Water Elevation July 2009 (MSL)	Depth to Water October 2009 (TOC)	Water Elevation October 2009 (MSL)	Depth to Water January 2010 (TOC)	Water Elevation January 2010 (MSL)	Depth to Water April 2010 (TOC)	Water Elevation April 2010 (MSL)	Depth to Water July 2010 (TOC)	Water Elevation July 2010 (MSL)	Depth to Water October 2010 (TOC)	Water Elevation October 2010 (MSL)
M7	MW124R	537.25	534.70	**NM**	**NM**	1.46	535.79	**NM**	**NM**	3.04	534.21	**NM**	**NM**	2.33	534.92	**NM**	**NM**	4.31	532.94
	MW156	541.35	537.45	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	4.38	536.97	**NM**	**NM**	4.40	536.95	**NM**	**NM**	4.90	536.45
	MW159	537.80	533.54	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	6.03	531.77	**NM**	**NM**	5.95	531.85	**NM**	**NM**	6.80	531.00
	MW216	538.03	536.51	**NM**	**NM**	4.99	533.04	**NM**	**NM**	6.94	531.09	**NM**	**NM**	5.78	532.25	**NM**	**NM**	9.57	528.46
	MW217	538.97	536.90	**NM**	**NM**	3.79	535.18	**NM**	**NM**	6.82	532.15	**NM**	**NM**	6.52	532.45	**NM**	**NM**	7.11	531.86
	MW321	545.55	542.93	**NM**	**NM**	6.77	538.78	**NM**	**NM**	7.08	538.47	**NM**	**NM**	6.74	538.81	**NM**	**NM**	7.99	537.56
	MW322	544.54	542.26	**NM**	**NM**	9.70	534.84	**NM**	**NM**	10.63	533.91	**NM**	**NM**	9.70	534.84	**NM**	**NM**	13.12	531.42
	MW660	539.73	537.08	**NM**	**NM**	5.26	534.47	**NM**	**NM**	5.71	534.02	**NM**	**NM**	5.27	534.46	**NM**	**NM**	7.22	532.51
	MW661	539.57	537.09	**NM**	**NM**	6.37	533.20	**NM**	**NM**	6.51	533.06	**NM**	**NM**	5.98	533.59	**NM**	**NM**	7.00	532.57
M8	MW147R	567.82	564.0	**NM**	**NM**	10.41	557.41	**NM**	**NM**	12.18	555.64	**NM**	**NM**	10.92	556.90	**NM**	**NM**	12.98	554.84
	MW148R	561.59	560.7	**NM**	**NM**	16.01	545.58	**NM**	**NM**	16.26	545.33	**NM**	**NM**	16.09	545.50	**NM**	**NM**	16.23	545.36
	MW323R	566.00	563.5	**NM**	**NM**	10.91	555.09	**NM**	**NM**	11.26	554.74	**NM**	**NM**	10.91	555.09	**NM**	**NM**	11.81	554.19
	MW324R	566.23	562.7	**NM**	**NM**	16.28	549.95	**NM**	**NM**	16.35	549.88	**NM**	**NM**	16.69	549.54	**NM**	**NM**	18.25	547.98
	MW325R	569.62	566.9	**NM**	**NM**	12.68	556.94	**NM**	**NM**	14.08	555.54	**NM**	**NM**	13.23	556.39	**NM**	**NM**	14.82	554.80
	MW327R	565.27	562.57	**NM**	**NM**	11.73	553.54	**NM**	**NM**	11.94	553.33	**NM**	**NM**	11.86	553.41	**NM**	**NM**	12.71	552.56
M8	MW121	575.75	572.50	**NM**	**NM**	18.14	557.61	**NM**	**NM**	18.69	557.06	**NM**	**NM**	18.68	557.07	**NM**	**NM**	19.24	556.51
	MW328	582.93	580.72	**NM**	**NM**	23.71	559.22	**NM**	**NM**	24.43	558.50	**NM**	**NM**	24.24	558.69	**NM**	**NM**	24.98	557.95
	MW330	580.33	578.20	**NM**	**NM**	21.71	558.62	**NM**	**NM**	22.02	558.31	**NM**	**NM**	21.96	558.37	**NM**	**NM**	22.51	557.82
Other Areas	MW116	535.20	532.60	**NM**	**NM**	4.13	531.07	**NM**	**NM**	5.41	529.79	**NM**	**NM**	4.74	530.46	**NM**	**NM**	10.62	524.58
	MW118	534.00	531.20	**NM**	**NM**	3.09	530.91	**NM**	**NM**	3.19	530.81	**NM**	**NM**	3.17	530.83	**NM**	**NM**	6.01	527.99
	MW119	538.90	535.50	**NM**	**NM**	5.67	533.23	**NM**	**NM**	5.96	532.94	**NM**	**NM**	5.63	533.27	**NM**	**NM**	7.19	531.71
M13	AEHA 14R	569.73	567.03	18.10	551.63	18.29	551.44	16.45	553.28	17.46	552.27	18.10	551.63	17.33	552.40	17.39	552.34	20.00	549.73
	AEHA 15	570.38	567.32	21.02	549.36	21.29	549.09	19.52	550.86	19.97	550.41	21.02	549.36	20.22	550.16	19.95	550.43	20.92	549.46
	MW126R	562.41	563.00	15.61	546.80	15.38	547.03	15.15	547.26	15.35	547.06	15.61	546.80	14.71	547.70	15.33	547.08	14.91	547.50
	MW350	554.34	552.34	16.21	538.13	15.93	538.41	14.19	540.15	15.27	539.07	16.21	538.13	15.08	539.26	15.26	539.08	16.11	538.23
	MW362	562.46	562.78	13.75	548.71	14.01	548.45	12.30	550.16	12.76	549.70	13.75	548.71	12.85	549.61	12.69	549.77	13.72	548.74
	MW363	570.03	567.66	28.27	541.76	28.17	541.86	26.99	543.04	27.77	542.26	28.27	541.76	27.68	542.35	27.80	542.23	28.44	541.59
	MW364	569.82	567.69	28.21	541.61	27.97	541.85	26.99	542.83	27.65	542.17	28.21	541.61	27.50	542.32	27.69	542.13	28.41	541.41
	MW806	565.53	**UNKNOWN**	15.07	550.46	13.91	551.62	13.32	552.21	13.67	551.86	15.07	550.46	14.19	551.34	13.55	551.98	14.41	551.12
	MW807	565.79	**UNKNOWN**	16.30	549.49	14.48	551.31	14.75	551.04	15.14	550.65	16.30	549.49	15.36	550.43	15.20	550.59	16.20	549.59
	MW808	569.23	**UNKNOWN**	17.15	552.08	15.58	553.65	16.48	552.75	17.30	551.93	17.15	552.08	16.68	552.55	17.05	552.18	17.91	551.32
	MW809	569.18	**UNKNOWN**	20.28	548.90	19.10	550.08	18.84	550.34	19.26	549.92	20.28	548.90	19.42	549.76	19.27	549.91	20.29	548.89

Notes:
ID = Identification
TOC = Top of Casing
MSL = Feet relative to mean seal level
NM = Water level not measured.
Unknown = Information not available

Table A1-22

Summary of Groundwater Elevations
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	TOC Elevation (MSL)	Depth to Water January 2011 (TOC)	Water Elevation January 2011 (MSL)	Depth to Water April 2011 (TOC)	Water Elevation April 2011 (MSL)	Depth to Water July 2011 (TOC)	Water Elevation July 2011 (MSL)	Depth to Water October 2011 (TOC)	Water Elevation October 2011 (MSL)	Depth to Water February 2012 (TOC)	Water Elevation February 2012 (MSL)	Depth to Water April 2012 (TOC)	Water Elevation April 2012 (MSL)	Depth to Water July 2012 (TOC)	Water Elevation July 2012 (MSL)	Depth to Water October 2012 (TOC)	Water Elevation October 2012 (MSL)
M1	MW104	549.10	**NM**	**NM**	5.68	543.42	**NM**	**NM**	7.52	541.58	**NM**	**NM**	6.05	543.05	**NM**	**NM**	11.27	537.83
	MW105	555.00	**NM**	**NM**	5.31	549.69	**NM**	**NM**	8.01	546.99	**NM**	**NM**	6.01	548.99	**NM**	**NM**	11.10	543.90
	MW106	542.00	**NM**	**NM**	3.06	538.94	**NM**	**NM**	5.10	536.90	**NM**	**NM**	3.60	538.40	**NM**	**NM**	**NM**	**NM**
	MW107	552.40	**NM**	**NM**	4.73	547.67	**NM**	**NM**	7.62	544.78	**NM**	**NM**	6.06	546.34	**NM**	**NM**	11.23	541.17
	MW201	546.15	**NM**	**NM**	NM	NM	**NM**	**NM**	4.72	541.43	**NM**	**NM**	2.88	543.27	**NM**	**NM**	8.48	537.67
	MW231	550.33	**NM**	**NM**	3.74	546.59	**NM**	**NM**	5.00	545.33	**NM**	**NM**	3.99	546.34	**NM**	**NM**	6.35	543.98
	MW347	551.73	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	7.13	544.60	**NM**	**NM**	4.81	546.92	**NM**	**NM**	**NM**	**NM**
	MW351	548.38	**NM**	**NM**	8.09	540.29	**NM**	**NM**	6.10	542.28	**NM**	**NM**	4.91	543.47	**NM**	**NM**	8.49	539.89
	MW640	548.12	**NM**	**NM**	3.32	544.80	**NM**	**NM**	6.17	541.95	**NM**	**NM**	3.95	544.17	**NM**	**NM**	8.30	539.82
	MW641	544.50	**NM**	**NM**	1.75	542.75	**NM**	**NM**	3.54	540.96	**NM**	**NM**	2.22	542.28	**NM**	**NM**	5.53	538.97
	MW642	544.47	**NM**	**NM**	2.24	542.23	**NM**	**NM**	3.98	540.49	**NM**	**NM**	2.75	541.72	**NM**	**NM**	6.04	538.43
	MW643	540.03	**NM**	**NM**	5.89	534.14	**NM**	**NM**	6.27	533.76	**NM**	**NM**	6.73	533.30	**NM**	**NM**	8.03	532.00
	MW644	540.23	**NM**	**NM**	6.14	534.09	**NM**	**NM**	6.33	533.90	**NM**	**NM**	6.22	534.01	**NM**	**NM**	8.16	532.07
	MW645	541.47	**NM**	**NM**	8.19	533.28	**NM**	**NM**	12.92	528.55	**NM**	**NM**	8.53	532.94	**NM**	**NM**	9.68	531.79
	MW646	541.48	**NM**	**NM**	8.16	533.32	**NM**	**NM**	12.77	528.71	**NM**	**NM**	8.49	532.99	**NM**	**NM**	9.45	532.03
	MW647	538.40	**NM**	**NM**	4.16	534.24	**NM**	**NM**	7.50	530.90	**NM**	**NM**	5.69	532.71	**NM**	**NM**	11.34	527.06
	MW648	546.77	**NM**	**NM**	5.65	541.12	**NM**	**NM**	6.89	539.88	**NM**	**NM**	6.03	540.74	**NM**	**NM**	9.06	537.71
	MW649	543.10	**NM**	**NM**	6.61	536.49	**NM**	**NM**	8.07	535.03	**NM**	**NM**	7.24	535.86	**NM**	**NM**	13.03	530.07
M4	MW115	533.40	**NM**	**NM**	4.87	528.53	**NM**	**NM**	7.31	526.09	**NM**	**NM**	4.59	528.81	**NM**	**NM**	14.03	519.37
	MW157	535.02	**NM**	**NM**	3.79	531.23	**NM**	**NM**	4.64	530.38	**NM**	**NM**	4.68	530.34	**NM**	**NM**	8.29	526.73
	MW158	534.40	**NM**	**NM**	3.03	531.37	**NM**	**NM**	4.34	530.06	**NM**	**NM**	4.06	530.34	**NM**	**NM**	7.89	526.51
M5	MW114R	556.80	**NM**	**NM**	9.10	547.70	**NM**	**NM**	10.40	546.40	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
	MW127R	596.04	**NM**	**NM**	42.12	553.92	**NM**	**NM**	42.28	553.76	**NM**	**NM**	42.29	553.75	**NM**	**NM**	43.01	553.03
	MW207R	560.21	**NM**	**NM**	11.36	548.85	**NM**	**NM**	11.85	548.36	**NM**	**NM**	NM	NM	**NM**	**NM**	11.74	548.47
	MW354R	559.61	**NM**	**NM**	13.17	546.44	**NM**	**NM**	13.11	546.50	**NM**	**NM**	13.69	545.92	**NM**	**NM**	**NM**	**NM**
	MW355R	558.12	**NM**	**NM**	10.49	547.63	**NM**	**NM**	13.21	544.91	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
	MW356R	558.08	**NM**	**NM**	15.60	542.48	**NM**	**NM**	15.37	542.71	**NM**	**NM**	16.05	542.03	**NM**	**NM**	13.33	544.75
M6	MW117	529.10	**NM**	**NM**	3.74	525.36	**NM**	**NM**	4.59	524.51	**NM**	**NM**	4.75	524.35	**NM**	**NM**	7.53	521.57
	MW122	540.10	**NM**	**NM**	3.90	536.20	**NM**	**NM**	4.68	535.42	**NM**	**NM**	4.60	535.50	**NM**	**NM**	**NM**	**NM**
	MW123R	537.22	**NM**	**NM**	5.12	532.10	**NM**	**NM**	5.57	531.65	**NM**	**NM**	5.48	531.74	**NM**	**NM**	7.30	529.92
	MW125R	567.69	**NM**	**NM**	14.42	553.27	**NM**	**NM**	14.33	553.36	**NM**	**NM**	14.27	553.42	**NM**	**NM**	**NM**	**NM**
	MW160	542.29	**NM**	**NM**	6.28	536.01	**NM**	**NM**	6.79	535.50	**NM**	**NM**	6.83	535.46	**NM**	**NM**	8.74	533.55
	MW162R	540.19	**NM**	**NM**	4.92	535.27	**NM**	**NM**	5.52	534.67	**NM**	**NM**	5.41	534.78	**NM**	**NM**	7.15	533.04
	MW164	545.21	**NM**	**NM**	5.86	539.35	**NM**	**NM**	8.14	537.07	**NM**	**NM**	6.49	538.72	**NM**	**NM**	**NM**	**NM**
	MW165	544.01	**NM**	**NM**	4.79	539.22	**NM**	**NM**	7.39	536.62	**NM**	**NM**	5.80	538.21	**NM**	**NM**	9.13	534.88
	MW166R	558.21	**NM**	**NM**	12.86	545.35	**NM**	**NM**	13.79	544.42	**NM**	**NM**	13.70	544.51	**NM**	**NM**	14.25	543.96
	MW208	538.38	**NM**	**NM**	4.22	534.16	**NM**	**NM**	5.91	532.47	**NM**	**NM**	5.91	532.47	**NM**	**NM**	**NM**	**NM**
	MW209	537.75	**NM**	**NM**	3.01	534.74	**NM**	**NM**	5.28	532.47	**NM**	**NM**	4.37	533.38	**NM**	**NM**	**NM**	**NM**
	MW210R	565.83	**NM**	**NM**	10.35	555.48	**NM**	**NM**	11.50	554.33	**NM**	**NM**	10.74	555.09	**NM**	**NM**	16.80	549.03
	MW212R	567.74	**NM**	**NM**	14.59	553.15	**NM**	**NM**	15.25	552.49	**NM**	**NM**	14.74	553.00	**NM**	**NM**	16.04	551.70
	MW213R	566.49	**NM**	**NM**	19.19	547.30	**NM**	**NM**	19.25	547.24	**NM**	**NM**	19.47	547.02	**NM**	**NM**	20.39	546.10
	MW215R	567.27	**NM**	**NM**	20.75	546.52	**NM**	**NM**	21.00	546.27	**NM**	**NM**	21.12	546.15	**NM**	**NM**	22.17	545.10
	MW307	563.56	**NM**	**NM**	19.58	543.98	**NM**	**NM**	19.81	543.75	**NM**	**NM**	19.55	544.01	**NM**	**NM**	20.06	543.50
	MW308	563.84	**NM**	**NM**	22.03	541.81	**NM**	**NM**	21.94	541.90	**NM**	**NM**	21.58	542.26	**NM**	**NM**	22.55	541.29
	MW309	565.59	**NM**	**NM**	10.82	554.77	**NM**	**NM**	11.99	553.60	**NM**	**NM**	11.26	554.33	**NM**	**NM**	12.92	552.67
	MW310R	565.17	**NM**	**NM**	21.99	543.18	**NM**	**NM**	22.13	543.04	**NM**	**NM**	22.06	543.11	**NM**	**NM**	**NM**	**NM**
	MW311	548.85	**NM**	**NM**	1.11	547.74	**NM**	**NM**	1.21	547.64	**NM**	**NM**	1.31	547.54	**NM**	**NM**	**NM**	**NM**
	MW312	548.59	**NM**	**NM**	0.86	547.73	**NM**	**NM**	0.97	547.62	**NM**	**NM**	1.04	547.55	**NM**	**NM**	**NM**	**NM**
	MW313	551.07	**NM**	**NM**	11.31	539.76	**NM**	**NM**	13.51	537.56	**NM**	**NM**	12.03	539.04	**NM**	**NM**	16.18	534.89
	MW314	542.32	**NM**	**NM**	6.22	536.10	**NM**	**NM**	7.04	535.28	**NM**	**NM**	6.90	535.42	**NM**	**NM**	9.13	533.19
	MW315	541.60	**NM**	**NM**	5.72	535.88	**NM**	**NM**	6.35	535.25	**NM**	**NM**	6.19	535.41	**NM**	**NM**	**NM**	**NM**
	MW316	542.89	**NM**	**NM**	6.05	536.84	**NM**	**NM**	6.54	536.35	**NM**	**NM**	6.15	536.74	**NM**	**NM**	**NM**	**NM**
	MW317	542.96	**NM**	**NM**	6.59	536.37	**NM**	**NM**	6.95	536.01	**NM**	**NM**	6.68	536.28	**NM**	**NM**	9.32	533.64
	MW318	547.67	**NM**	**NM**	9.59	538.08	**NM**	**NM**	11.34	536.33	**NM**	**NM**	10.12	537.55	**NM**	**NM**	13.86	533.81
	MW319	548.10	**NM**	**NM**	9.97	538.13	**NM**	**NM**	11.59	536.51	**NM**	**NM**	10.43	537.67	**NM**	**NM**	14.11	533.99
	MW320R	557.09	**NM**	**NM**	11.56	545.53	**NM**	**NM**	12.55	544.54	**NM**	**NM**	12.46	544.63	**NM**	**NM**	**NM**	**NM**
	MW650	566.45	**NM**	**NM**	9.62	556.83	**NM**	**NM**	11.21	555.24	**NM**	**NM**	10.84	555.61	**NM**	**NM**	12.06	554.39
	MW651	566.88	**NM**	**NM**	18.19	548.69	**NM**	**NM**	18.22	548.66	**NM**	**NM**	18.29	548.59	**NM**	**NM**	18.98	547.90
	MW652	565.03	**NM**	**NM**	10.80	554.23	**NM**	**NM**	12.13	552.90	**NM**	**NM**	11.31	553.72	**NM**	**NM**	13.30	551.73
	MW653	564.60	**NM**	**NM**	17.52	547.08	**NM**	**NM**	17.37	547.23	**NM**	**NM**	17.69	546.91	**NM**	**NM**	18.37	546.23
	MW654	551.15	**NM**	**NM**	11.75	539.40	**NM**	**NM**	14.03	537.12	**NM**	**NM**	12.55	538.60	**NM**	**NM**	16.55	534.60
	MW655	540.19	**NM**	**NM**	6.65	533.54	**NM**	**NM**	7.53	532.66	**NM**	**NM**	7.46	532.73	**NM**	**NM**	**NM**	**NM**
	MW662	547.56	**NM**	**NM**	6.56	541.00	**NM**	**NM**	8.45	539.11	**NM**	**NM**	9.15	538.41	**NM**	**NM**	8.38	539.18
	MW663	547.86	**NM**	**NM**	6.78	541.08	**NM**	**NM**	8.73	539.13	**NM**	**NM**	9.31	538.55	**NM**	**NM**	8.77	539.09
	MW664	547.43	**NM**	**NM**	5.71	541.72	**NM**	**NM**	8.41	539.02	**NM**	**NM**	8.62	538.81	**NM**	**NM**	**NM**	**NM**
	MW665	546.98	**NM**	**NM**	3.41	543.57	**NM**	**NM**	4.80	542.18	**NM**	**NM**	4.94	542.04	**NM**	**NM**	5.20	541.78

Table A1-22

Summary of Groundwater Elevations
Groundwater Remediation Unit 2
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Site	Well ID	TOC Elevation (MSL)	Depth to Water January 2011 (TOC)	Water Elevation January 2011 (MSL)	Depth to Water April 2011 (TOC)	Water Elevation April 2011 (MSL)	Depth to Water July 2011 (TOC)	Water Elevation July 2011 (MSL)	Depth to Water October 2011 (TOC)	Water Elevation October 2011 (MSL)	Depth to Water February 2012 (TOC)	Water Elevation February 2012 (MSL)	Depth to Water April 2012 (TOC)	Water Elevation April 2012 (MSL)	Depth to Water July 2012 (TOC)	Water Elevation July 2012 (MSL)	Depth to Water October 2012 (TOC)	Water Elevation October 2012 (MSL)
M7	MW124R	537.25	**NM**	**NM**	1.98	535.27	**NM**	**NM**	4.30	532.95	**NM**	**NM**	2.90	534.35	**NM**	**NM**	4.94	532.31
	MW156	541.35	**NM**	**NM**	4.30	537.05	**NM**	**NM**	5.44	535.91	**NM**	**NM**	5.84	535.51	**NM**	**NM**	5.93	535.42
	MW159	537.80	**NM**	**NM**	5.96	531.84	**NM**	**NM**	6.59	531.21	**NM**	**NM**	6.62	531.18	**NM**	**NM**	**NM**	**NM**
	MW216	538.03	**NM**	**NM**	5.58	532.45	**NM**	**NM**	7.16	530.87	**NM**	**NM**	6.60	531.43	**NM**	**NM**	9.93	528.10
	MW217	538.97	**NM**	**NM**	6.16	532.81	**NM**	**NM**	7.01	531.96	**NM**	**NM**	7.03	531.94	**NM**	**NM**	NM	NM
	MW321	545.55	**NM**	**NM**	6.26	539.29	**NM**	**NM**	7.99	537.56	**NM**	**NM**	7.82	537.73	**NM**	**NM**	NM	NM
	MW322	544.54	**NM**	**NM**	9.66	534.88	**NM**	**NM**	11.22	533.32	**NM**	**NM**	10.75	533.79	**NM**	**NM**	NM	NM
	MW660	539.73	**NM**	**NM**	4.88	534.85	**NM**	**NM**	6.12	533.61	**NM**	**NM**	5.85	533.88	**NM**	**NM**	8.07	531.66
	MW661	539.57	**NM**	**NM**	5.34	534.23	**NM**	**NM**	6.78	532.79	**NM**	**NM**	6.75	532.82	**NM**	**NM**	7.48	532.09
M8	MW147R	567.82	**NM**	**NM**	10.02	557.80	**NM**	**NM**	11.24	556.58	**NM**	**NM**	11.42	556.40	**NM**	**NM**	**NM**	**NM**
	MW148R	561.59	**NM**	**NM**	15.80	545.79	**NM**	**NM**	16.01	545.58	**NM**	**NM**	15.90	545.69	**NM**	**NM**	**NM**	**NM**
	MW323R	566.00	**NM**	**NM**	11.22	554.78	**NM**	**NM**	11.02	554.98	**NM**	**NM**	1.88	564.12	**NM**	**NM**	11.19	554.81
	MW324R	566.23	**NM**	**NM**	14.94	551.29	**NM**	**NM**	14.54	551.69	**NM**	**NM**	15.78	550.45	**NM**	**NM**	16.76	549.47
	MW325R	569.62	**NM**	**NM**	12.78	556.84	**NM**	**NM**	14.25	555.37	**NM**	**NM**	13.77	555.85	**NM**	**NM**	14.57	555.05
	MW327R	565.27	**NM**	**NM**	11.56	553.71	**NM**	**NM**	11.17	554.10	**NM**	**NM**	12.31	552.96	**NM**	**NM**	12.86	552.41
M8	MW121	575.75	**NM**	**NM**	18.71	557.04	**NM**	**NM**	19.07	556.68	**NM**	**NM**	18.92	556.83	**NM**	**NM**	19.36	556.39
	MW328	582.93	**NM**	**NM**	24.57	558.36	**NM**	**NM**	24.87	558.06	**NM**	**NM**	24.68	558.25	**NM**	**NM**	**NM**	**NM**
	MW330	580.33	**NM**	**NM**	22.42	557.91	**NM**	**NM**	22.48	557.85	**NM**	**NM**	22.35	557.98	**NM**	**NM**	22.88	557.45
Other Areas	MW116	535.20	**NM**	**NM**	3.67	531.53	**NM**	**NM**	6.38	528.82	**NM**	**NM**	6.33	528.87	**NM**	**NM**	12.28	522.92
	MW118	534.00	**NM**	**NM**	3.02	530.98	**NM**	**NM**	3.25	530.75	**NM**	**NM**	3.71	530.29	**NM**	**NM**	3.53	530.47
	MW119	538.90	**NM**	**NM**	5.50	533.40	**NM**	**NM**	5.91	532.99	**NM**	**NM**	6.21	532.69	**NM**	**NM**	5.78	533.12
M13	AEHA 14R	569.73	18.10	551.63	18.00	551.73	17.66	552.07	17.65	552.08	17.76	551.97	17.83	551.90	18.23	551.50	19.95	549.78
	AEHA 15	570.38	21.02	549.36	20.73	549.65	20.07	550.31	20.04	550.34	20.17	550.21	21.07	549.31	20.55	549.83	20.75	549.63
	MW126R	562.41	15.61	546.80	15.36	547.05	15.35	547.06	15.36	547.05	16.03	546.38	15.95	546.46	15.46	546.95	15.80	546.61
	MW350	554.34	16.21	538.13	15.23	539.11	15.47	538.87	15.84	538.50	NM	NM	15.58	538.76	15.97	538.37	**NM**	**NM**
	MW362	562.46	13.75	548.71	13.35	549.11	12.89	549.57	12.90	549.56	13.11	549.35	13.25	549.21	13.32	549.14	13.52	548.94
	MW363	570.03	28.27	541.76	27.67	542.36	27.80	542.23	27.94	542.09	27.85	542.18	27.90	542.13	28.12	541.91	28.08	541.95
	MW364	569.82	28.21	541.61	27.36	542.46	27.68	542.14	27.74	542.08	27.72	542.10	27.68	542.14	27.98	541.84	27.77	542.05
	MW806	565.53	15.07	550.46	14.55	550.98	13.65	551.88	13.51	552.02	13.98	551.55	14.09	551.44	13.93	551.60	14.19	551.34
	MW807	565.79	16.30	549.49	15.88	549.91	15.38	550.41	15.22	550.57	15.41	550.38	15.63	550.16	15.78	550.01	15.92	549.87
	MW808	569.23	17.15	552.08	16.78	552.45	16.90	552.33	17.27	551.96	17.38	551.85	17.09	552.14	17.63	551.60	19.87	549.36
	MW809	569.18	20.28	548.90	20.03	549.15	19.50	549.68	19.41	549.77	20.11	549.07	20.32	548.86	19.93	549.25	20.11	549.07

Notes:
ID = Identification
TOC = Top of Casing
MSL = Feet relative to mean seal level
NM = Water level not measured.
Unknown = Information not available

Table A1-23

Surface Water Elevations
Groundwater Remediation Unit 2
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Site	Surface Water Location	Surface Water Elevation			
		Date	ft (MSL)	Date	ft (MSL)
M1	SW709	4/30/2009	534.73	10/21/2009	533.02
		4/6/2010	533.24	10/25/2010	533.18
		4/18/2011	533.10	10/10/2011	532.61
		4/13/2012	532.71	10/25/2012	532.64

Notes:
ft = feet
MSL = Mean sea level

Table A1-24

Groundwater Horizontal Gradients
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well Numbers		Horizontal Gradient (ft/ft)							
			April 2009	October 2009	April 2010	October 2010	April 2011	October 2011	April 2012	October 2012
M1	MW231	MW351	0.0041	0.0080	0.0086	0.0092	0.0210	0.0102	(1)	(1)
	MW107	MW643	(1)	(1)	(1)	(1)	(1)	(1)	0.0303	0.0306
M5	MW127R	MW207R	0.0024	0.0021	0.0024	0.0027	0.0020	0.0021	(1)	(1)
M6 North	MW650	MW165	0.0176	0.0181	0.0182	NA	0.0188	0.0199	0.0187	0.0208
M6 South	MW309	MW160	0.0248	0.0230	0.0239	0.0223	0.0241	0.0232	0.0225	0.0245
M7	MW307	MW216	0.0090	0.0103	0.0095	0.0123	0.0093	0.0104	0.0105	0.0124
M8	MW127R	MW323R	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0002	0.0004
M13	AEHA14R	MW350	0.0066	0.0065	0.0065	0.0057	0.0062	0.0067	(1)	(1)
	AEHA14R	MW126R	(1)	(1)	(1)	(1)	(1)	(1)	0.0047	0.0016

Notes:
ft = feet
MSL = Mean sea level
NA = Not Applicable. Dry well, gradient cannot be calculated.

Footnotes:
(1) Horizontal gradient for site not calculated using these wells.

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Table A1-25

Vertical Gradient Calculations
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Vertical Gradient 4/09 (ft/ft)	Vertical Gradient 10/09 (ft/ft)	Vertical Gradient 4/10 (ft/ft)	Vertical Gradient 10/10 (ft/ft)	Vertical Gradient 4/11 (ft/ft)	Vertical Gradient 10/11 (ft/ft)	Vertical Gradient 2/12 (ft/ft)	Vertical Gradient 4/12 (ft/ft)	Vertical Gradient 7/12 (ft/ft)	Vertical Gradient 10/12 (ft/ft)
M1	MW640	-0.0023	0.0381	0.0118	0.0123	0.1561	-0.0107	NM	0.0218	NM	-0.0025
	MW351										
	MW642	-0.0135	-0.0176	-0.0151	-0.0167	-0.0164	-0.0157	NM	-0.0179	NM	-0.0194
	MW641										
MFG (M4)	MW158	NM	-0.0189	0.0043	-0.0887	0.0074	-0.0177	NM	0.0000	NM	-0.0153
	MW157										
MFG (M6)	MW308	-0.2019	-0.2089	-0.2014	-0.2548	-0.0534	-0.0458	NM	-0.0431	NM	-0.0551
	MW307										
	MW310R	-0.2567	-0.2437	-0.2534	-0.2526	-0.2648	-0.2479	NM	-0.2589	NM	NM
	MW309										
	MW312	-0.0006	0.0000	0.0002	0.0002	-0.0002	-0.0004	NM	0.0002	NM	NM
	MW311										
	MW315	-0.0020	-0.0021	-0.0026	-0.0069	-0.0064	-0.0009	NM	-0.0003	NM	NM
	MW314										
	MW317	-0.0119	-0.0123	-0.0117	-0.0045	-0.0125	-0.0092	NM	-0.0123	NM	NM
	MW316										
	MW319	0.0027	0.0023	0.0023	0.0035	0.0012	0.0047	NM	-0.0030	NM	0.0050
	MW318										
	MW313	0.0075	0.0088	0.0071	0.0100	0.0159	0.0215	NM	0.0201	NM	0.0162
	MW654										
	MW651	-0.2305	-0.1964	-0.2126	-0.2031	-0.2394	-0.2030	NM	NM	NM	-0.2056
	MW650										
	MW653	-0.2036	-0.1709	-0.1958	-0.1901	-0.2147	-0.1774	NM	NM	NM	-0.1786
	MW652										

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P:\JOLIET 2014\Third Five-Year Review\Attachment 1 - Tables\Table A1-25 - GRU2 Vert GradsVert. Grads - GRU2

Table A1-25

Vertical Gradient Calculations
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Vertical Gradient 4/09 (ft/ft)	Vertical Gradient 10/09 (ft/ft)	Vertical Gradient 4/10 (ft/ft)	Vertical Gradient 10/10 (ft/ft)	Vertical Gradient 4/11 (ft/ft)	Vertical Gradient 10/11 (ft/ft)	Vertical Gradient 2/12 (ft/ft)	Vertical Gradient 4/12 (ft/ft)	Vertical Gradient 7/12 (ft/ft)	Vertical Gradient 10/12 (ft/ft)
MFG (M7)	MW217	0.0925	0.0500	0.0089	0.1832	0.0160	0.0520	NM	0.0237	NM	NM
	MW216										
	MW322	-0.1023	-0.1193	-0.1030	-0.1646	-0.1130	-0.1137	NM	-0.1052	NM	NM
	MW321										
	MW661	-0.0567	-0.0438	-0.0389	0.0029	-0.0272	-0.0381	NM	-0.0486	NM	0.0220
	MW660										
Landfill M13	MW362	0.1718	0.1786	0.1239	0.0815	0.1395	0.1699	0.2106	0.1939	0.1493	0.1626
	MW126R										
	MW364	0.0047	-0.0064	-0.0021	-0.0134	0.0071	-0.0007	-0.0057	0.0007	-0.0051	0.0073
	MW363										
						making pdfs singly					
	MW807	-0.0111	-0.0431	-0.0330	-0.0560	-0.0394	-0.0514	-0.0421	-0.0463	-0.0572	-0.0534
	MW806										
	MW809	-0.1354	-0.0815	-0.1104	-0.1011	-0.1311	-0.0887	-0.1131	-0.1319	-0.0966	-0.0131
	MW808										

Notes:

Vertical Gradient = ----------

Negative vertical gradients indicate downward flow, positive indicates upward flow.
ft = feet
ft/ft = feet per foot
MSL = Mean sea level
NM = Not measured
ID = Identification

Water Level in Deep Well - Water Level in Shallow Well

ABS (Water Table Elevation - Screen Midpoint of Deep Well)

Table A1-26

Groundwater Flow Velocities
Groundwater Remediation Unit 2
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	April 2009			October 2009			April 2010			October 2010		
	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
M1	0.000001	0.00	0.9	0.000001	0.00	1.4	0.000005	0.01	4.8	0.000002	0.01	2.1
M6	0.000061	0.17	62.9	0.000060	0.17	62.0	0.000062	0.17	63.8	0.000064	0.18	66.1
M7	0.000020	0.06	20.8	0.000021	0.06	22.2	0.000021	0.06	21.5	0.000027	0.08	28.4
Landfill M13	0.001760	4.99	1820.5	0.001760	4.99	1820.5	0.001653	4.69	1710.2	0.001520	4.31	1572.3

Site	April 2011			October 2011			April 2012			October 2012		
	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
M1	0.000005	0.01	4.8	0.000002	0.01	2.3	0.000007	0.02	6.9	0.000007	0.02	6.9
M6	0.000062	0.17	63.8	0.000062	0.18	64.0	0.000059	0.17	61.1	0.000065	0.18	67.3
M7	0.000021	0.06	21.5	0.000023	0.07	24.0	0.000023	0.07	24.3	0.000026	0.07	26.6
Landfill M13	0.001653	4.69	1710.2	0.001787	5.06	1848.1	0.001253	3.55	1296.4	0.000827	2.34	855.1

Notes:
cm/sec = centimeters per second
ft = feet

GRU 3 Tables

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Table A1-27

Groundwater Sample Parameters
Groundwater Remediation Unit 3
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Parameter Sampled	Sampling Frequency
M3	***In-plume***		
	MW233	V[(1)]	Discontinued Fall 2012
	Compliance		
	MW352	V[(1)]	Discontinued Fall 2012

Notes:
V - Volatile Organic Compounds (VOCs)
Site M10 was not included in the LTM Plan.

Footnotes:
(1) Parameters sampled prior to removal from LTM Program.

TABLE A1-28

Summary of Analytical Results - Volatile Organic Compounds
Groundwater Remediation UNit 3
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[(1)]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M3	***In-Plume***																																						
	MW233	4/30/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW233(DUP)	4/30/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW233	10/9/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW233(DUP)	10/9/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW233	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW233	4/9/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW233	11/2/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW233	4/20/2011	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	Compliance																																						
	MW352	5/6/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW352	10/13/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW352	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW352	4/9/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW352	11/2/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW352	4/20/2011	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	

Footnotes:
(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
An abbreviated list of compounds is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = micrograms per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
cis-1,2-DCE = cis-1,2-Dichloroethene
MethCl = Methylene Chloride
MEK = Methyl Ethyl Ketone (2-butanone)
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
VC = Vinyl chloride

Table A1-29

Monitoring Well Information Table
Groundwater Remediation Unit 3
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
M3	MW111	15028902.95	1318551.57	531.80	529.40	10.5	54.0	UNKNOWN	10.00	519.40	1981	BRK	43.5	4.0
	MW112	15030353.67	1318557.88	534.10	531.70	7.2	27.2	UNKNOWN	8.00	523.70	1981	BRK	20.0	4.0
	MW113	15030379.46	1319676.13	536.32	533.70	7.2	27.2	UNKNOWN	5.00	528.70	1981	BRK	20.0	4.0
	MW154	15027749.55	1318572.52	533.06	529.15	5.5	9.1	UNKNOWN	8.00	521.15	1982	BRK	3.6	UNKNOWN
	MW203	15029235.44	1318551.15	534.23	532.02	10.5	25.5	UNKNOWN	5.50	526.52	1988	BRK	15.0	4.0
	MW232	15030123.95	1318974.36	535.79	533.38	20.0	35.0	UNKNOWN	7.00	526.38	1988	BRK	15.0	4.0
	MW233	15029737.88	1319024.94	535.58	532.96	10.0	25.0	UNKNOWN	2.50	530.46	1988	BRK	15.0	4.0
	MW348	15029911.26	1318978.02	535.71	532.61	16.5	31.5	UNKNOWN	3.00	529.61	1991	BRK	15.0	4.0
	MW352	15029602.85	1318617.32	534.89	532.33	19.0	34.0	UNKNOWN	6.00	526.33	1991	BRK	15.0	4.0
	MW353	15030120.63	1318562.29	534.64	531.86	17.0	32.0	UNKNOWN	2.00	529.86	1991	BRK	15.0	4.0

Notes:
Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)
UNKOWN = Indicate data not presented on borelogs or provided in RI/FS documentation.
NM = Water level not measured.
BRK = Bedrock
OVB = Overburden
COMBO = Combination Overburden and Bedrock Well
MSL = Feet relative to mean seal level
BGS = Feet below ground surface
ID = Identification
TOC = Top of Casing

Table A1-30

Summary of Groundwater Elevations
Groundwater Remediation Unit 3
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Water April 2009 (TOC)	Water Elevation April 2009 (MSL)	Depth to Water October 2009 (TOC)	Water Elevation October 2009 (MSL)	Depth to Water April 2010 (TOC)	Water Elevation April 2010 (MSL)	Depth to Water October 2010 (TOC)	Water Elevation October 2010 (MSL)	Depth to Water April 2011 (TOC)	Water Elevation April 2011 (MSL)	Depth to Water October 2011 (TOC)	Water Elevation October 2011 (MSL)	Depth to Water April 2012 (TOC)	Water Elevation April 2012 (MSL)	Depth to Water October 2012 (TOC)	Water Elevation October 2012 (MSL)
M3	MW111	531.80	529.40	6.11	525.69	7.03	524.77	6.68	525.12	9.26	522.54	6.05	525.75	7.07	524.73	**NM**	**NM**	**NM**	**NM**
	MW112	534.10	531.70	3.15	530.95	4.76	529.34	2.95	531.15	7.88	526.22	3.08	531.02	4.63	529.47	**NM**	**NM**	12.46	521.64
	MW113	536.32	533.70	3.99	532.41	4.65	531.75	3.72	532.68	7.31	529.09	4.68	531.64	5.25	531.07	6.02	530.30	11.90	524.42
	MW154	533.06	529.15	5.29	527.77	8.64	524.42	8.38	524.68	8.98	524.08	7.82	525.24	8.51	524.55	**NM**	**NM**	**NM**	**NM**
	MW203	534.23	532.02	4.78	529.45	6.11	528.12	5.32	528.91	10.16	524.07	3.79	530.44	6.09	528.14	**NM**	**NM**	**NM**	**NM**
	MW232	535.79	533.38	4.98	530.81	6.60	529.19	5.06	530.73	9.75	526.04	**NM**	**NM**	6.40	529.39	**NM**	**NM**	**NM**	**NM**
	MW233	535.58	532.96	3.61	531.97	5.05	530.53	3.66	531.92	7.75	527.83	3.63	531.95	5.04	530.54	**NM**	**NM**	9.18	526.40
	MW348	535.71	532.61	3.37	532.34	4.81	530.90	3.42	532.29	7.53	528.18	3.41	532.30	4.83	530.88	**NM**	**NM**	**NM**	**NM**
	MW352	534.89	532.33	5.59	529.30	8.82	526.07	6.17	528.72	11.47	523.42	5.44	529.45	8.80	526.09	**NM**	**NM**	**NM**	**NM**
	MW353	534.64	531.86	2.28	532.36	4.11	530.53	2.30	532.34	7.01	527.63	**NM**	**NM**	4.08	530.56	**NM**	**NM**	**NM**	**NM**

Notes:
ID = Identification
TOC = Top of Casing
MSL = Feet relative to mean sea level
NM = Water level not measured.

A1-93

RJR/rjr/CRS
P:\JOLIET 2014\Third Five-Year Review\Attachment 1 - Tables\Table A1-30 - GRU3 Summary of Groundwater ElevationsGW Elev - GRU3

Landfill M11 Tables

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Table A1-31

Groundwater Sample Parameters
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Parameter Sampled	Sampling Frequency
Landfill M11	***Upgradient***		
	MW802	E, I, M, SVOC & V	(1)
	MW803	E, I, M, SVOC & V	(1)
	Downgradient		
	MW333	E, I, M, SVOC & V	(1)
	MW334	E, I, M, SVOC & V	(1)
	MW335	E, I, M, SVOC & V	(1)
	MW336	E, I, M, SVOC & V	(1)
	MW804	E, I, M, SVOC & V	(1)
	MW805	E, I, M, SVOC & V	(1)

Notes:

E - Explosives
M - Metals
S - Sulfate
I - Indicator parameters (Nitrate-N and Sulfate)
SVOC - Semivolatile Organic Compounds
V - Volatile Organic Compounds (VOCs)

Footnotes:

(1) Sampling frequency was reduced from semi-annually in spring and fall to annually only in fall beginning spring 2013.

TABLE A1-32

Summary of Analytical Results - Explosives
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M11	***Upgradient***																													
	MW802	5/15/2008	<0.7		<0.7		<1.4		<1.4		3		<1.4		<0.7		<1.4		<1.4		<1.4		<0.7		<1.4		<0.7		<0.7	
	MW802	10/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW802(DUP)	10/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW802	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW802	10/27/2009	<0.24		<0.47		<0.47		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	
	MW802	4/13/2010	<0.17		<0.33		<0.33		<0.33		<0.33		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.42		<0.17		<0.17	
	MW802	10/28/2010	<0.34		<0.65		<0.65		<0.65		<0.65		<0.65		<0.34		<0.65		<0.65		<0.65		<0.34		<0.82		<0.34		<0.34	
	MW802	4/15/2011	<0.37		<0.72		<0.72		<0.72		<0.72		<0.72		<0.37		<0.72		<0.72		<0.72		<0.37		<0.91		<0.37		<0.37	
	MW802	10/11/2011	<0.17		<0.17		<0.17		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW802	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	U / UJ
	MW802	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW803	10/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW803	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW803	10/27/2009	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW803	4/13/2010	<0.17		<0.32		<0.32		<0.32		<0.32		<0.32		<0.17		<0.32		<0.32		<0.32		<0.17		<0.40		<0.17		<0.17	
	MW803	10/28/2010	<0.33		<0.63		<0.63		<0.63		<0.63		<0.63		<0.33		<0.63		<0.63		<0.63		<0.33		<0.79		<0.33		<0.33	
	MW803	4/15/2011	<0.31		<0.59		<0.59		<0.59		<0.59		<0.59		<0.31		<0.59		<0.59		<0.59		<0.31		<0.75		<0.31		<0.31	
	MW803	10/11/2011	<0.18		<0.18		<0.18		<0.35		<0.35		<0.35		<0.18		<0.35		<0.35		<0.35		<0.18		<0.44		<0.18		<0.18	
	MW803	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	Downgradient																													
	MW333	5/12/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW333	10/6/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW333	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW333	10/28/2009	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.52		<0.21		<0.21	
	MW333	4/13/2010	<0.17		<0.34		<0.34		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW333	10/28/2010	<0.30		<0.58		<0.58		<0.58		<0.58		<0.58		<0.30		<0.58		<0.58		<0.58		<0.30		<0.73		<0.30		<0.30	
	MW333	4/18/2011	<0.18		<0.36		<0.36		<0.36		<0.36		<0.36	U / UJ	<0.18		<0.36		<0.36		<0.36		<0.18		<0.45		<0.18		<0.18	
	MW333	10/11/2011	<0.17		<0.17		<0.17		<0.34		<0.34		<0.34		<0.17		<0.34		<0.34		<0.34		<0.17		<0.42		<0.17		<0.17	
	MW333	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW334	5/12/2008	<0.46		<0.46		<0.92		<0.92		<0.92		<0.92		<0.46		<0.92		<0.92		<0.92		<0.46		<0.92		<0.46		<0.46	
	MW334	10/6/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW334	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW334	10/28/2009	<0.20		<0.39		<0.39		<0.39		<0.39		<0.39		<0.20		<0.39		<0.39		<0.39		<0.20		<0.49		<0.20		<0.20	
	MW334	4/13/2010	<0.18		<0.34		<0.34		<0.34		<0.34		<0.34		<0.18		<0.34		<0.34		<0.34		<0.18		<0.43		<0.18		<0.18	
	MW334	10/28/2010	<0.32		<0.63		<0.63		<0.63		<0.63		<0.63		<0.32		<0.63		<0.63		<0.63		<0.32		<0.79		<0.32		<0.32	
	MW334	4/18/2011	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37	U / UJ	<0.19		<0.37		<0.37		<0.37		<0.19		<0.47		<0.19		<0.19	
	MW334	10/11/2011	<0.18		<0.18		<0.36		<0.36		<0.36		<0.36		<0.18		<0.36		<0.36		<0.36		0.15	F / NJ	<0.45		<0.18		<0.18	
	MW334(DUP)	10/11/2011	<0.26		<0.26		<0.51		<0.51		<0.51		<0.51		<0.26		<0.51		<0.51		<0.51		0.21	F / NJ	<0.64		<0.26		<0.26	
	MW334	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW335	5/13/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW335	10/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW335(DUP)	10/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW335	5/4/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW335	10/28/2009	<0.29		<0.56		<0.56		<0.56		<0.56		<0.56		<0.29		<0.56		<0.56		<0.56		<0.29		<0.71		<0.29		<0.29	
	MW335	4/13/2010	<0.25		<0.49		<0.49		<0.49		<0.49		<0.49		<0.25		<0.49		<0.49		<0.49		<0.25		<0.62		<0.25		<0.25	
	MW335(DUP)	4/13/2010	<0.18		<0.36		<0.36		<0.36		<0.36		<0.36		<0.18		<0.36		<0.36		<0.36		<0.18		<0.45		<0.18		<0.18	
	MW335	10/28/2010	<0.24		<0.46		<0.46		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW335	4/15/2011	<0.19		<0.38		<0.38		<0.38		<0.38		<0.38		<0.19		<0.38		<0.38		<0.38		<0.19		<0.47		<0.19		<0.19	
	MW335	10/12/2011	<0.24		<0.24		<0.24		<0.47		<0.47		<0.47		<0.24		<0.47		<0.47		<0.47		<0.24		<0.59		<0.24		<0.24	U / UJ
	MW335	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	U / UJ
	MW335	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW336	5/13/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW336	10/7/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW336	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW336(DUP)	5/5/2009	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW336	10/27/2009	<0.21		<0.40		<0.40		<0.40		<0.40		<0.40		<0.21		<0.40		<0.40		<0.40		<0.21		<0.51		<0.21		<0.21	
	MW336(DUP)	10/27/2009	<0.21		<0.41		<0.41		<0.41		<0.41		<0.41		<0.21		<0.41		<0.41		<0.41		<0.21		<0.51		<0.21		<0.21	
	MW336	4/13/2010	<0.24		<0.46		<0.46		<0.46		<0.46		<0.46		<0.24		<0.46		<0.46		<0.46		<0.24		<0.58		<0.24		<0.24	
	MW336	10/28/2010	<0.30		<0.59		<0.59		<0.59		<0.59		<0.59		<0.30		<0.59		<0.59		<0.59		<0.30		<0.74		<0.30		<0.30	
	MW336	4/18/2011	<0.19		<0.37		<0.37		<0.37		<0.37		<0.37	U / UJ	<0.19		<0.37		<0.37		<0.37		<0.19		<0.47		<0.19		<0.19	
	MW336	10/12/2011	<0.18		<0.18		<0.18		<0.36		<0.36		<0.36		<0.18		<0.36		<0.36		<0.36		<0.18		<0.45		<0.18		<0.18	U / UJ
	MW336	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	U / UJ
	MW336	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31	U / J	<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW336(DUP)	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW804	5/15/2008	<0.42		<0.42		<0.83		<0.83		<0.83		<0.83		<0.42		<0.83		<0.83		<0.83		<0.42		<0.83		<0.42		<0.42	
	MW804	10/6/2008	<0.46		<0.46		<0.92		1.6		4.7		<0.92		<0.46		<0.92		<0.92		<0.92		<0.46		<0.92		<0.46		0.52	
	MW804	5/5/2009	<0.16		<0.31		<0.31		0.81		2.6		0.8		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		0.57	
	MW804	10/27/2009	<0.24		<0.47		<0.47		0.73		2.3		0.79		<0.24		<0.47		<0.47		<0.47		0.22	F /	<0.59		<0.24		1.4	
	MW804	4/13/2010	<0.17		<0.33		<0.33		<0.33		0.88		<0.33		<0.17		<0.33		<0.33		<0.33		<0.17		<0.41		<0.17		<0.17	
	MW804	10/28/2010	<0.38		<0.74		<0.74		<0.74		<0.74		<0.74		<0.38		<0.74		<0.74		<0.74		<0.38		<0.93		<0.38		<0.38	
	MW804	4/15/2011	<0.45		<0.88		<0.88		0.52	F /	1.4		0.37	F /	<0.45		<0.88		<0.88		<0.88		0.26	F /	<1.1		<0.45		<0.45	
	MW804(DUP)	4/15/2011	<0.32		<0.61		<0.61		0.51	F /	1.4		0.39	F /	<0.32		<0.61		<0.61		<0.61		<0.32		<0.77		<0.32		<0.32	
	MW804	10/11/2011	<0.16		<0.16		<0.16		0.37		1	/ J	0.68		<0.16		<0.31		<0.31		<0.31		0.22		<0.39		<0.16		<0.16	
	MW804	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

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TABLE A1-32

Summary of Analytical Results - Explosives
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M11	***Downgradient***																													
	MW805	10/6/2008	<0.39		<0.39		<0.78		<0.78		<0.78		<0.78		<0.39		<0.78		<0.78		<0.78		<0.39		<0.78		<0.39		<0.39	
	MW805	5/5/2009	<0.17		<0.32		<0.32		<0.32		<0.32		<0.32		<0.17		<0.32		<0.32		<0.32		<0.17		<0.40		<0.17		<0.17	
	MW805	10/27/2009	<0.16		<0.32		<0.32		<0.32		0.26	F /	<0.32		<0.16		<0.32		<0.32		<0.32		<0.16		<0.40		<0.16		<0.16	
	MW805	4/13/2010	<0.41		<0.79		<0.79		<0.79		<0.79		<0.79		<0.41		<0.79		<0.79		<0.79		<0.41		<0.99		<0.41		<0.41	
	MW805	11/2/2010	<0.27		<0.52		<0.52		<0.52		<0.52		<0.52		<0.27		<0.52		<0.52		<0.52		<0.27		<0.66		<0.27		<0.27	
	MW805	4/15/2011	<0.31		<0.59		<0.59		<0.59		<0.59		<0.59		<0.31		<0.59		<0.59		<0.59		<0.31		<0.75		<0.31		<0.31	
	MW805	10/11/2011	<0.16		<0.16		<0.16		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	
	MW805	4/16/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	U / UJ
	MW805	10/24/2012	<0.16		<0.31		<0.31		<0.31		<0.31		<0.31		<0.16		<0.31		<0.31		<0.31		<0.16		<0.39		<0.16		<0.16	

Footnotes:
(1) Project Action Limits (Remedial Goal, {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Preventive Action Limit (Remedial Goal {RG}) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
B = Blank contamination
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate
The laboratory is aware of instances where the MRL for 2,4- and 2,6-DNT exceeded the RG. However, this does not affect protectiveness.

1,3-DNB = 1,3-Dinitrobenzene
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
2-A-4,6-DNT = 2-amino-4,6-Dinitrotoluene
4-A-2,6-DNT = 4-amino-2,6-Dinitrotoluene
HMX = High Melting Explosive
NB = Nitrobenzene
2-NT = 2-Nitrotoluene
3-NT = 3 Nitrotoluene
4-NT = 4-Nitrotoluene
RDX = Royal Demolition Explosive
1,3,5-TNB = 1,3,5-Trinitrobenzene
2,4,6-TNT = 2,4,6-Trinitrotoluene

TABLE A1-33

Summary of Analytical Results - Metals
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well	Date	Analyte	Units	Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
			Project Action Limit[1]	mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
			Surface Water RG	mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
					Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M11																																												
	MW802	5/15/2008	mg/L	<0.2		<0.02		<0.01		0.018		<0.002		120		<0.01		<0.005		0.0011	F /	<0.15		<0.005		76		0.039		NA		<0.0002		<0.01		0.6		<0.005		15		0.0015	F /	0.0041	F /
	MW802(DUP)	10/7/2008	mg/L	<0.2		<0.02		<0.01		0.025		<0.002		71		<0.01		<0.005		0.001	F /	0.026	F /	<0.005		31		0.12		NA		<0.0002		<0.01		0.86		<0.005		29		0.0025	F /	0.041	
	MW802	10/7/2008	mg/L	0.038	F /	<0.02		<0.01		0.027		<0.002		77		<0.01		<0.005		<0.01		0.033	F /	<0.005		33		0.13		NA		<0.0002		<0.01		0.97		<0.005		32		0.0029	F /	0.044	
	MW802	5/4/2009	mg/L	<0.20		<0.020		<0.010		0.024		<0.0020		74		<0.010		0.0029	F /	0.0028	F /	0.14		<0.0050		32		0.23		NA		<0.0002		<0.010		0.86		<0.0050		36		<0.0050		<0.020	
	MW802	10/27/2009	mg/L	<0.20		<0.020		<0.010		0.037		<0.0020		94		<0.010		0.0024	F /	<0.010		0.69		<0.0050		44		0.8		NA		<0.0002		0.0022	F /	1		<0.0050		34		0.0029	F /	<0.020	
	MW802	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.022		<0.0020		73		<0.010		<0.0050		<0.010		0.076	F /	<0.0050		34		0.4		NA		<0.0002		<0.010		1.1		<0.0050		30		0.0018	F /	0.0047	F /
	MW802	10/28/2010	mg/L	<0.20		<0.020		0.0027	F /	0.04		0.00042	F / U	93		<0.010		<0.0050		<0.010		3.6		<0.0050		40		0.63		NA		<0.0002		<0.010		1.4		<0.0050		32		<0.0050		0.0039	F /
	MW802	4/15/2011	mg/L	<0.2		<0.02		<0.01		0.033		<0.002		86		<0.01		<0.005		<0.01		0.14	F / U	<0.005		39		0.01		NA		<0.0002		0.00081	F /	1.2	/ J	<0.005		25		0.0024	F /	<0.02	
	MW802	10/11/2011	mg/L	<0.20		<0.020		<0.010		0.043		0.001	F / U	100		<0.010		<0.0050		0.0019	F /	1.4		<0.0050		46		0.64		NA		0.000087	F / J	<0.010		2		<0.0050		27		<0.0050		<0.020	
	MW802	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.026		<0.0020		75		<0.010		<0.0050		0.0012	F /	<0.20		<0.0050		34		0.75		NA		<0.20		0.0023	F /	2		<0.0050		19		0.0025	F /	0.0078	F /
	MW802	10/24/2012	mg/L	<0.2		<0.02		<0.01		0.099		0.00098	F /	120		<0.01		<0.005		0.0018	F /	<0.2		<0.005		55		0.58		NA		<0.2		<0.01		3.2		<0.005		33		0.00067	F /	<0.02	
	MW803	10/7/2008	mg/L	<0.2		<0.02		<0.01		0.028		<0.002		42		<0.01		<0.005		0.00093	F /	<0.15		<0.005		23		<0.01		NA		<0.0002		<0.01		7.4		<0.005		97		0.0019	F /	0.018	F /
	MW803	5/4/2009	mg/L	<0.20		<0.020		<0.010		0.028		<0.0020		43		<0.010		0.001	F /	<0.010		<0.10		<0.0050		23		<0.010		NA		<0.0002		<0.010		6.7		<0.0050		100		<0.0050		<0.020	
	MW803	10/27/2009	mg/L	<0.20		<0.020		<0.010		0.027		<0.0020		43		<0.010		<0.0050		<0.010		<0.10		<0.0050		25		<0.010		NA		<0.0002		0.0018	F /	7.5		<0.0050		93		0.0022	F /	<0.020	
	MW803	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.027		<0.0020		44		<0.010		<0.0050		0.0012	F /	<0.20		<0.0050		26		<0.010		NA		<0.0002		<0.010		7.6		<0.0050		90		0.0021	F /	0.0046	F /
	MW803	10/28/2010	mg/L	<0.20		<0.020		<0.010		0.027		0.00039	F / U	45		<0.010		<0.0050		<0.010		<0.20		<0.0050		26		<0.010		NA		<0.0002		<0.010		7		<0.0050		92		<0.0050		<0.020	
	MW803	4/15/2011	mg/L	<0.2		<0.02		<0.01		0.027		<0.002		43		<0.01		<0.005		<0.01		<0.2		<0.005		26		<0.01		NA		<0.0002		0.0015	F /	8.8	/ J	<0.005		83		0.0019	F /	<0.02	
	MW803	10/11/2011	mg/L	<0.20		<0.020		<0.010		0.026		0.0008	F / U	43		<0.010		<0.0050		0.0019	F /	<0.20		<0.0050		25		<0.010		NA		0.000093	F / J	<0.010		6.9		<0.0050		85		<0.0050		<0.020	
	MW803	10/24/2012	mg/L	<0.2		<0.02		<0.01		0.028		0.0012	F /	47		<0.01		<0.005		<0.01		<0.2		<0.005		28		<0.01		NA		<0.2		<0.01		7.3		<0.005		84		<0.005		<0.02	
	MW333	5/12/2008	mg/L	<0.2		<0.02		<0.01		0.19		<0.002		49		<0.01		<0.005		<0.01		<0.15		<0.005		33		<0.01		NA		<0.0002		<0.01		6.3		<0.005		34		<0.005		0.026	
	MW333	10/6/2008	mg/L	<0.2		<0.02		<0.01		0.22		<0.002		52		<0.01		0.0014	F /	<0.01		0.72		<0.005		35		1		NA		<0.0002		<0.01		6.6		<0.005		37		0.0029	F /	0.0065	F /
	MW333	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.17		<0.0020		50		<0.010		0.00072	F /	<0.010		0.074	F /	<0.0050		32		0.042		NA		<0.0002		<0.010		6.6		<0.0050		44		<0.0050		<0.020	
	MW333	10/28/2009	mg/L	<0.20		<0.020		<0.010		0.18		<0.0020		47		<0.010		0.00061	F /	<0.010		0.28		<0.0050		33		1.2		NA		<0.0002		<0.010		6.4		<0.0050		38		0.0023	F /	<0.020	
	MW333	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.14		<0.0020		50		<0.010		<0.0050		0.0018	F /	<0.20		<0.0050		34		<0.010		NA		<0.0002		<0.010		6.4		<0.0050		39		0.0021	F /	0.0038	F /
	MW333	10/28/2010	mg/L	<0.20		<0.020		<0.010		0.16		0.00064	F / U	51		<0.010		0.0015	F /	<0.010		0.4		<0.0050		34		1		NA		<0.0002		<0.010		6.6		<0.0050		45		<0.0050		0.006	F /
	MW333	4/18/2011	mg/L	<0.20		0.0034	F /	<0.010		0.14		0.001	F / U	47		<0.010		<0.0050		<0.010		<0.20		<0.0050		33		<0.010		NA		<0.0002		<0.010		6.7		<0.0050		45		<0.0050		<0.020	
	MW333	10/11/2011	mg/L	<0.20		<0.020		<0.010		0.12		0.00083	F / U	49		<0.010		<0.0050		0.0016	F /	<0.20		<0.0050		33		0.099		NA		<0.0002		<0.010		6.3		<0.0050		42		<0.0050		<0.020	
	MW333	10/24/2012	mg/L	<0.2		<0.02		<0.01		0.1		0.00073	F /	51		<0.01		<0.005		<0.01		<0.2		<0.005		34		0.011		NA		<0.2		<0.01		6.4		<0.005		43		<0.005		<0.02	
	MW334	5/12/2008	mg/L	<0.2		<0.02		<0.01		0.023		<0.002		160		<0.01		<0.005		<0.01		<0.15		<0.005		110		0.024		NA		<0.0002		<0.01		5.7		<0.005		28		<0.005		0.074	
	MW334	10/6/2008	mg/L	<0.2		<0.02		<0.01		0.034		<0.002		180		<0.01		0.0036	F /	<0.01		3.4		<0.005		120		1.1		NA		<0.0002		<0.01		6.5		<0.005		35		0.0053		0.01	F /
	MW334	5/5/2009	mg/L	<0.20		<0.020		<0.010		0.025		<0.0020		150		<0.010		0.0016	F /	<0.010		0.049	F /	<0.0050		99		0.027		NA		<0.0002		<0.010		5.6		<0.0050		40		<0.0050		<0.020	F / U
	MW334	10/28/2009	mg/L	<0.20		<0.020		0.0037	F /	0.039		<0.0020		150		<0.010		0.0047	F /	<0.010		**5.2**		<0.0050		100		0.83		NA		<0.0002		<0.010		6.3		<0.0050		42		0.0041	F /	<0.020	
	MW334	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.027		<0.0020		150		<0.010		<0.0050		<0.010		<0.20		<0.0050		100		0.056		NA		<0.0002		<0.010		6.3		<0.0050		44		0.005		<0.020	
	MW334	10/28/2010	mg/L	<0.20		0.0043	F /	0.002	F /	0.034		0.00084	F / U	130		<0.010		0.003	F /	<0.010		3.4		<0.0050		90		0.57		NA		<0.0002		<0.010		5.7		0.00091	F / U	43		<0.0050		<0.020	
	MW334	4/18/2011	mg/L	<0.20		0.0034	F /	<0.010		0.027		0.0013	F / U	120		<0.010		<0.0050		<0.010		0.056	F /	<0.0050		82		0.044		NA		<0.0002		<0.010		5.4		<0.0050		49		<0.0050		<0.020	
	MW334	10/11/2011	mg/L	<0.20		0.0037	F /	<0.010		0.037		0.00099	F / U	110		<0.010		<0.0050		0.0017	F /	0.92		<0.0050		77		0.76		NA		0.00016	F / J	<0.010		5.3		<0.0050		46		<0.0050		<0.020	
	MW334(DUP)	10/11/2011	mg/L	<0.20		0.0039	F /	<0.010		0.037		0.0011	F / U	110		<0.010		<0.0050		0.0018	F /	0.71		<0.0050		79		0.75		NA		0.00016	F / J	<0.010		5.4		<0.0050		47		<0.0050		<0.020	
	MW334	10/24/2012	mg/L	<0.2		<0.02		<0.01		0.038		0.0011	F /	110		<0.01		0.0012	F /	<0.01		2		<0.005		71		0.52		NA		<0.2		<0.01		5.2		<0.005		46		0.00073	F /	<0.02	
	MW335	5/13/2008	mg/L	0.024	F /	<0.02		<0.01		0.016		<0.002		260		<0.01		0.0011	F /	0.0028	F /	<0.15		<0.005		220		0.083		NA		<0.0002		0.0031	F /	5.3		<0.005		47		<0.005		0.06	
	MW335	10/7/2008	mg/L	<0.2		<0.02		<0.01		0.021		<0.002		310		<0.01		<0.005		0.0053	F /	<0.15		<0.005		220		0.1		NA		<0.0002		0.0045	F /	6.1		<0.005		49		0.0071		0.032	
	MW335(DUP)	10/7/2008	mg/L	0.028	F /	<0.02		<0.01		0.02		<0.002		140		<0.01		0.0012	F /	<0.01		0.79		<0.005		95		0.13		NA		<0.0002		0.0042	F /	5		<0.005		58		0.0054		0.0026	F /
	MW335	5/4/2009	mg/L	<0.20		<0.020		<0.010		0.018		<0.0020		290		<0.010		0.001	F /	0.007	F /	<0.10		<0.0050		230		<0.010		NA		<0.0002		<0.010		4.6		<0.0050		60		<0.0050		<0.020	
	MW335	10/28/2009	mg/L	<0.20		<0.020		<0.010		0.025		<0.0020		290		<0.010		0.0073		<0.010		0.051	F /	<0.0050		200		1.4		NA		<0.0002		0.011		5.2		<0.0050		48		0.0052		<0.020	
	MW335	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.017		<0.0020		260		<0.010		<0.0050		0.005	F /	<0.20		<0.0050		200		0.0088	F /	NA		<0.0002		0.002	F /	4.9		<0.0050		50		0.0049	F /	<0.020	
	MW335(DUP)	4/13/2010	mg/L	<0.20		<0.020		<0.010		0.018		<0.0020		270		<0.010		<0.0050		0.005	F /	<0.20		<0.0050		200		0.0086	F /	NA		<0.0002		0.0024	F /	5.1		<0.0050		51		0.0061		<0.020	
	MW335	10/28/2010	mg/L	<0.20		0.0037	F /	<0.010		0.024		0.001	F / U	240		<0.010		<0.0050		0.0071	F /	<0.20		<0.0050		170		0.29		NA		<0.0002		0.0041	F /	4.7		<0.0050		53		<0.0050		0.0047	F /
	MW335	4/15/2011	mg/L	<0.2		<0.02		<0.01		0.018		<0.002		200		<0.01		<0.005		0.004	F /	<0.2		<0.005		140		<0.01		NA		<0.0002		0.0018	F /	5.9	/ J	<0.005		42		0.0032	F /	0.0079	F /
	MW335	10/12/2011	mg/L	<0.20		<0.020		<0.010		0.022		0.001	F /	210		<0.010		<0.0050		0.0066	F /	0.042	F /	<0.0050		140		0.057		NA		<0.0002		0.0011	F /	5.1		<0.0050		49		<0.0050		<0.020	
	MW335	4/16/2012	mg/L	<0.20		<0.020		<0.010		0.021		<0.0020		210		<0.010		<0.0050		0.0051	F /	<0.20		<0.0050		140		<0.010		NA		<0.20		0.0024	F /	6.4		<0.0050		48		0.0047	F /	0.0047	F /
	MW335	10/24/2012	mg/L	<0.2		<0.02		<0.01		0.027		0.0012	F /	200		<0.01		<0.005		0.0081	F /	<0.2		<0.005		120		0.076		NA		<0.2		0.0037	F /	6.6		<0.005		51		<0.005		0.0051	F /

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TABLE A1-33

Summary of Analytical Results - Metals
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Analyte		Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Manganese (Dissolved)		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc	
	Project Action Limit[(1)]	mg/L	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		0.1		NS		10		10		NS		NS		NS		0.511		NS		NS		10	
	Surface Water RG	mg/L	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		0.064		NS		1.0		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	**Well** **Date**	**Units**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M11	***Downgradient***																																										
	MW336 5/13/2008	mg/L	0.018	F /	<0.02		<0.01		0.019		<0.002		110		<0.01		<0.005		<0.01		0.11	F /	<0.005		78		0.042		NA		<0.0002		<0.01		4.2		<0.005		51		0.0013	F /	0.034	
	MW336 10/7/2008	mg/L	0.022	F /	<0.02		<0.01		0.02		<0.002		140		<0.01		0.0017	F /	<0.01		0.77		<0.005		93		0.13		NA		<0.0002		0.0042	F /	4.9		<0.005		57		0.0058		0.004	F /
	MW336 5/5/2009	mg/L	<0.20		<0.020		<0.010		0.019		<0.0020		140		<0.010		<0.0050		<0.010		<0.10		<0.0050		96		0.0077	F /	NA		<0.0002		<0.010		4.2		<0.0050		73		<0.0050		<0.020	
	MW336(DUP) 5/5/2009	mg/L	<0.20		<0.020		<0.010		0.019		<0.0020		140		<0.010		0.00047	F /	<0.010		<0.10		<0.0050		97		0.0051	F /	NA		<0.0002		<0.010		4.1		<0.0050		71		<0.0050		<0.020	
	MW336 10/27/2009	mg/L	<0.20		<0.020		<0.010		0.021		<0.0020		140		<0.010		0.0004	F /	<0.010		0.54		<0.0050		91		0.14		NA		<0.0002		<0.010		4.2		<0.0050		60		0.0044	F /	<0.020	
	MW336(DUP) 10/27/2009	mg/L	<0.20		<0.020		<0.010		0.021		<0.0020		140		<0.010		<0.0050		<0.010		0.54		<0.0050		91		0.14		NA		<0.0002		0.0016	F /	4.3		<0.0050		61		0.0042	F /	<0.020	
	MW336 4/13/2010	mg/L	<0.20		<0.020		<0.010		0.019		<0.0020		140		<0.010		<0.0050		<0.010		<0.20		<0.0050		95		0.007	F /	NA		<0.0002		0.002	F /	4.4		<0.0050		63		0.0038	F /	<0.020	
	MW336 10/28/2010	mg/L	<0.20		0.0051	F /	<0.010		0.028		0.00084	F / U	140		<0.010		0.0014	F /	<0.010		1.2		<0.0050		94		0.36		NA		<0.0002		<0.010		4.6		<0.0050		69		<0.0050		<0.020	
	MW336 4/18/2011	mg/L	<0.20		0.0038	F /	<0.010		0.023		0.0013	F / U	130		<0.010		<0.0050		<0.010		0.096	F /	<0.0050		85		0.019		NA		<0.0002		<0.010		4.1		<0.0050		67		<0.0050		<0.020	
	MW336 10/12/2011	mg/L	<0.20		<0.020		<0.010		0.029		0.0011	F /	130		<0.010		0.0046	F /	0.0018	F /	1.7		<0.0050		87		0.42		NA		<0.0002		0.0029	F /	4.1		<0.0050		63		<0.0050		<0.020	
	MW336 4/16/2012	mg/L	<0.20		<0.020		<0.010		0.02		<0.0020		120		<0.010		<0.0050		0.0011	F /	0.15	F /	<0.0050		80		0.033		NA		<0.20		<0.010		4.1		<0.0050		56		0.004	F /	0.0069	F /
	MW336 10/24/2012	mg/L	<0.2		<0.02		<0.01		0.024		0.001	F /	150		<0.01		0.0015	F /	0.0016	F /	0.24		<0.005		110		0.15		NA		<0.2		0.0036	F /	4.6		<0.005		77		<0.005		<0.02	
	MW336(DUP) 10/24/2012	mg/L	<0.2		0.0046	F /	<0.01		0.025		0.001	F /	160		<0.01		0.0018	F /	0.0014	F /	0.29		<0.005		110		0.16		NA		<0.2		0.0047	F /	4.8		<0.005		79		<0.005		0.0056	F /
	MW804 5/15/2008	mg/L	0.017	F /	<0.02		<0.01		0.025		<0.002		75		<0.01		<0.005		0.00086	F /	<0.15		<0.005		35		0.31		NA		<0.0002		<0.01		0.62		<0.005		26		0.0014	F /	0.0031	F /
	MW804 10/6/2008	mg/L	0.019	F /	<0.02		<0.01		0.031		<0.002		160		<0.01		<0.005		0.0034	F /	<0.15		<0.005		100		0.036		NA		<0.0002		0.0038	F /	2.4		<0.005		32		0.0059		0.059	
	MW804 5/7/2009	mg/L	<0.2	U / UJ	<0.02	U / UJ	<0.01	U / UJ	0.019	/ J	<0.002	U / UJ	120	/ J	<0.01	U / UJ	0.0031	F / J	<0.01	U / UJ	<0.1	U / UJ	<0.005	U / UJ	72	/ J	0.038	/ J	NA		<0.0002		<0.01	U / UJ	0.67	/ J	<0.005	U / UJ	17	/ J	<0.005	U / UJ	<0.02	U / UJ
	MW804 10/27/2009	mg/L	<0.20		<0.020		<0.010		0.028		<0.0020		130		<0.010		<0.0050		<0.010		<0.10		<0.0050		82		0.039		NA		<0.0002		0.0019	F /	1.8		<0.0050		27		0.0038	F /	<0.020	
	MW804 4/13/2010	mg/L	<0.20		<0.020		<0.010		0.023		<0.0020		120		<0.010		<0.0050		<0.010		<0.20		<0.0050		77		0.12		NA		<0.0002		<0.010		0.54	/ J	<0.0050		14		0.0042	F /	0.0043	F /
	MW804 10/28/2010	mg/L	<0.20		<0.020		<0.010		0.066		0.00086	F / U	140		<0.010		0.0023	F /	<0.010		2		<0.0050		110		0.58		NA		<0.0002		0.0024	F /	4.2		<0.0050		49		<0.0050		<0.020	
	MW804 4/15/2011	mg/L	<0.2		<0.02		<0.01		0.024		<0.002		100		<0.01		<0.005		0.0019	F /	<0.2		<0.005		64		<0.01		NA		<0.0002		0.0015	F /	0.82	/ J	<0.005		15		0.0032	F /	<0.02	
	MW804(DUP) 4/15/2011	mg/L	<0.2		<0.02		<0.01		0.024		<0.002		100		<0.01		<0.005		0.0017	F /	<0.2		<0.005		62		<0.01		NA		<0.0002		0.0012	F /	0.78	/ J	<0.005		15		0.0036	F /	<0.02	
	MW804 10/11/2011	mg/L	<0.20		0.0028	F /	<0.010		0.042		0.0011	F / U	140		<0.010		<0.0050		0.0018	F /	0.44		<0.0050		90		0.088		NA		0.00011	F / J	0.0027	F /	2.3		<0.0050		29		<0.0050		<0.020	
	MW804 10/24/2012	mg/L	<0.2		0.0056	F /	<0.01		0.076		0.00074	F /	150		<0.01		0.0028	F /	0.0016	F /	1.7		<0.005		110		0.53		NA		<0.2		<0.01		5.3		0.0073		64		0.0063		<0.02	
	MW805 10/6/2008	mg/L	<0.2		<0.02		<0.01		0.029		<0.002		120		<0.01		<0.005		0.0011	F /	0.035	F /	<0.005		73		0.0092	F /	NA		<0.0002		0.0076	F /	13		<0.005		100		0.005	F /	0.085	
	MW805 5/7/2009	mg/L	<0.2	U / UJ	<0.02	U / UJ	<0.01	U / UJ	0.029	/ J	<0.002	U / UJ	120	/ J	<0.01	U / UJ	<0.005	U / UJ	<0.01	U / UJ	<0.1	U / UJ	<0.005	U / UJ	77	/ J	<0.01	U / UJ	NA		<0.0002		0.0042	F / J	11	/ J	<0.005	U / UJ	130	/ J	<0.005	U / UJ	<0.02	U / UJ
	MW805 10/27/2009	mg/L	<0.20		<0.020		<0.010		0.027		<0.0020		120		<0.010		<0.0050		<0.010		<0.10		<0.0050		78		<0.010		NA		<0.0002		0.0048	F /	12		<0.0050		110		0.0042	F /	<0.020	
	MW805 4/13/2010	mg/L	<0.20		<0.020		<0.010		0.031		<0.0020		130		<0.010		<0.0050		0.0012	F /	<0.20		<0.0050		84		<0.010		NA		<0.0002		0.005	F /	11	/ J	<0.0050		120		0.0042	F /	0.0044	F /
	MW805 11/2/2010	mg/L	<0.20		<0.020		<0.010		0.036		0.00092	F / U	130		<0.010		0.0016	F /	<0.010		1.2		<0.0050		83		0.026		NA		<0.0002		0.0034	F /	9.9		<0.0050		120		<0.0050		<0.020	
	MW805 4/15/2011	mg/L	<0.2		<0.02		<0.01		0.033		<0.002		120		<0.01		<0.005		0.0014	F /	<0.2		<0.005		82		<0.01		NA		<0.0002		0.0055	F /	13	/ J	<0.005		120		0.0036	F /	<0.02	
	MW805 10/11/2011	mg/L	<0.20		0.0029	F /	<0.010		0.03		0.001	F / U	120		<0.010		<0.0050		0.0023	F /	<0.20		<0.0050		79		0.004	F /	NA		<0.0002		0.0029	F /	8.5		<0.0050		110		<0.0050		<0.020	
	MW805 4/16/2012	mg/L	<0.20		<0.020		<0.010		0.028		<0.0020		110		<0.010		<0.0050		0.0016	F /	<0.20		<0.0050		75		<0.010		NA		<0.20		0.0059	F /	9.5		<0.0050		97		0.0037	F /	0.0078	F /
	MW805 10/24/2012	mg/L	<0.2		<0.02		<0.01		0.029		0.00098	F /	110		<0.01		<0.005		0.0018	F /	0.099	F /	<0.005		79		0.0094	F /	NA		<0.2		0.004	F /	8.1		<0.005		100		<0.005		<0.02	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

An abbreviated list of analytes is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
NA = not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance

< = Result shows laboratory Method Reporting Limit for non-detected results
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = duplicate

TABLE A1-34

Summary of Analytical Results - Volatile Organic Compounds
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M11	*Upgradient*																																							
	MW802	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW802	10/7/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW802(DUP)	10/7/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW802	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW802	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW802	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW802	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW802	4/15/2011	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW802	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW802	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW802	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW803	10/7/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW803	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW803	10/27/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW803	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW803	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW803	4/15/2011	<5	U / UJ	<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW803	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW803	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	Downgradient																																							
	MW333	5/12/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW333	10/6/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW333	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW333	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW333	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW333	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW333	4/18/2011	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW333	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW333	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW334	5/12/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW334	10/6/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW334	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW334	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW334	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW334	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW334	4/18/2011	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW334	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW334(DUP)	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW334	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW335	5/13/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW335	10/7/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW335(DUP)	10/7/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW335	5/4/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW335	10/28/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	

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TABLE A1-34

Summary of Analytical Results - Volatile Organic Compounds
Landfill M11
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	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		1,2-DCE(tot)		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		NS		25		NS		500		NS		3500		25		200		25		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
	Surface Water RG		120,000		420		NS		79		NS		2,000		4,500		NS		1,100		17		NS		NS		NS		150		650		390		NS		NS		110	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M11	*Downgradient*																																							
	MW335	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW335(DUP)	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW335	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW335	4/15/2011	<5	U / UJ	<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW335	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW335	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW335	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW336	5/13/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW336	10/7/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW336	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW336(DUP)	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW336	10/27/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW336(DUP)	10/27/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW336	4/13/2010	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW336	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW336	4/18/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		0.94	F /	<1.0		<1.0		<1.0		<1.0		<1.0	
	MW336	10/12/2011	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW336	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW336	10/24/2012	5.1		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW336(DUP)	10/24/2012	5.4		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW804	5/15/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW804	10/6/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW804	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW804	10/27/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW804	4/13/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW804	10/28/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW804	4/15/2011	<5	U / UJ	<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW804(DUP)	4/15/2011	<5	U / UJ	<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW804	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW804	10/24/2012	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW805	10/6/2008	<10		<1		<5		<1		<1		<1		<1		NA		<2		<1		<1		<10		NA		<1		<1		<1		<1		<1		<2	
	MW805	5/5/2009	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0	U / UJ	<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW805	10/27/2009	<5.0	U / UJ	<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW805	4/13/2010	<5.0	U / UJ	<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW805	11/2/2010	<5.0		<1.0		<5.0	U / UJ	<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0	
	MW805	4/15/2011	<5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	
	MW805	10/11/2011	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW805	4/16/2012	<5.0		<1.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		NA		<1.0		<3.0		<5.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0		<1.0	
	MW805	10/24/2012	5.5		<1		<5		<1		<1		<1		<1		<1		NA		<1		<3		<5		<1		<1		<1		<1		<1		<1		<1	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

An abbreviated list of compounds is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = micrograms per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
cis-1,2-DCE = cis-1,2-Dichloroethene
MethCl = Methylene Chloride
MEK = Methyl Ethyl Ketone (2-butanone)
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
VC = Vinyl chloride

TABLE A1-35

Summary of Analytical Results - Semivolatile Organic Compounds
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

	Compound		2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		0.42		0.42		NS		51		NS		NS	
	Surface Water RG		330		150		68		8000		12		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M11	***Upgrdient***													
	MW802	5/15/2008	<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW802	10/7/2008	<0.95		<0.48		<0.95		<1.4		<0.48		<4.8	
	MW802(DUP)	10/7/2008	<0.96		<0.48		<0.96		<1.4		<0.48		<4.8	
	MW802	5/4/2009	<1.3		<0.48		<0.95		<0.95		<0.48		<4.8	
	MW802	10/27/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	U / UJ
	MW802	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW802	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW802	4/15/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW802	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW802	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW802	10/24/2012	<1.4		<0.51		<1		<1		<0.51		<5.1	
	MW803	10/7/2008	<0.93		<0.47		<0.93		<1.4		<0.47		<4.7	
	MW803	5/4/2009	<1.3		<0.47		<0.94		<0.94		<0.47		<4.7	
	MW803	10/27/2009	<1.3		<0.47		<0.94		<0.94	U / UJ	<0.47		<4.7	U / UJ
	MW803	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW803	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW803	4/15/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW803	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW803	10/24/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	Downgradient													
	MW333	5/12/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	MW333	10/6/2008	<0.98		<0.49		<0.98		<1.4		<0.47		<4.7	
	MW333	5/5/2009	<1.3		<0.47		<0.94		<0.94		<0.47		<4.7	
	MW333	10/28/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	U / UJ
	MW333	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW333	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW333	4/18/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW333	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW333	10/24/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW334	5/12/2008	<0.98		<0.49		<0.98		<1.5		<0.49		<4.9	
	MW334	10/6/2008	<0.97		<0.49		<0.97		<1.5		<0.49		<4.9	
	MW334	5/5/2009	<1.3		<0.48		<0.95		<0.95		<0.48		<4.8	
	MW334	10/28/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	U / UJ
	MW334	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW334	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW334	4/18/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW334	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW334(DUP)	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW334	10/24/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW335	5/13/2008	<0.96		<0.48		<0.96		<1.4		<0.48		<4.8	
	MW335	10/7/2008	<0.99		<0.5		<0.99		<1.5		<0.5		<5	
	MW335(DUP)	10/7/2008	<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW335	5/4/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW335	10/28/2009	<1.3		<0.47		<0.94		<0.94	U / UJ	<0.47		<4.7	U / UJ
	MW335	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW335(DUP)	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW335	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW335	4/15/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW335	10/12/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW335	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW335	10/24/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	

TABLE A1-35

Summary of Analytical Results - Semivolatile Organic Compounds
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	Compound		2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[1]		0.42		0.42		NS		51		NS		NS	
	Surface Water RG		330		150		68		8000		12		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M11	***Downgradient***													
	MW336	5/13/2008	<0.96		<0.48		<0.96		<1.4		<0.48		<4.8	
	MW336	10/7/2008	<0.93		<0.47		<0.93		<1.4		<0.47		<4.7	
	MW336	5/5/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW336(DUP)	5/5/2009	<1.3		<0.47		<0.94		<0.94		<0.47		<4.7	
	MW336	10/27/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	U / UJ
	MW336(DUP)	10/27/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	U / UJ
	MW336	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW336	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW336	4/18/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW336	10/12/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW336	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW336	10/24/2012	<1.3	U / J	<0.47	U / J	<0.93	U / J	<0.93	U / J	<0.47	U / J	<4.7	U / J
	MW336	10/24/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW804	5/15/2008	<0.96		<0.48		<0.96		<1.4		<0.48		<4.8	
	MW804	10/6/2008	<0.94		<0.47		<0.94		<1.4		<0.47		<4.7	
	MW804	5/5/2009	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW804	10/27/2009	<1.3		<0.48		<0.95		<0.95	U / UJ	<0.48		<4.8	U / UJ
	MW804	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW804	10/28/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW804	4/15/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW804(DUP)	4/15/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW804	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW804	10/24/2012	<4		<1.4		<2.9		<2.9		<1.4		<14	
	MW805	10/6/2008	<1		<0.51		<1		<1.5		<0.51		<5.1	
	MW805	5/5/2009	<1.3		<0.47		<0.94		<0.94		<0.47		<4.7	
	MW805	10/27/2009	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	U / UJ
	MW805	4/13/2010	<1.3	U / UJ	<0.47	U / UJ	<0.93		<0.93		<0.47		<4.7	
	MW805	11/2/2010	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW805	4/15/2011	<1.3		<0.47		<0.93		<0.93	U / UJ	<0.47		<4.7	
	MW805	10/11/2011	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	
	MW805	4/16/2012	<1.3		<0.47		<0.93		<0.93		<0.47	U / UJ	<4.7	
	MW805	10/24/2012	<1.3		<0.47		<0.93		<0.93		<0.47		<4.7	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.
Only data collected since 2001 are shown.
µg/L = microgram per liter
NS = No standard
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
R = Rejected data, unusable
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
NB = Nitrobenzene

TABLE A1-36

Summary of Analytical Results - Indicator Parameters
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit[(1)]		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M11	***Upgradient***					
	MW802	5/15/2008	<0.1		320	
	MW802	10/7/2008	0.034	F /	91	
	MW802(DUP)	10/7/2008	0.055	F /	93	
	MW802	5/4/2009	<0.10	U / UJ	45	/ J
	MW802	10/27/2009	0.13		82	
	MW802	4/13/2010	<0.10		51	
	MW802	10/28/2010	0.063	F / J	79	
	MW802	4/15/2011	0.42		130	
	MW802	10/11/2011	0.18	/ UJ	140	
	MW802	4/16/2012	0.11		85	
	MW802	10/24/2012	0.13	F /	260	
	MW803	10/7/2008	0.77		110	
	MW803	5/4/2009	0.82	/ J	91	/ J
	MW803	10/27/2009	0.28		87	
	MW803	4/13/2010	0.82		91	
	MW803	10/28/2010	0.95	/ J	91	
	MW803	4/15/2011	1.2		89	
	MW803	10/11/2011	1.1	/ J	92	
	MW803	10/24/2012	0.99		98	
	Downgradient					
	MW333	5/12/2008	0.19		66	
	MW333	10/6/2008	0.042	F /	68	
	MW333	5/5/2009	NA		58	/ J
	MW333	10/28/2009	<0.10		46	
	MW333	4/13/2010	0.22		59	
	MW333	10/28/2010	<0.10		56	
	MW333	4/18/2011	0.22		60	
	MW333	10/11/2011	0.19	/ UJ	59	
	MW333	10/24/2012	0.14	F /	59	
	MW334	5/12/2008	0.09	F /	**530**	
	MW334	10/6/2008	0.036	F /	**520**	
	MW334	5/5/2009	0.2	/ J	**420**	
	MW334	10/28/2009	<0.10		330	/ J
	MW334	4/13/2010	<0.10		340	
	MW334	10/28/2010	0.066	F / J	340	
	MW334	4/18/2011	0.094	F /	300	
	MW334	10/11/2011	0.23	/ UJ	250	
	MW334(DUP)	10/11/2011	0.25	/ UJ	260	
	MW334	10/24/2012	<0.2		240	
	MW335	5/13/2008	0.11		**1,300**	
	MW335	10/7/2008	0.12		**1,300**	
	MW335(DUP)	10/7/2008	<0.1		**460**	
	MW335	5/4/2009	0.21	/ J	**1,100**	
	MW335	10/28/2009	<0.10		190	/ J
	MW335	4/13/2010	0.36		**890**	
	MW335(DUP)	4/13/2010	0.34		**910**	
	MW335	10/28/2010	0.079	F / J	**780**	
	MW335	4/15/2011	0.47		**710**	
	MW335	10/12/2011	0.28	/ UJ	**750**	
	MW335	4/16/2012	0.31		**660**	
	MW335	10/24/2012	<0.2		**580**	

TABLE A1-36

Summary of Analytical Results - Indicator Parameters
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	Compound		Nitrate		Sulfate (SO_4)	
	Units		mg/L		mg/L	
	Project Action Limit(1)		10		400	
	Surface Water RG		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M11	***Downgradient***					
	MW336	5/13/2008	0.026	F /	400	
	MW336	10/7/2008	0.031	F /	**510**	
	MW336	5/5/2009	<0.10		**490**	
	MW336(DUP)	5/5/2009	<0.10	/ U	**500**	
	MW336	10/27/2009	<0.10		**450**	/ J
	MW336(DUP)	10/27/2009	0.1		**2,100**	/ J
	MW336	4/13/2010	0.089	F /	**430**	
	MW336	10/28/2010	0.088	F / J	**480**	
	MW336	4/18/2011	0.14		400	
	MW336	10/12/2011	0.14	/ UJ	**410**	
	MW336	4/16/2012	0.12		**410**	
	MW336	10/24/2012	0.37		**510**	
	MW336(DUP)	10/24/2012	0.37		**530**	
	MW804	5/15/2008	<0.1		78	
	MW804	10/6/2008	0.088	F /	**520**	
	MW804	5/5/2009	<0.10	U / UJ	190	
	MW804	10/27/2009	0.11		210	
	MW804	4/13/2010	<0.10		140	
	MW804	10/28/2010	0.068	F / J	**470**	
	MW804	4/15/2011	0.087	F /	190	
	MW804(DUP)	4/15/2011	0.091	F /	190	
	MW804	10/11/2011	0.21	/ UJ	320	
	MW804	10/24/2012	0.17	F /	**490**	
	MW805	10/6/2008	1.5		**590**	
	MW805	5/5/2009	1.1	/ J	**490**	
	MW805	10/27/2009	1.4		**510**	/ J
	MW805	4/13/2010	0.29		**490**	
	MW805	11/2/2010	<0.10		**540**	
	MW805	4/15/2011	0.18		**500**	
	MW805	10/11/2011	0.21	/ UJ	**470**	
	MW805	4/16/2012	0.22		**470**	
	MW805	10/24/2012	0.21		**450**	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG})obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

Only data collected since 2003 are shown.
mg/L = milligrams per liter
NS = No standard
NA = Not analyzed
LF/VF = Lab Flag/Validation Flag
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
R = Rejected data, unusable
F = Concentration below the reported detection limit
J = Estimated concentration
U = Not detected
UJ = Estimated detection limit
DUP = Duplicate

Table A1-37

Summary of Groundwater Trends - Estimated Cleanup Times
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Site	Critical Monitoring Well	Critical Compound	Initial (1) Concentration (mg/L)	Date of Initial Concentration	Final Concentration (µg/L) (Remediation Goal - RG)	Record of Decision Estimated Clean-Up time for Site (yrs)	R^2 Value(2)	Estimated Clean-Up Time (yrs)	Estimated Clean-Up Date (yr)	Source Removal Completion Date
M11	MW335	Sulfate	1,300	2008	400	NC	0.1145	**7**	2019	2008
	MW336	Sulfate	510	2008	400		0.0078	**29**	2041	2008
	MW805	Sulfate	590	2008	400		0.5771	**7**	2019	2008

Note:
Bolded value represents the estimated cleanup time for the associated site.
Estimated clean-up times are approximate and based on constant contamination reduction rates for a specific compound at a specific point within the aquifer.
RG = Remediation Goal
mg/L = milligrams per liter
yr(s) = year(s)
NC = Not calculated

Footnote:
(1) Initial concentration is the maximum observed concentration during the timeframe included.
(2) The R^2 value represents an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables. Shaded analysis results with and R^2 value less than 0.1 are unreliable.

TABLE A1-38

Summary of Mann-Kendall Trend Analyses - Sulfate
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		Trend Analysis Test	Sulfate
MFG (Site M11)			
MW334	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		**DECREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW335	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		**DECREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW336	Trend ≥ 80% Confidence Level	Mann-Kendall	No Trend
	Trend ≥ 90% Confidence Level		No Trend
	Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 **STABLE**
MW804	Trend ≥ 80% Confidence Level	Mann-Kendall	**INCREASING**
	Trend ≥ 90% Confidence Level		**INCREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA
MW805	Trend ≥ 80% Confidence Level	Mann-Kendall	**DECREASING**
	Trend ≥ 90% Confidence Level		**DECREASING**
	Stability Test, If No Trend Exists at 80% Confidence Level		NA

Notes

For results that were not detected above the reporting limit, 1/2 of the reporting limit was used for the Mann-Kendall trend analysis, as applicable.

CV = coefficient of variation

MFG = manufacturing

NA = not analyzed

Table A1-39

Monitoring Well Information Table
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Site	Well ID	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
M11	MW108	15025248.13	1320261.16	543.60	540.80	7.0	27.0	UNKNOWN	9.00	531.80	1981	BRK	20.0	4.0
	MW333	15026529.41	1319776.92	536.41	533.63	17.9	32.9	UNKNOWN	5.00	528.63	1991	BRK	15.0	4.0
	MW334	15025998.41	1319521.79	536.22	533.40	19.0	34.0	UNKNOWN	5.00	528.40	1991	BRK	15.0	4.0
	MW335	15025671.86	1319364.79	538.36	535.66	9.4	19.4	UNKNOWN	6.00	529.66	1991	BRK	10.0	4.0
	MW336	15025322.08	1319223.43	537.28	534.79	12.0	22.0	UNKNOWN	7.50	527.29	1991	BRK	10.0	4.0
	MW337	15024991.97	1319103.37	536.96	534.32	21.1	36.1	UNKNOWN	6.50	527.82	1991	BRK	15.0	4.0
	MW338	15024414.06	1318777.52	537.73	534.70	13.5	28.5	UNKNOWN	3.00	531.70	1991	BRK	15.0	4.0
	MW339	15023897.93	1318660.60	541.27	538.41	9.7	19.7	UNKNOWN	9.00	529.41	1991	BRK	10.0	4.0
	MW340	15023157.68	1318683.22	542.47	539.83	7.0	17.0	UNKNOWN	10.00	529.83	1991	COMBO	10.0	4.0
	MW802	15025690.00	1320235.70	543.42	541.62	5.0	15.0	15.0	9.50	532.12	2008	COMBO	10.0	4.0
	MW803	15025697.70	1320237.50	543.66	541.56	26.5	36.5	36.5	9.50	532.06	2008	BRK	10.0	4.0
	MW804	15025916.10	1319219.30	536.48	533.78	5.0	15.0	15.0	3.50	530.28	2008	COMBO	10.0	4.0
	MW805	15025913.60	1319229.60	536.27	533.62	25.0	35.0	35.0	3.50	530.12	2008	BRK	10.0	4.0

Notes:
Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)
UNKOWN = Indicate data not presented on borelogs or provided in RI/FS documentation.
NM = Water level not measured.
BRK = Bedrock
OVB = Overburden
COMBO = Combination Overburden and Bedrock Well
MSL = Feet relative to mean sea level
BGS = Feet below ground surface
ID = Identification
TOC = Top of Casing

Table A1-40

Summary of Groundwater Elevations
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	TOC Elevation (MSL)	Depth to Water April 2009 (TOC)	Water Elevation April 2009 (MSL)	Depth to Water October 2009 (TOC)	Water Elevation October 2009 (MSL)	Depth to Water April 2010 (TOC)	Water Elevation April 2010 (MSL)	Depth to Water October 2010 (TOC)	Water Elevation October 2010 (MSL)	Depth to Water April 2011 (TOC)	Water Elevation April 2011 (MSL)	Depth to Water October 2011 (TOC)	Water Elevation October 2011 (MSL)	Depth to Water April 2012 (TOC)	Water Elevation April 2012 (MSL)	Depth to Water October 2012 (TOC)	Water Elevation October 2012 (MSL)
M11	MW108	543.60	3.44	540.16	8.68	534.92	6.98	536.62	9.73	533.87	7.25	536.35	9.15	534.45	7.97	535.63	**NM**	**NM**
	MW333	536.41	2.41	534.00	3.12	533.29	2.67	533.74	4.55	531.86	2.73	533.68	4.28	532.13	2.78	533.63	5.63	530.78
	MW334	536.22	2.82	533.40	4.00	532.22	3.05	533.17	5.70	530.52	3.41	532.81	4.80	531.42	3.41	532.81	5.77	530.45
	MW335	538.36	4.94	533.42	6.51	531.85	5.21	533.15	8.56	529.80	5.64	532.72	7.73	530.63	6.11	532.25	9.60	528.76
	MW336	537.28	2.55	534.73	5.89	531.39	4.35	532.93	10.66	526.62	4.94	532.34	8.55	528.73	7.65	529.63	13.51	523.77
	MW337	536.96	3.80	533.16	6.18	530.78	4.90	532.06	10.35	526.61	5.55	531.41	7.39	529.57	5.71	531.25	**NM**	**NM**
	MW338	537.73	**NM**	**NM**	7.35	530.38	4.65	533.08	7.70	530.03	5.22	532.51	5.87	531.86	5.28	532.45	**NM**	**NM**
	MW339	541.27	**NM**	**NM**	9.07	532.20	6.29	534.98	12.87	528.40	7.00	534.27	10.65	530.62	8.44	532.83	**NM**	**NM**
	MW340	542.47	4.10	538.37	10.35	532.12	6.95	535.52	13.55	528.92	7.76	534.71	11.51	530.96	8.70	533.77	**NM**	**NM**
	MW802	543.42	3.08	540.34	7.28	536.14	4.74	538.68	9.00	534.42	5.29	538.13	7.94	535.48	6.69	536.73	11.95	531.47
	MW803	543.66	2.24	541.42	3.66	540.00	2.57	541.09	3.92	539.74	3.09	540.57	4.07	539.59	3.39	540.27	5.68	537.98
	MW804	536.48	3.69	532.79	5.25	531.23	4.29	532.19	9.54	526.94	4.78	531.70	6.65	529.83	5.07	531.41	12.58	523.90
	MW805	536.27	4.15	532.12	5.44	530.83	4.20	532.07	8.92	527.35	4.35	531.92	6.04	530.23	5.18	531.09	12.35	523.92

Notes:
ID = Identification
TOC = Top of Casing
MSL = Feet relative to mean sea level
NM = Water level not measured.

Table A1-41

Vertical Gradient Calculations
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well ID	Vertical Gradient 4/09 (ft/ft)	Vertical Gradient 10/09 (ft/ft)	Vertical Gradient 4/10 (ft/ft)	Vertical Gradient 10/10 (ft/ft)	Vertical Gradient 4/11 (ft/ft)	Vertical Gradient 10/11 (ft/ft)	Vertical Gradient 4/12 (ft/ft)	Vertical Gradient 10/12 (ft/ft)
Landfill M11	MW803	0.0357	0.1480	0.0842	0.2184	0.0869	0.1617	0.1327	0.3041
	MW802								
	MW805	-0.0230	-0.0145	-0.0042	0.0176	0.0078	0.0153	-0.0115	0.0010
	MW804								

Notes:

$$\text{Vertical Gradient} = \frac{\text{Water Level in Deep Well - Water Level in Shallow Well}}{\text{ABS (Water Table Elevation - Screen Midpoint of Deep Well)}}$$

Negative vertical gradients indicate downward flow, positive indicates upward flow.
ft = feet
ft/ft = feet per foot
MSL = Mean sea level
NA - Well dry. Therfore, vertical gradient could not be calculated.
NM = Not measured
ID = Identification

Table A1-42

Groundwater Horizontal Gradients
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	Well Numbers		Horizontal Gradient (ft/ft)			
			April 2009	October 2009	April 2010	October 2010
Landfill M11	MW802	MW804	0.0073	0.0048	0.0063	0.0073

Site	Well Numbers		Horizontal Gradient (ft/ft)			
			April 2011	October 2011	April 2012	October 2012
Landfill M11	MW802	MW804	0.0062	0.0055	0.0052	0.0073

Notes:
ft/ft = feet per foot

Table A1-43

Groundwater Flow Velocities
Landfill M11
Third Five-Year Review Report
Joliet Army Ammunition Plant

Site	April 2009			October 2009			April 2010			October 2010		
	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
Landfill M11[(1)]	0.000016	0.05	16.9	0.000013	0.04	13.9	0.000014	0.04	14.3	0.000016	0.05	16.9

Site	April 2011			October 2011			April 2012			October 2012		
	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
Landfill M11[(1)]	0.000014	0.04	14.3	0.000013	0.04	13.6	0.000012	0.03	12.0	0.000014	0.04	14.6

Notes:
cm/sec = centimeters per second
ft = feet

Footnotes:
(1) No hydraulic conductivity data were available for Site M11 Landfill. Value used is from nearby Site M7.

GRU1
Mann-Kendall U Statistical Test

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site L1		BRRTS No. =		Well Number =	MW131

	Compound ->	2,6-DNT	1,3,5-TNB	2,4,6-TNT			
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	1-May-09	1.55	460.00	1,400.00			
2	27-Oct-09	3.95	4,000.00	11,000.00			
3	12-Apr-10	3.90	3,200.00	4,100.00			
4	27-Oct-10	6.80	1,700.00	1,000.00			
5	15-Apr-11	28.50	3,400.00	5,800.00			
6	11-Oct-11	0.95	0.95	1,100.00			
7	12-Apr-12	1.55	0.80	2,200.00			
8	29-Oct-12	15.50	8.00	1,000.00			
9							
10							
	Mann Kendall Statistic (S) =	5.0	-12.0	-9.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	8	0	0	0
	Average =	7.84	1596.22	3450.00	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	9.591	1712.073	3509.986	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.224	1.073	1.017	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected					n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	DECREASING	DECREASING	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	DECREASING	No Trend	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		CV > 1 NON-STABLE	NA	NA	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
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Site Name :	JOAAP - Site L1		BRRTS No. =		Well Number =	MW173

	Compound ->	2,4-DNT	RDX	2,4,6-TNT			
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event Number	Sampling Date (most recent last)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)
1	1-May-09	0.16	12.00	20.00			
2	27-Oct-09	0.23	9.60	1.70			
3	13-Apr-10	0.16	8.60	10.00			
4	27-Oct-10	0.19	3.40	0.95			
5	14-Apr-11	0.30	9.60	10.00			
6	11-Oct-11	0.17	10.00	8.20			
7	11-Apr-12	0.16	10.00	12.00			
8	29-Oct-12	0.80	0.80	0.40			
9							
10							
	Mann Kendall Statistic (S) =	5.0	-6.0	-7.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	8	0	0	0
	Average =	0.27	8.00	7.91	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.220	3.826	6.710	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.817	0.478	0.849	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected					n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	No Trend	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	**CV <= 1 STABLE**	**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

State of Wisconsin **Mann-Kendall Statistical Test**
Department of Natural Resources **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site L1			BRRTS No. =		Well Number =	WES1
	Compound ->	2,4-DNT	1,3,5-TNB	2,4,6-TNT			
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	27-Oct-09	0.22	0.78	1.70			
2	12-Apr-10	0.16	3.70	7.40			
3	27-Oct-10	1.60	21.00	34.00			
4	15-Apr-11	0.28	39.00	48.00			
5	11-Oct-11	0.13	0.13	31.00			
6	12-Apr-12	1.55	40.00	38.00			
7	29-Oct-12	0.80	0.40	6.40			
8							
9							
10							
	Mann Kendall Statistic (S) =	3.0	3.0	5.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	7	7	0	0	0
	Average =	0.68	15.00	23.79	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.655	18.263	18.272	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.969	1.218	0.768	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected					n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	No Trend	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	**CV > 1 NON-STABLE**	**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS Date = 21-Mar-13 Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site L1		BRRTS No. =		Well Number =	WES3

	Compound ->	2,4,6-TNT					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	4-May-09	1.30					
2	27-Oct-09	0.65					
3	13-Apr-10	1.20					
4	27-Oct-10	0.99					
5	15-Apr-11	2.30					
6	11-Oct-11	0.90					
7	11-Apr-12	1.20					
8	29-Oct-12	0.76					
9							
10							
	Mann Kendall Statistic (S) =	-5.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	1.16	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.513	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.441	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS Date = 21-Mar-13 Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site L2		BRRTS No. =		Well Number =	MW404

	Compound ->	RDX					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	1-May-09	16.00					
2	26-Oct-09	27.00					
3	12-Apr-10	27.00					
4	27-Oct-10	46.00					
5	14-Apr-11	74.00					
6	11-Oct-11	94.00					
7							
8	26-Oct-12	130.00					
9							
10							
	Mann Kendall Statistic (S) =	20.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	59.14	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	41.946	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.709	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site L3		BRRTS No. =		Well Number =	MW412

	Compound ->	RDX					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	210.00					
2	27-Oct-09	130.00					
3	12-Apr-10	220.00					
4	26-Oct-10	200.00					
5	14-Apr-11	110.00					
6	17-Oct-11	67.00					
7	11-Apr-12	120.00					
8	30-Oct-12	120.00					
9							
10							
	Mann Kendall Statistic (S) =	-13.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	147.13	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	55.579	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.378	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site L3		BRRTS No. =		Well Number =	MW630

	Compound ->	RDX					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	0.08					
2	26-Oct-09	0.96					
3	9-Apr-10	8.90					
4	26-Oct-10	0.29					
5	14-Apr-11	13.00					
6	14-Oct-11	8.00					
7	11-Apr-12	8.70					
8	30-Oct-12	0.36					
9							
10							
	Mann Kendall Statistic (S) =	6.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	5.04	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	5.157	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.024	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		**CV > 1**	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		**NON-STABLE**	n<4	n<4	n<4	n<4	n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site L3		BRRTS No. =		Well Number =	MW633

	Compound ->	RDX					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	33.00					
2	27-Oct-09	7.70					
3	12-Apr-10	56.00					
4	26-Oct-10	16.00					
5	14-Apr-11	4.20					
6	17-Oct-11	7.90					
7	11-Apr-12	6.70					
8	30-Oct-12	10.00					
9							
10							
	Mann Kendall Statistic (S) =	-8.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	17.69	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	17.978	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.016	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name : JOAAP - Site L14		BRRTS No. =		Well Number = H7	

	Compound ->	2,4-DNT	2,6-DNT				
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	30-Apr-09	0.16	0.16				
2	23-Oct-09	0.32	0.32				
3	6-Apr-10	0.30	0.30				
4	26-Oct-10	0.17	0.17				
5	18-Apr-11	0.24	0.24				
6	14-Oct-11	0.15	0.15				
7	26-Oct-12	1.50	0.58				
8							
9							
10							
	Mann Kendall Statistic (S) =	1.0	1.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	7	0	0	0	0
	Average =	0.40	0.27	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.488	0.152	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.210	0.559	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected				n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV > 1 NON-STABLE**	**CV <= 1 STABLE**	n<4	n<4	n<4	n<4

Data Entry By = CRS	Date = 21-Mar-13	Checked By = RJR

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Site Name :	JOAAP - Site L14		BRRTS No. =		Well Number =	MW511

	Compound ->	RDX					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	30-Apr-09	0.08					
2	26-Oct-09	31.00					
3	7-Apr-10	0.19					
4	26-Oct-10	110.00					
5	18-Apr-11	0.94					
6	14-Oct-11	84.00					
7	26-Oct-12	76.00					
8							
9							
10							
	Mann Kendall Statistic (S) =	9.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	43.17	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	46.272	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.072	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site L14		BRRTS No. =		Well Number =	MW512

	Compound ->	RDX					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	30-Apr-09	0.62					
2	23-Oct-09	42.00					
3	6-Apr-10	11.00					
4	26-Oct-10	240.00					
5	18-Apr-11	150.00					
6	14-Oct-11	400.00					
7	26-Oct-12	220.00					
8							
9							
10							
	Mann Kendall Statistic (S) =	13.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	151.95	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	146.500	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.964	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

GRU2
Mann-Kendall U Statistical Test

State of Wisconsin **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW107

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	49,000.00					
2	29-Oct-09	34,000.00					
3	12-Apr-10	30,000.00					
4	31-Oct-10	26,000.00					
5	20-Apr-11	26,000.00					
6	15-Oct-11	23,000.00					
7	12-Apr-12	26,000.00					
8	25-Oct-12	22,000.00					
9							
10							
	Mann Kendall Statistic (S) =	-23.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	29500.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	8750.510	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.297	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at			n<4	n<4	n<4	n<4	n<4
80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS Date = 21-Mar-13 Checked By = RJR

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW231

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	41,000.00					
2	29-Oct-09	38,000.00					
3	9-Apr-10	41,000.00					
4	31-Oct-10	32,000.00					
5	20-Apr-11	34,000.00					
6	15-Oct-11	32,000.00					
7	12-Apr-12	35,000.00					
8	25-Oct-12	36,000.00					
9							
10							
	Mann Kendall Statistic (S) =	-8.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	36125.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	3603.074	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.100	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

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Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW640

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	5,000.00					
2	29-Oct-09	5,000.00					
3	12-Apr-10	5,200.00					
4	31-Oct-10	5,000.00					
5	19-Apr-11	5,400.00					
6	15-Oct-11	5,100.00					
7	12-Apr-12	5,200.00					
8	25-Oct-12	4,300.00					
9							
10							
	Mann Kendall Statistic (S) =	2.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	5025.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	324.037	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.064	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW641

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	820.00					
2	29-Oct-09	910.00					
3	12-Apr-10	920.00					
4	31-Oct-10	1,300.00					
5	20-Apr-11	670.00					
6	17-Oct-11	1,100.00					
7	12-Apr-12	640.00					
8	25-Oct-12	1,100.00					
9							
10							
	Mann Kendall Statistic (S) =	3.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	932.50	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	226.448	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.243	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS Date = 21-Mar-13 Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW642

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	440.00					
2	29-Oct-09	430.00					
3	12-Apr-10	430.00					
4	31-Oct-10	460.00					
5	20-Apr-11	430.00					
6	17-Oct-11	410.00					
7	12-Apr-12	420.00					
8	25-Oct-12	390.00					
9							
10							
	Mann Kendall Statistic (S) =	-17.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	426.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	20.659	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.048	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		DECREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at			n<4	n<4	n<4	n<4	n<4
80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW643

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	110.00					
2	28-Oct-09	53.00					
3	12-Apr-10	59.00					
4	1-Nov-10	25.00					
5	18-Apr-11	54.00					
6	15-Oct-11	38.00					
7	13-Apr-12	58.00					
8	26-Oct-12	160.00					
9							
10							
	Mann Kendall Statistic (S) =	2.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	69.63	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	44.010	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.632	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW644

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	240.00					
2	28-Oct-09	120.00					
3	12-Apr-10	140.00					
4	1-Nov-10	170.00					
5	18-Apr-11	170.00					
6	15-Oct-11	180.00					
7	13-Apr-12	160.00					
8	26-Oct-12	86.00					
9							
10							
	Mann Kendall Statistic (S) =	-5.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	158.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	45.437	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.287	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW645

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	65.00					
2	28-Oct-09	65.00					
3	12-Apr-10	57.00					
4	1-Nov-10	70.00					
5	18-Apr-11	90.00					
6	15-Oct-11	88.00					
7	13-Apr-12	67.00					
8	25-Oct-12	90.00					
9							
10							
	Mann Kendall Statistic (S) =	14.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	74.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	13.223	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.179	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW646

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	130.00					
2	28-Oct-09	100.00					
3	12-Apr-10	190.00					
4	1-Nov-10	150.00					
5	19-Apr-11	120.00					
6	15-Oct-11	120.00					
7	13-Apr-12	110.00					
8	25-Oct-12	110.00					
9							
10							
	Mann Kendall Statistic (S) =	-10.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	128.75	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	29.001	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.225	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW648

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	28-Oct-09	10.00					
2	12-Apr-10	10.00					
3	1-Nov-10	10.00					
4	18-Apr-11	37.00					
5	15-Oct-11	7.50					
6	12-Apr-12	34.00					
7	25-Oct-12	14.00					
8							
9							
10							
	Mann Kendall Statistic (S) =	4.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	17.50	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	12.473	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.713	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS Date = 21-Mar-13 Checked By = RJR

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	MW649

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	29-Oct-09	100.00					
2	12-Apr-10	57.00					
3	1-Nov-10	240.00					
4	20-Apr-11	86.00					
5	17-Oct-11	68.00					
6	13-Apr-12	64.00					
7	25-Oct-12	120.00					
8							
9							
10							
	Mann Kendall Statistic (S) =	-1.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	105.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	63.495	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.605	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		**CV <= 1**	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		**STABLE**	n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS Date = 21-Mar-13 Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - Site M1		BRRTS No. =		Well Number =	SW709

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	2-May-09	33.00					
2	26-Oct-09	39.00					
3	12-Apr-10	43.00					
4	1-Nov-10	86.00					
5	18-Apr-11	54.00					
6	15-Oct-11	47.00					
7	13-Apr-12	60.00					
8	26-Oct-12	180.00					
9							
10							
	Mann Kendall Statistic (S) =	20.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	67.75	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	48.195	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.711	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name :	JOAAP - MFG (Site M6)		BRRTS No. =		Well Number =	MW212R

	Compound ->	2,4-DNT	2,6-DNT	2-NT	2,4,6-TNT		
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	7-May-09	1,000.00	340.00	1,800.00	150.00		
2	26-Oct-09	4,500.00	1,200.00	20,000.00	870.00		
3	9-Apr-10	95.00	84.00	4.80	8.20		
4	2-Nov-10	140.00	280.00	2,900.00	67.00		
5	21-Apr-11	2,400.00	730.00	4,800.00	230.00		
6	19-Oct-11	2,700.00	1,100.00	12,000.00	230.00		
7	15-Apr-12	620.00	260.00	4,100.00	39.00		
8	23-Oct-12	2,500.00	640.00	12,000.00	200.00		
9							
10							
	Mann Kendall Statistic (S) =	4.0	0.0	9.0	-1.0	0.0	0.0
	Number of Rounds (n) =	8	8	8	8	0	0
	Average =	1744.38	579.25	7200.60	224.28	#DIV/0!	#DIV/0!
	Standard Deviation =	1540.884	410.037	6810.820	274.872	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.883	0.708	0.946	1.226	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected						n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	**INCREASING**	No Trend	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	No Trend	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV <= 1 STABLE**	**CV <= 1 STABLE**	NA	**CV > 1 NON-STABLE**	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name :	JOAAP - MFG (Site M6)		BRRTS No. =		Well Number =	MW313

	Compound ->	2,4-DNT	2,6-DNT				
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	7-May-09	0.19	0.19				
2	26-Oct-09	0.20	0.20				
3	9-Apr-10	0.28	0.28				
4	2-Nov-10	0.19	0.19				
5	21-Apr-11	0.19	0.19				
6	19-Oct-11	0.18	0.18				
7	15-Apr-12	0.16	0.16				
8	23-Oct-12	5.00	3.30				
9							
10							
	Mann Kendall Statistic (S) =	-3.0	-3.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	0	0	0	0
	Average =	0.80	0.58	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	1.699	1.098	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	2.132	1.879	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected				n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		CV > 1 NON-STABLE	CV > 1 NON-STABLE	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

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Site Name :	JOAAP - MFG (Site M6)		BRRTS No. =		Well Number =	MW318

	Compound ->	2,6-DNT					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	0.16					
2	26-Oct-09	0.80					
3	8-Apr-10	0.21					
4	2-Nov-10	0.35					
5	21-Apr-11	0.28					
6	19-Oct-11	2.80					
7	14-Apr-12	0.45					
8	23-Oct-12	0.80					
9							
10							
	Mann Kendall Statistic (S) =	13.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	0.73	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.872	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.195	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

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Site Name :	JOAAP - MFG (Site M6)		BRRTS No. =		Well Number =	MW319

	Compound ->	2,4-DNT	2,6-DNT				
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	0.16	0.16				
2	26-Oct-09	0.80	0.80				
3	8-Apr-10	0.25	3.00				
4	2-Nov-10	6.20	0.18				
5	21-Apr-11	0.74	0.18				
6	19-Oct-11	0.44	0.44				
7	14-Apr-12	0.31	0.31				
8	23-Oct-12	0.80	0.80				
9							
10							
	Mann Kendall Statistic (S) =	5.0	5.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	0	0	0	0
	Average =	1.21	0.73	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	2.032	0.954	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.679	1.303	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected				n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		CV > 1 NON-STABLE	CV > 1 NON-STABLE	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

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Site Name :	JOAAP - MFG (Site M6)		BRRTS No. =		Well Number =	MW652

	Compound ->	2,4-DNT	2,6-DNT	2-NT	2,4,6-TNT		
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	7-May-09	2,000.00	630.00	5,300.00	340.00		
2	26-Oct-09	4,900.00	1,500.00	23,000.00	810.00		
3	9-Apr-10	8,000.00	2,800.00	36,000.00	1,400.00		
4	2-Nov-10	5,800.00	2,800.00	28,000.00	1,200.00		
5	21-Apr-11	5,400.00	1,400.00	24,000.00	770.00		
6	19-Oct-11	2,800.00	1,500.00	13,000.00	520.00		
7	14-Apr-12	8,400.00	3,300.00	44,000.00	1,600.00		
8	23-Oct-12	5,100.00	2,000.00	23,000.00	950.00		
9							
10							
	Mann Kendall Statistic (S) =	6.0	10.0	5.0	6.0	0.0	0.0
	Number of Rounds (n) =	8	8	8	8	0	0
	Average =	5300.00	1991.25	24537.50	948.75	#DIV/0!	#DIV/0!
	Standard Deviation =	2220.039	902.875	12132.476	430.363	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.419	0.453	0.494	0.454	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected						n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	INCREASING	No Trend	No Trend	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	No Trend	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		CV <= 1 STABLE	NA	CV <= 1 STABLE	CV <= 1 STABLE	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

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Site Name :	JOAAP - MFG (Site M6)		BRRTS No. =		Well Number =	MW654

	Compound ->	2,4-DNT	2,6-DNT	RDX			
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	7-May-09	0.16	0.16	0.70			
2	26-Oct-09	0.63	0.25	0.11			
3	9-Apr-10	0.26	0.26	0.70			
4	2-Nov-10	0.08	0.10	0.80			
5	21-Apr-11	0.19	0.19	0.10			
6	19-Oct-11	0.10	0.10	0.10			
7	15-Apr-12	1.70	0.97	0.31			
8	23-Oct-12	8.90	4.80	0.80			
9							
10							
	Mann Kendall Statistic (S) =	8.0	9.0	1.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	8	0	0	0
	Average =	1.50	0.85	0.45	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	3.038	1.620	0.328	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	2.023	1.900	0.726	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected					n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	INCREASING	No Trend	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	No Trend	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	CV <= 1 STABLE	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - MFG (Site M7)		BRRTS No. =		Well Number =	MW124R

	Compound ->	2,4-DNT	2,4,6-TNT				
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	1.10	21.00				
2	26-Oct-09	0.65	2.30				
3	8-Apr-10	0.25	0.15				
4	3-Nov-10	0.28	0.15				
5	20-Apr-11	0.11	0.10				
6	18-Oct-11	0.11	0.11				
7	14-Apr-12	0.16	0.08				
8	23-Oct-12	0.16	0.08				
9							
10							
	Mann Kendall Statistic (S) =	-16.0	-24.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	0	0	0	0
	Average =	0.35	3.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.350	7.315	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.999	2.443	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected				n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		DECREASING	DECREASING	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		DECREASING	DECREASING	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
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Site Name :	JOAAP - MFG (Site M9)		BRRTS No. =		Well Number =	MW330

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	6-May-09	530.00					
2	23-Oct-09	410.00					
3	9-Apr-10	410.00					
4	3-Nov-10	460.00					
5	20-Apr-11	420.00					
6	18-Oct-11	440.00					
7	17-Apr-12	430.00					
8	23-Oct-12	440.00					
9							
10							
	Mann Kendall Statistic (S) =	2.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	442.50	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	39.188	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.089	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		**CV <= 1**	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		**STABLE**	n<4	n<4	n<4	n<4	n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - MFG (Site M13)		BRRTS No. =		Well Number =	MW126R

	Compound ->	2,4-DNT	2,6-DNT				
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	0.16	0.16				
2	29-Oct-09	0.23	0.23				
3	14-Apr-10	0.20	0.20				
4	28-Oct-10	0.22	0.22				
5	19-Apr-11	0.45	0.45				
6	13-Oct-11	0.26	0.26				
7	16-Apr-12	0.26	0.26				
8	25-Oct-12	1.10	0.62				
9							
10							
	Mann Kendall Statistic (S) =	19.0	19.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	0	0	0	0
	Average =	0.36	0.30	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.313	0.158	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.879	0.532	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected				n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	INCREASING	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	INCREASING	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
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Site Name :	JOAAP - MFG (Site M13)		BRRTS No. =		Well Number =	MW362

	Compound ->	2,4-DNT	2,6-DNT	RDX			
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	0.16	0.16	0.08			
2	29-Oct-09	4.30	0.42	0.09			
3	14-Apr-10	5.00	0.24	0.12			
4	28-Oct-10	7.20	0.24	0.13			
5	19-Apr-11	3.20	1.20	0.09			
6	13-Oct-11	2.90	0.36	0.13			
7	16-Apr-12	4.90	0.16	0.08			
8	25-Oct-12	6.70	1.00	13.00			
9							
10							
	Mann Kendall Statistic (S) =	8.0	7.0	13.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	8	0	0	0
	Average =	4.29	0.47	1.71	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	2.248	0.403	4.560	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.523	0.856	2.661	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected					n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	No Trend	INCREASING	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	INCREASING	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	CV <= 1 STABLE	NA	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
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Site Name :	JOAAP - MFG (Site M13)		BRRTS No. =		Well Number =	MW806

	Compound ->	2,4-DNT	2,6-DNT				
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	0.16	0.16				
2	28-Oct-09	0.19	0.19				
3	14-Apr-10	0.19	0.19				
4	28-Oct-10	0.25	0.25				
5	19-Apr-11	0.24	0.24				
6	12-Oct-11	0.16	0.16				
7	16-Apr-12	0.16	0.16				
8	24-Oct-12	1.40	0.96				
9							
10							
	Mann Kendall Statistic (S) =	7.0	7.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	8	0	0	0	0
	Average =	0.34	0.29	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.430	0.275	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.264	0.965	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected				n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	No Trend	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		CV > 1 NON-STABLE	CV <= 1 STABLE	n<4	n<4	n<4	n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

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Site Name :	JOAAP - MFG (Other Areas)		BRRTS No. =		Well Number =	MW117

	Compound ->	2,4-DNT					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	8-May-09	0.16					
2	22-Oct-09	0.18					
3	8-Apr-10	0.22					
4	1-Nov-10	0.21					
5	20-Apr-11	0.20					
6	17-Oct-11	0.20					
7	13-Apr-12	0.16					
8	23-Oct-12	2.60					
9							
10							
	Mann Kendall Statistic (S) =	7.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	0.49	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.854	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.752	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		**CV > 1**	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		**NON-STABLE**	n<4	n<4	n<4	n<4	n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

State of Wisconsin — **Mann-Kendall Statistical Test**

Department of Natural Resources — **Form 4400-215 (2/2001)**

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Site Name :	JOAAP - MFG (Other Areas)		BRRTS No. =		Well Number =	MW118

	Compound ->	2,4-DNT					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	8-May-09	0.16					
2	22-Oct-09	0.17					
3	8-Apr-10	0.22					
4	2-Nov-10	0.22					
5	20-Apr-11	0.18					
6	17-Oct-11	0.17					
7	13-Apr-12	0.16					
8	23-Oct-12	2.30					
9							
10							
	Mann Kendall Statistic (S) =	3.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	0.44	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.750	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.688	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		**CV > 1**	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		**NON-STABLE**	n<4	n<4	n<4	n<4	n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

Landfill M11
Mann-Kendall U Statistical Test

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
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Site Name :	JOAAP - MFG (Site M11)		BRRTS No. =		Well Number =	MW334

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	420.00					
2	28-Oct-09	330.00					
3	13-Apr-10	340.00					
4	28-Oct-10	340.00					
5	18-Apr-11	300.00					
6	11-Oct-11	250.00					
7							
8	24-Oct-12	240.00					
9							
10							
	Mann Kendall Statistic (S) =	-16.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	317.14	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	61.296	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.193	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - MFG (Site M11)		BRRTS No. =		Well Number =	MW335

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	4-May-09	1,100.00					
2	28-Oct-09	190.00					
3	13-Apr-10	890.00					
4	28-Oct-10	780.00					
5	15-Apr-11	710.00					
6	12-Oct-11	750.00					
7	16-Apr-12	660.00					
8	24-Oct-12	580.00					
9							
10							
	Mann Kendall Statistic (S) =	-14.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	707.50	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	262.066	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.370	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - MFG (Site M11)		BRRTS No. =		Well Number =	MW336

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	490.00					
2	27-Oct-09	450.00					
3	13-Apr-10	430.00					
4	28-Oct-10	480.00					
5	18-Apr-11	400.00					
6	12-Oct-11	410.00					
7	16-Apr-12	410.00					
8	24-Oct-12	510.00					
9							
10							
	Mann Kendall Statistic (S) =	-5.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	447.50	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	41.662	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.093	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		**CV <= 1**	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		**STABLE**	n<4	n<4	n<4	n<4	n<4

Data Entry By =	CRS	Date =	21-Mar-13	Checked By =	RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - MFG (Site M11)		BRRTS No. =		Well Number =	MW804

	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	190.00					
2	27-Oct-09	210.00					
3	13-Apr-10	140.00					
4	28-Oct-10	470.00					
5	15-Apr-11	190.00					
6	11-Oct-11	320.00					
7							
8	24-Oct-12	490.00					
9							
10							
	Mann Kendall Statistic (S) =	10.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	0	0
	Average =	287.14	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	142.678	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.497	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		INCREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS — Date = 21-Mar-13 — Checked By = RJR

State of Wisconsin — **Mann-Kendall Statistical Test**
Department of Natural Resources — **Form 4400-215 (2/2001)**
Remediation and Redevelopment Program

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Site Name :	JOAAP - MFG (Site M11)		BRRTS No. =		Well Number =	MW805

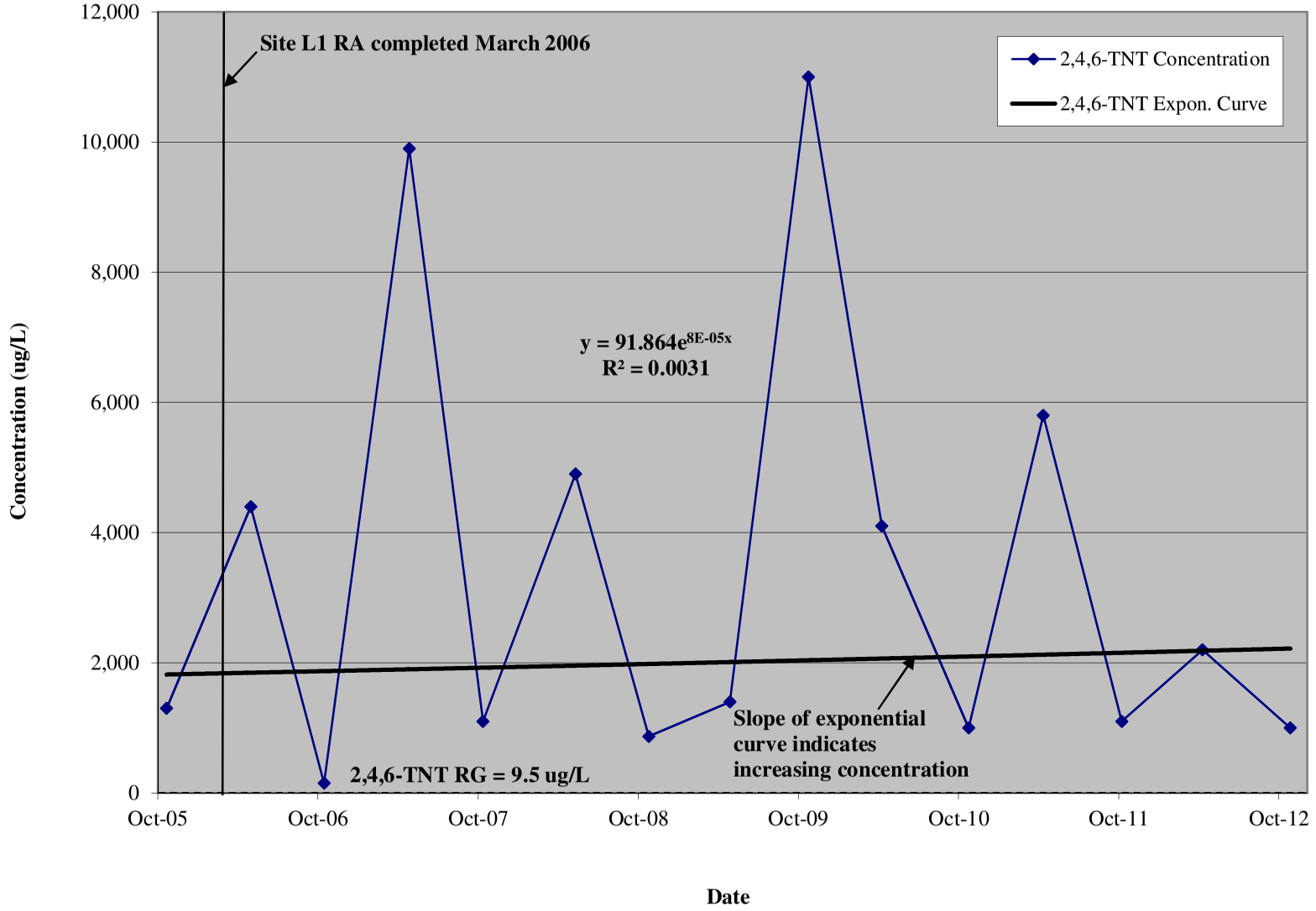
	Compound ->	Sulfate					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	5-May-09	490.00					
2	27-Oct-09	510.00					
3	13-Apr-10	490.00					
4	2-Nov-10	540.00					
5	15-Apr-11	500.00					
6	11-Oct-11	470.00					
7	16-Apr-12	470.00					
8	24-Oct-12	450.00					
9							
10							
	Mann Kendall Statistic (S) =	-14.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	8	0	0	0	0	0
	Average =	490.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	27.775	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.057	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥ 80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥ 90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
			n<4	n<4	n<4	n<4	n<4

Data Entry By = CRS | Date = 21-Mar-13 | Checked By = RJR

GRU1
Trend Graphs

Graph 1

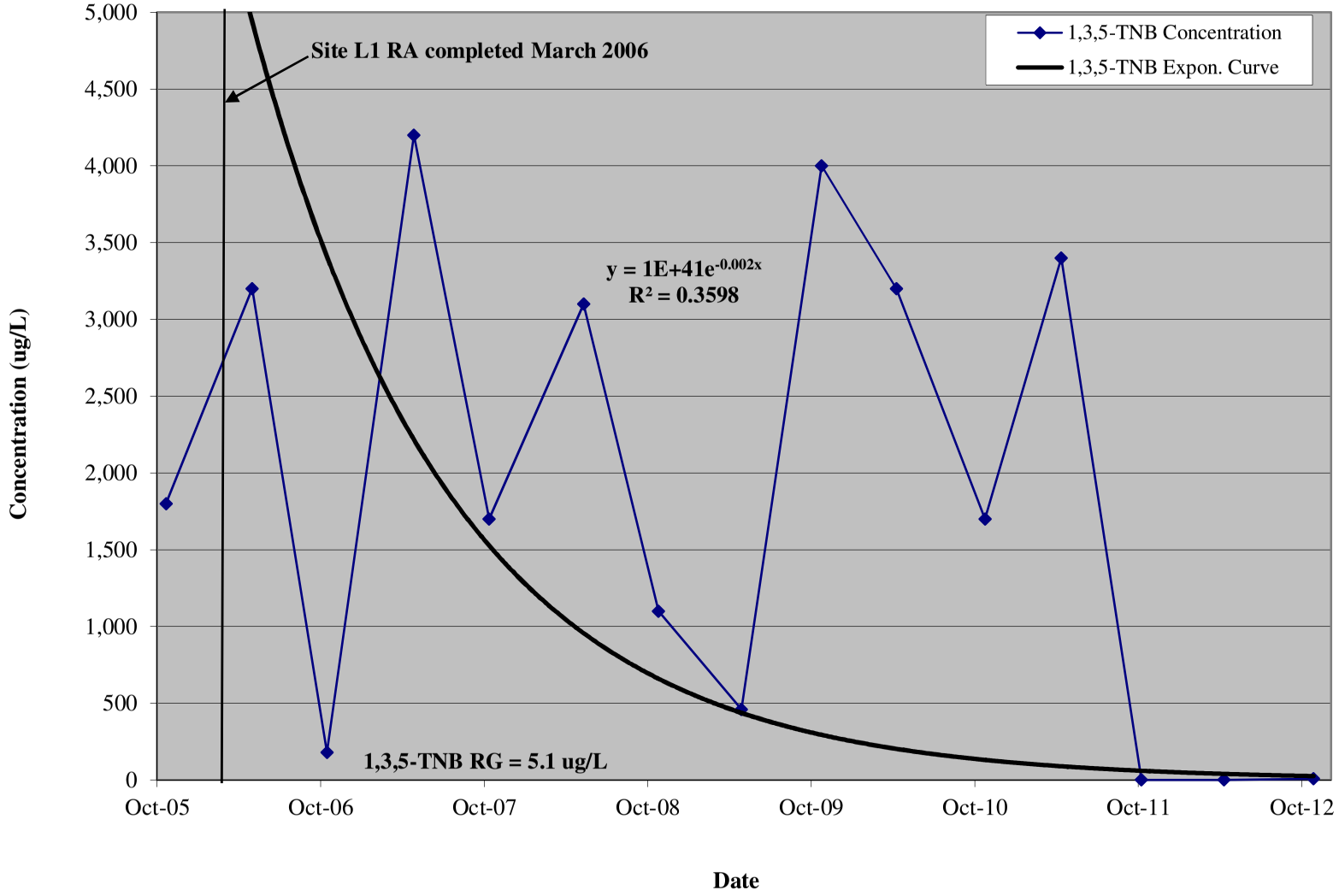
Site L1 - MW131
First Order Decay Rate Constant Estimation - 2,4,6-TNT
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\1-2_L1 MW131 Trend Analysis.xls(MW131 2,4,6-TNT)

Graph 2

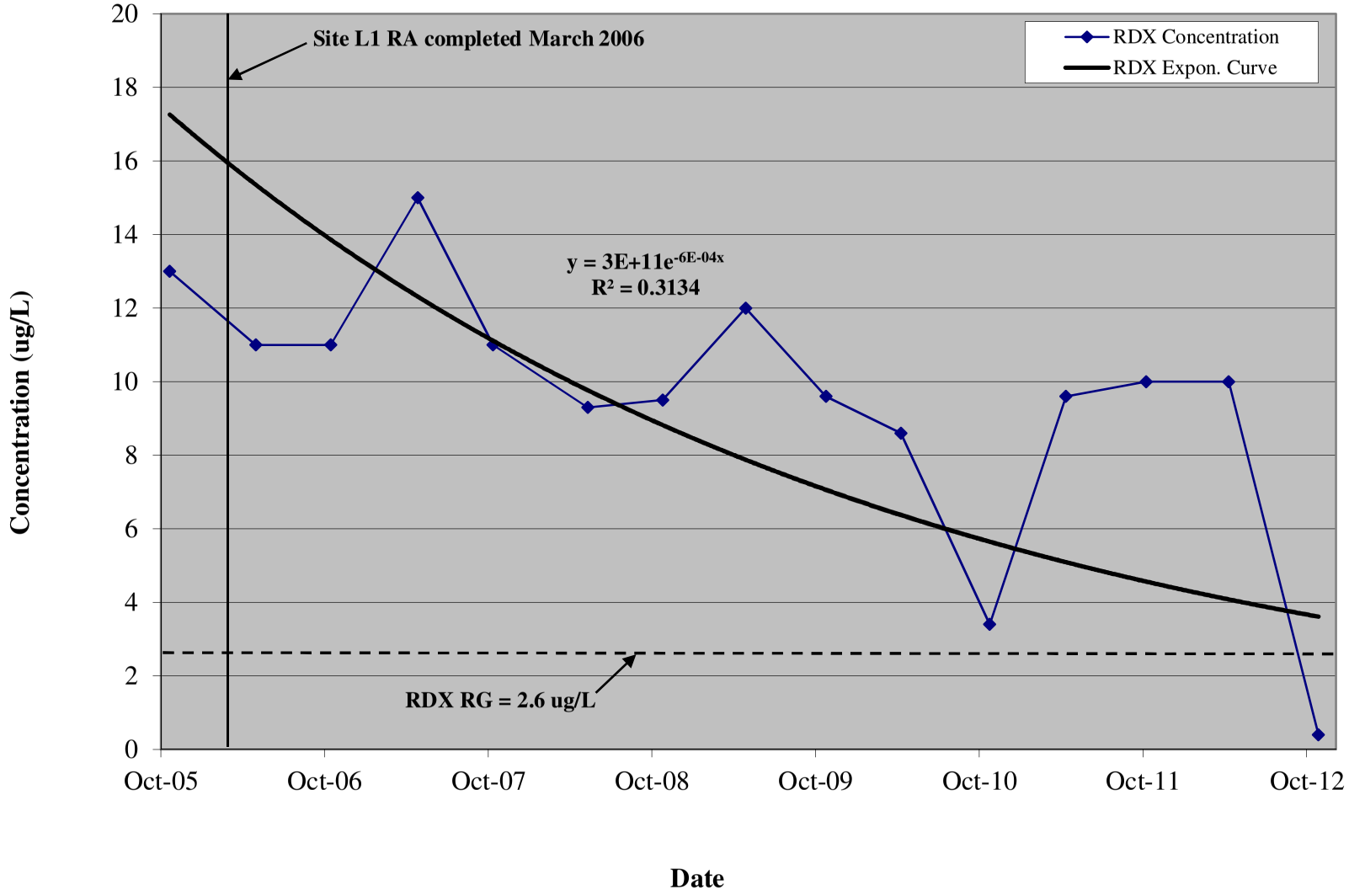
Site L1 - MW131
First Order Decay Rate Constant Estimation - 1,3,5-TNB
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\1-2_L1 MW131 Trend Analysis.xls(MW131 1,3,5-TNB)

Graph 3

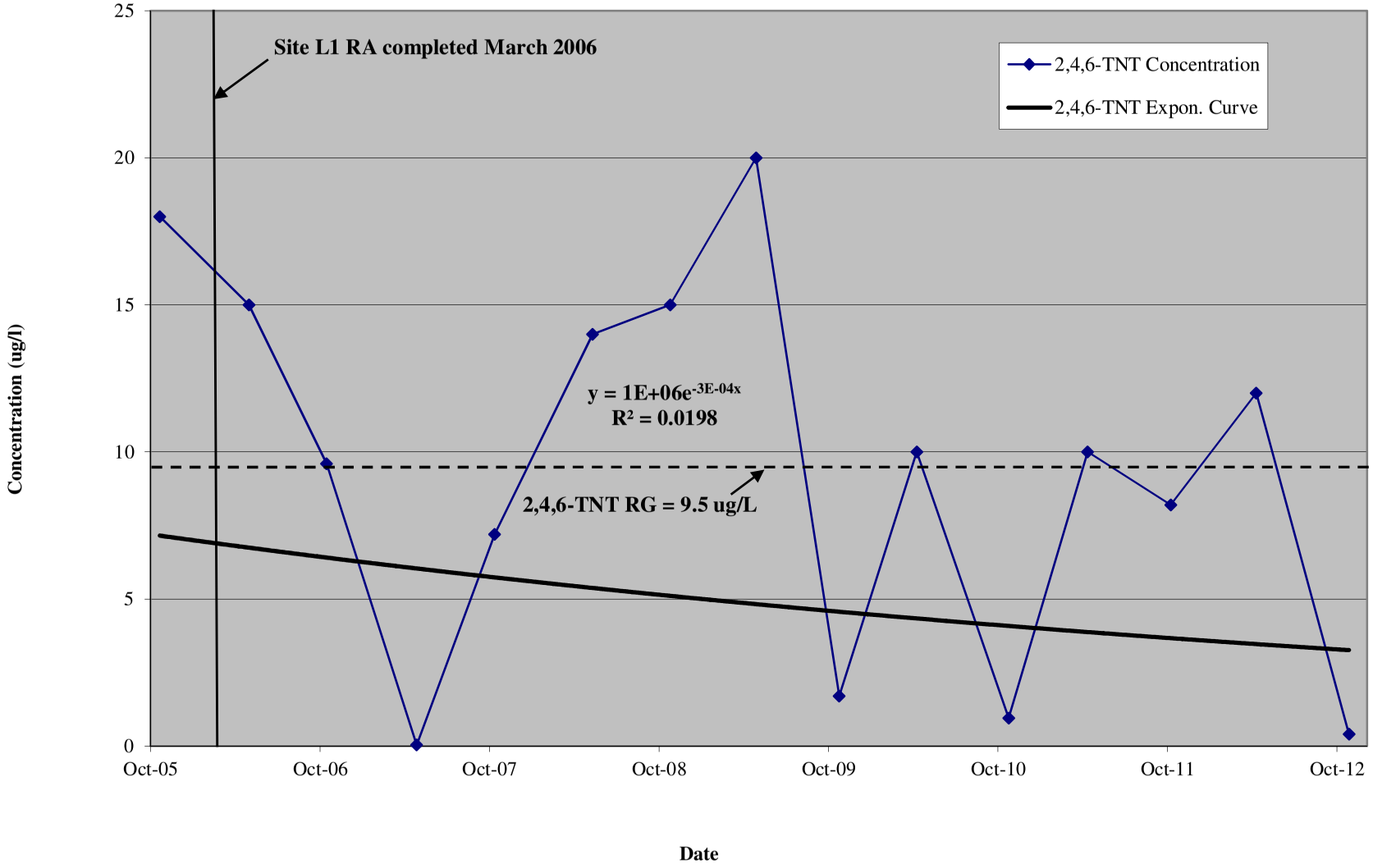
Site L1 - MW173
First Order Deacy Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\3-4_L1 MW173 Trend Analysis.xls(MW173 RDX)

Graph 4

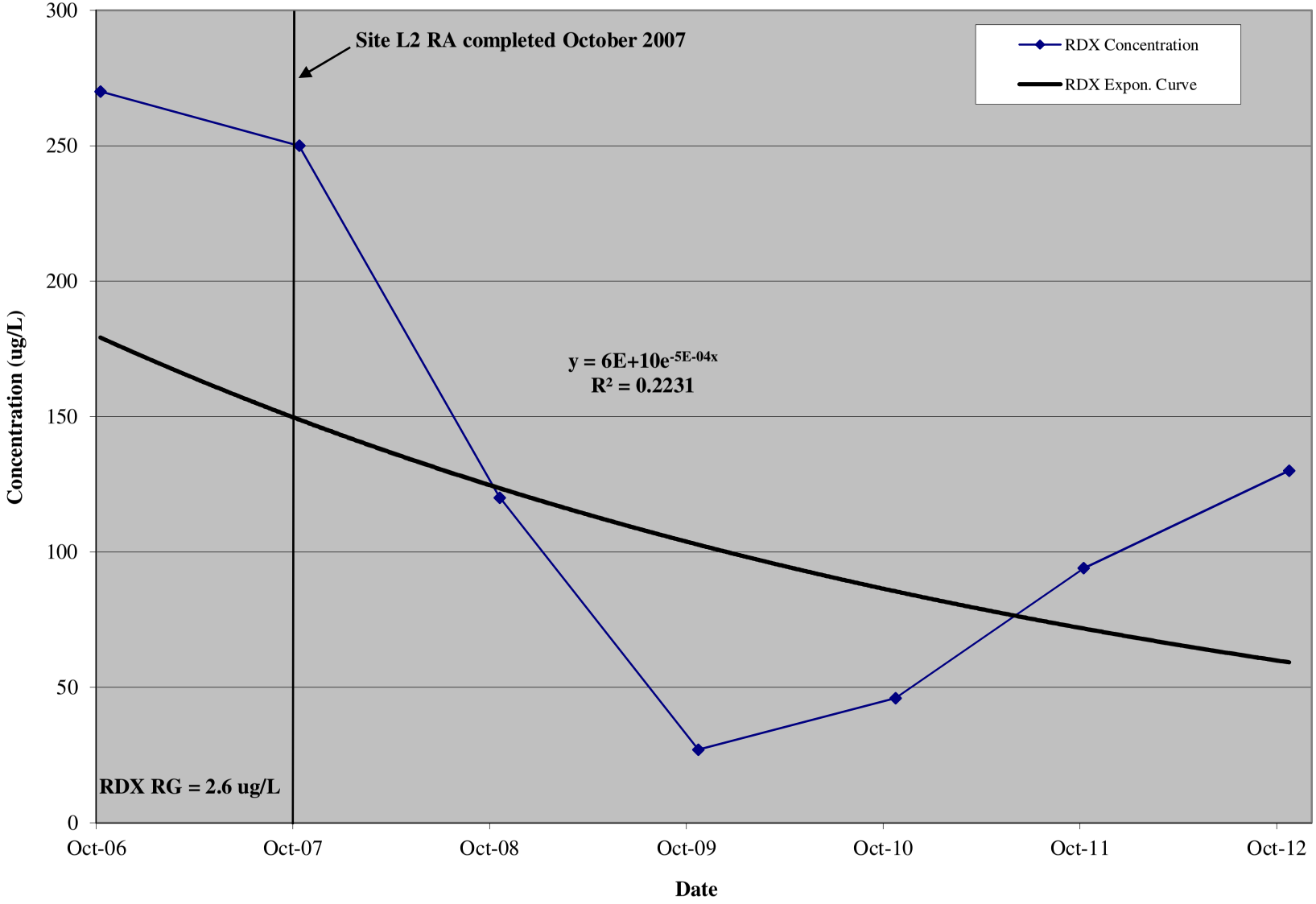
Site L1 - MW173
First Order Decay Rate Constant Estimation - 2,4,6-TNT
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\3-4_L1 MW173 Trend Analysis.xls(MW173 2,4,6-TNT)

Graph 5

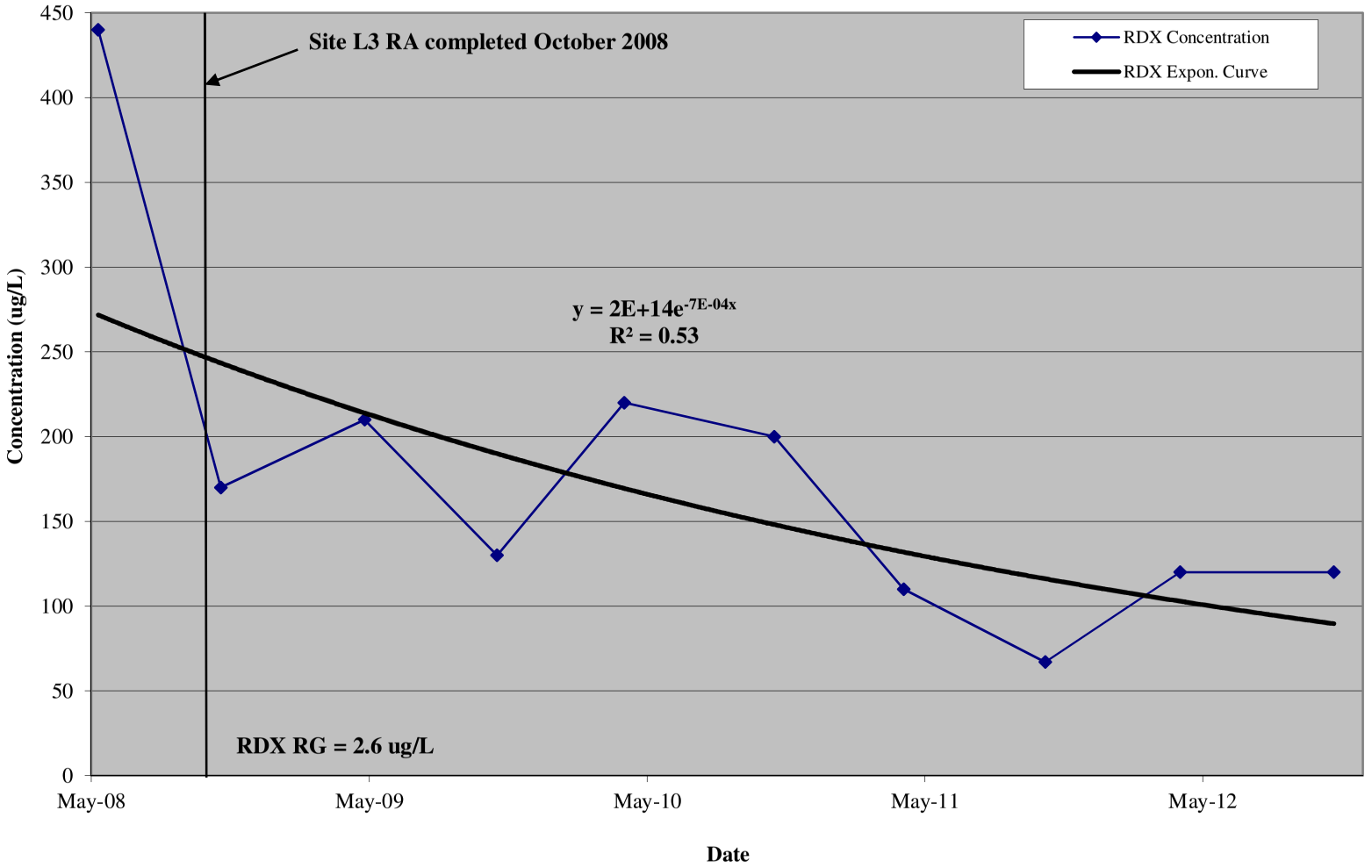
Site L2 - MW404
First Order Decay Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\5_L2 MW404 Trend Analysis.xls(MW404 RDX)

Graph 6

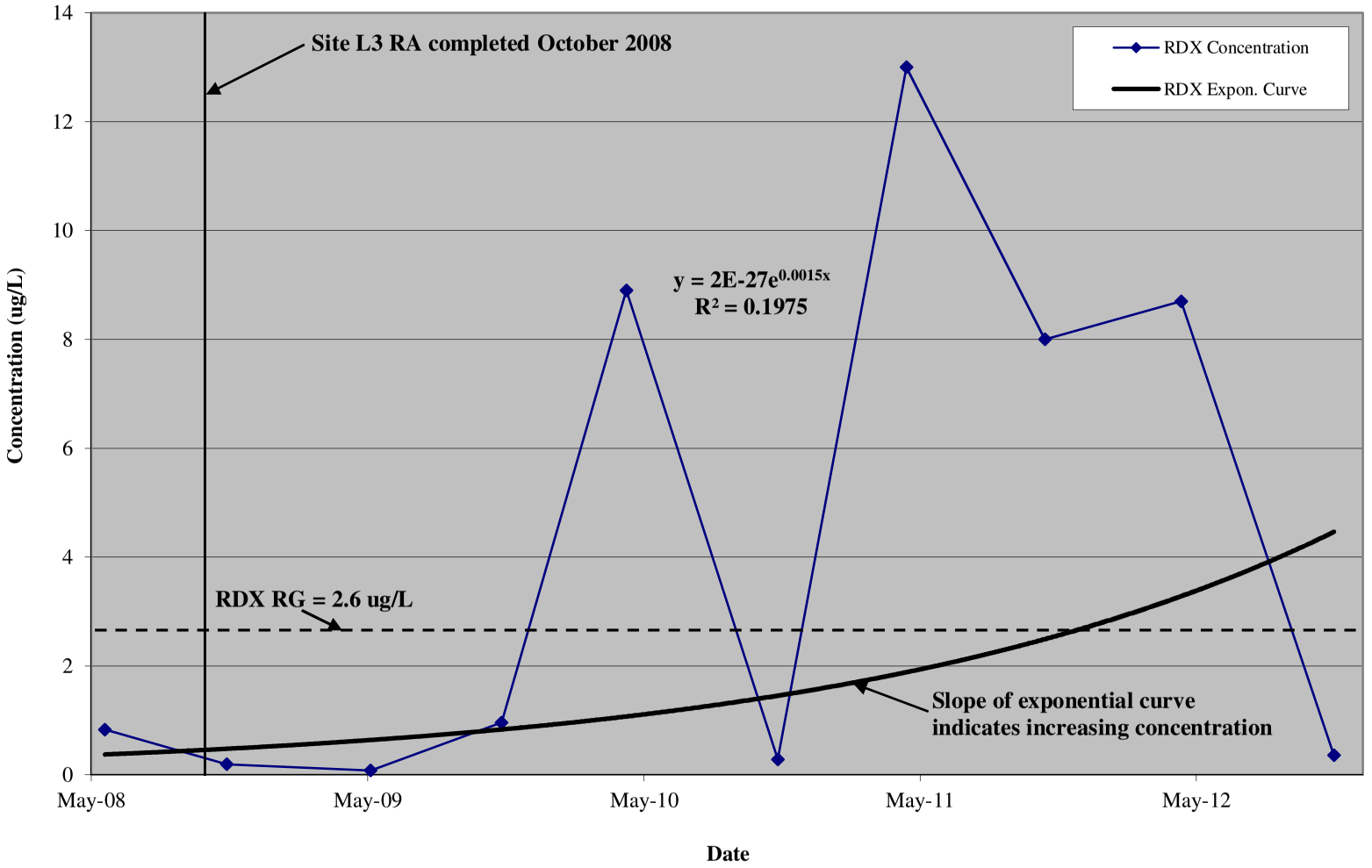
Site L3 - MW412
First Order Decay Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\6_L3 MW412 Trend Analysis.xls(MW412 RDX)

Graph 7

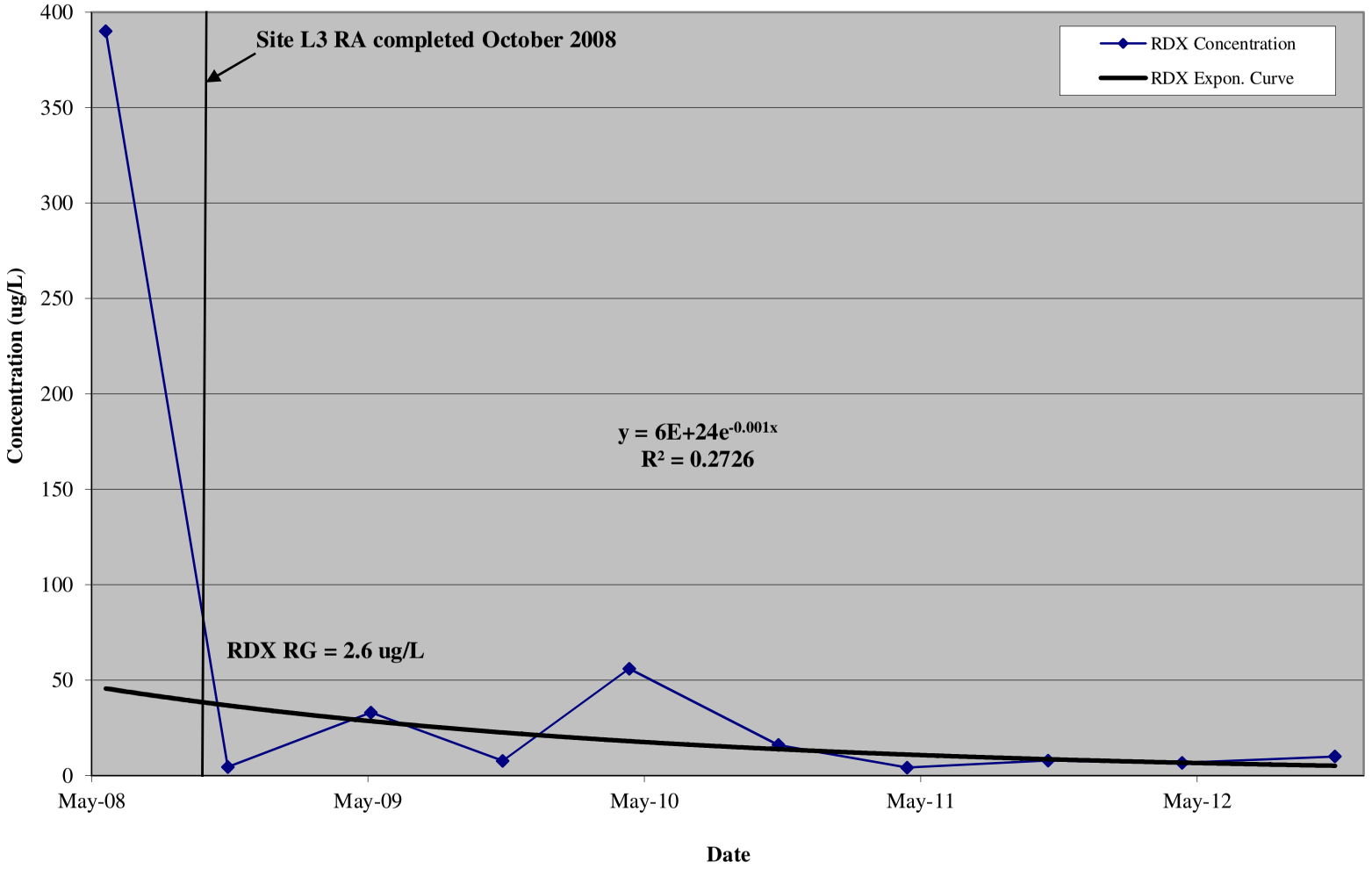
Site L3 - MW630
First Order Decay Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\7_L3 MW630 Trend Analysis.xls(MW630 RDX)

Graph 8

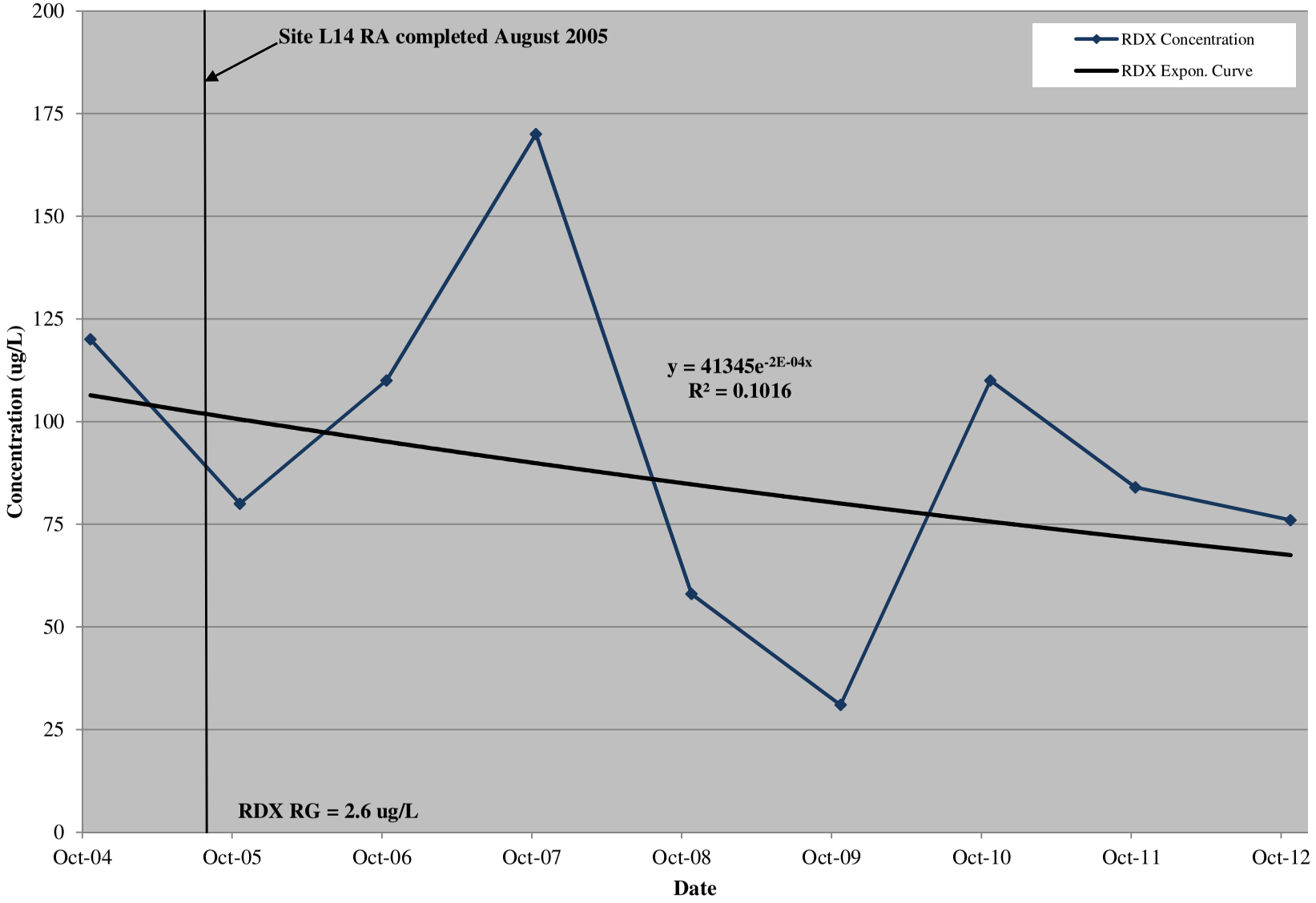
Site L3 - MW633
First Order Deacy Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\8_L3 MW633 Trend Analysis.xls(MW633 RDX)

Graph 9

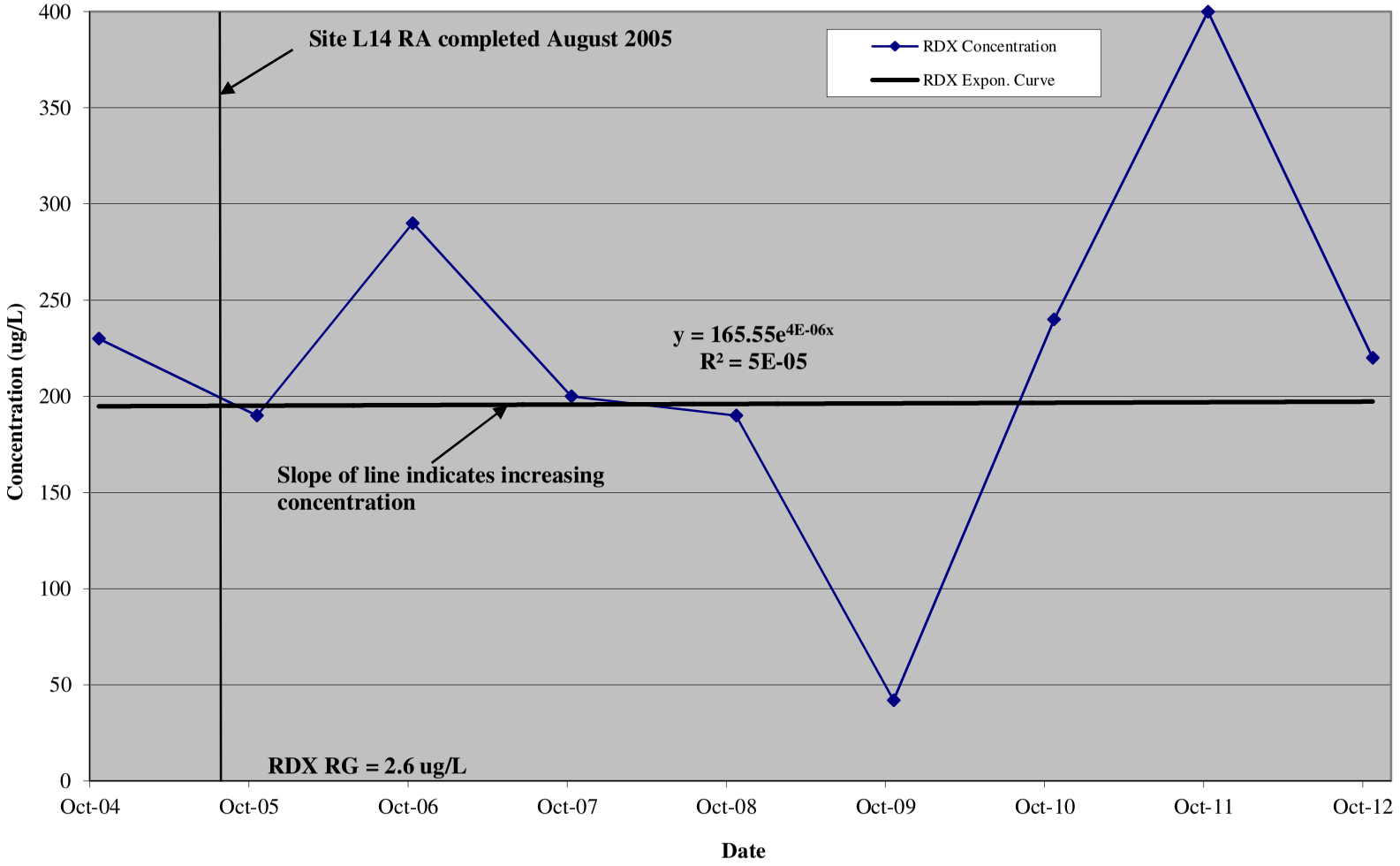
Site L14 - MW511
First Order Decay Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\9_L14 MW511 Trend Analysis.xls(MW511 RDX)

Graph 10

Site L14 - MW512
First Order Decay Rate Constant Estimation - RDX
Third Five-Year Review Report
Joliet Army Ammunition Plant

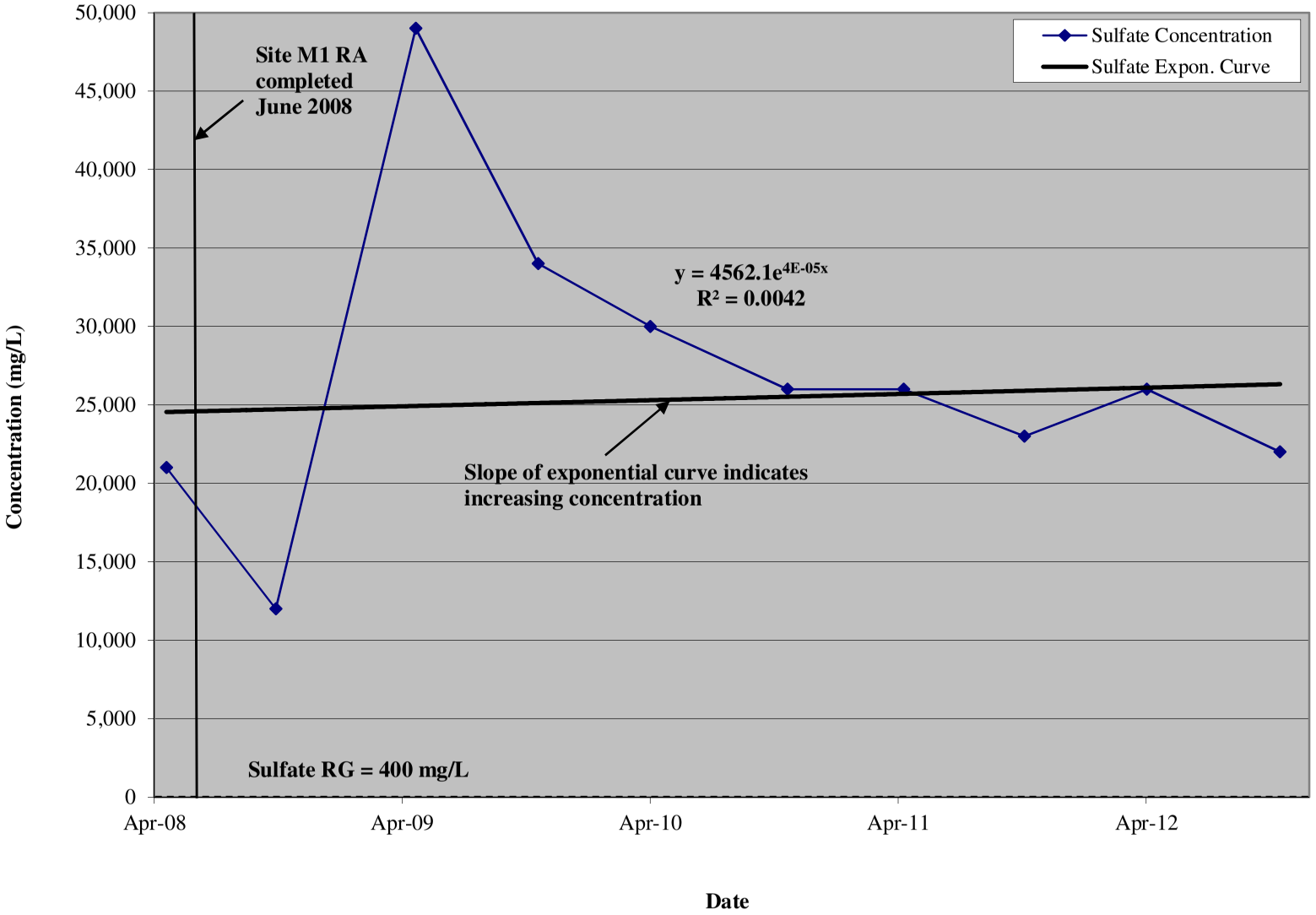


RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\10_L14 MW512 Trend Analysis.xls(MW512 RDX)

GRU2
Trend Graphs

Graph 11

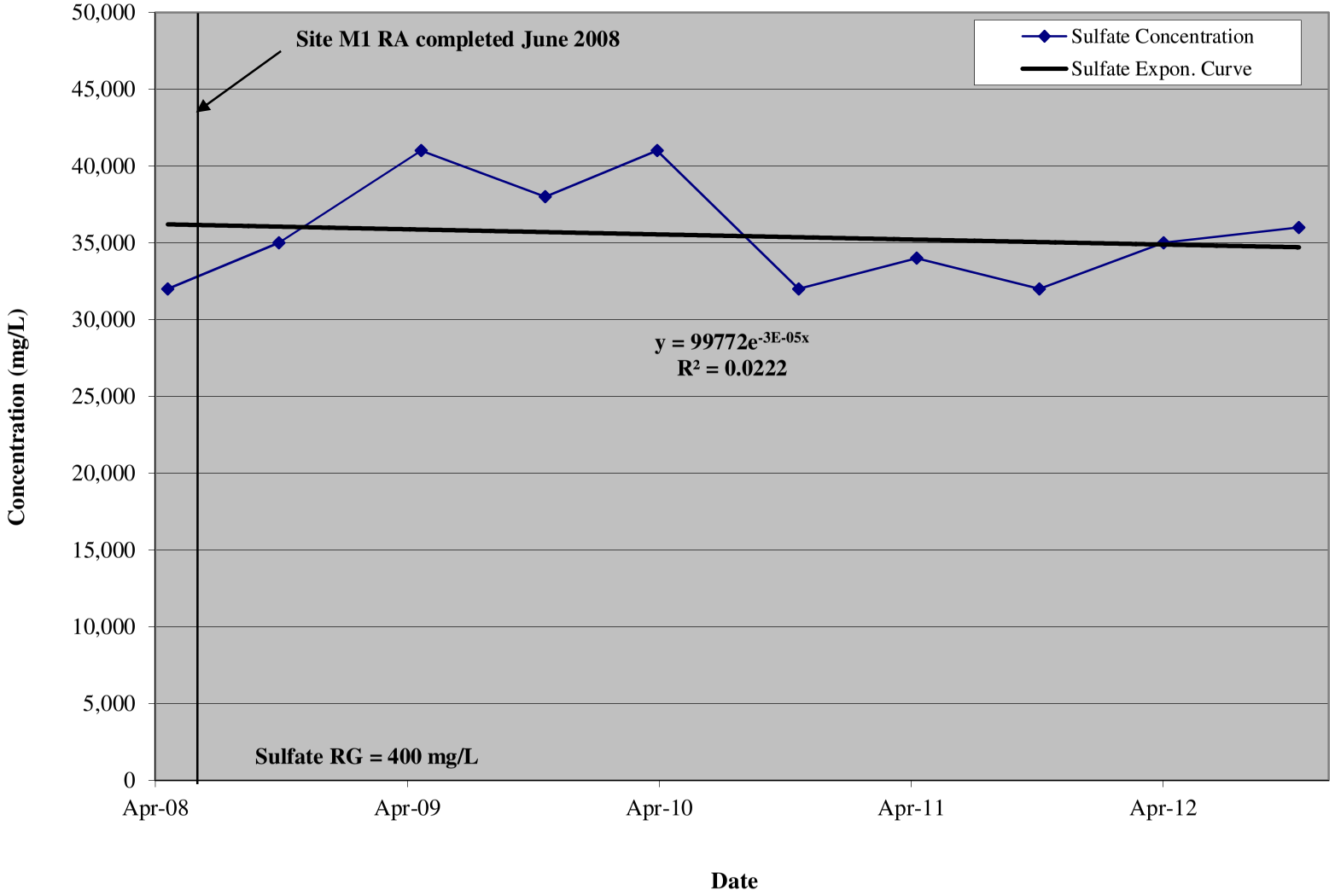
Site M1 - MW107
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\11-15_M1 Trend Analysis.xls(MW107 Sulfate)

Graph 12

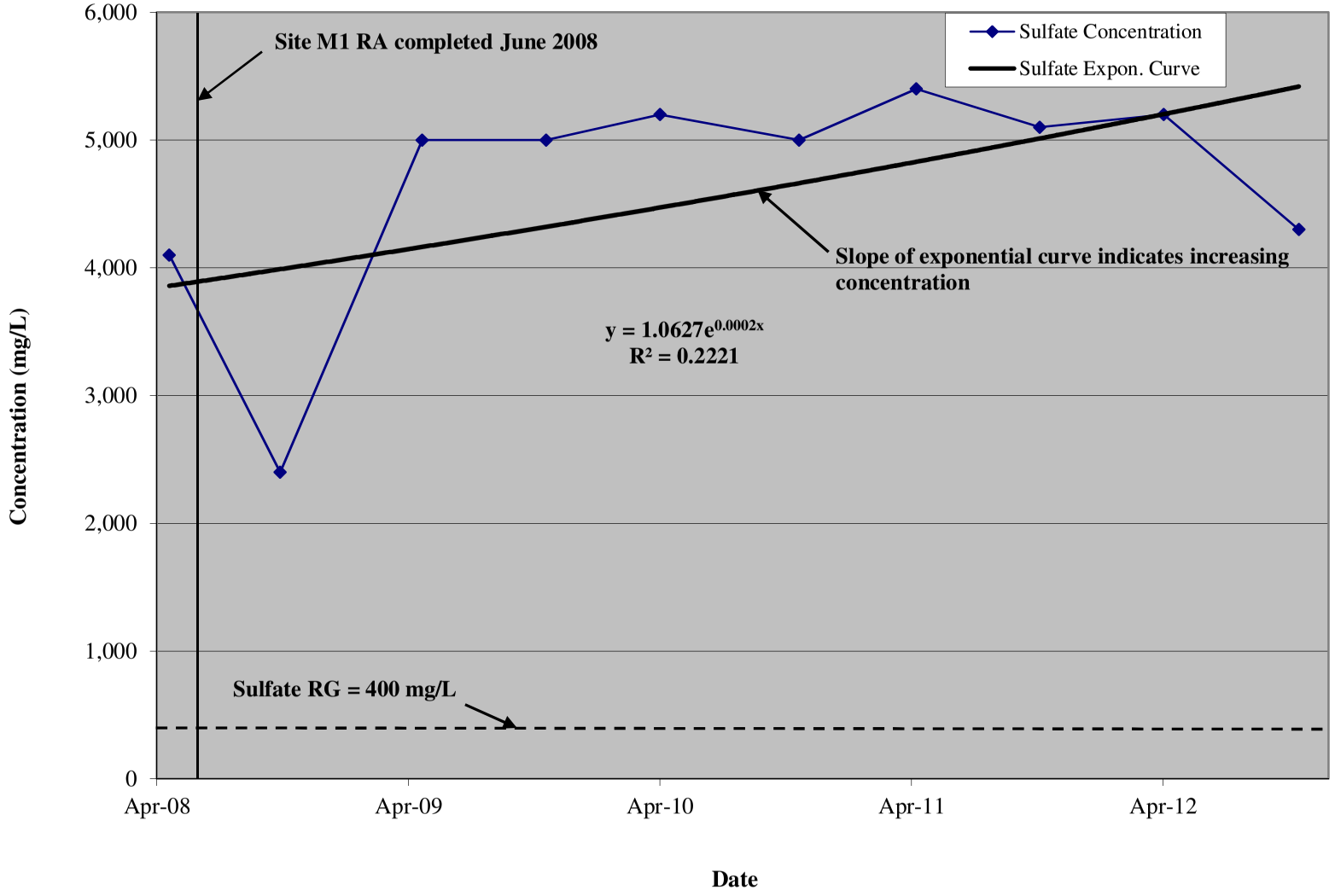
Site M1 - MW231
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\11-15_M1 Trend Analysis.xls(MW231 Sulfate)

Graph 13

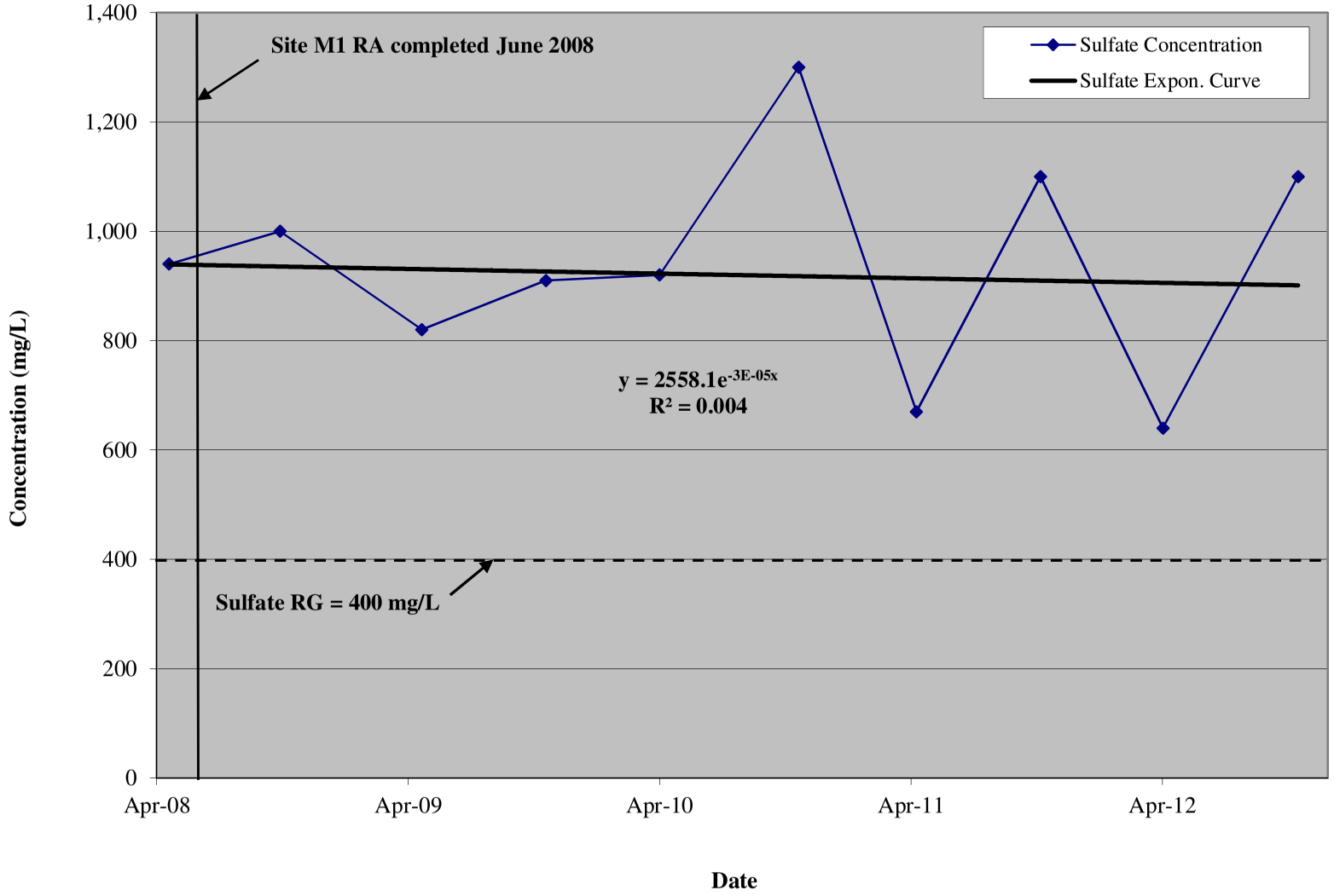
Site M1 - MW640
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\11-15_M1 Trend Analysis.xls(MW640 Sulfate)

Graph 14

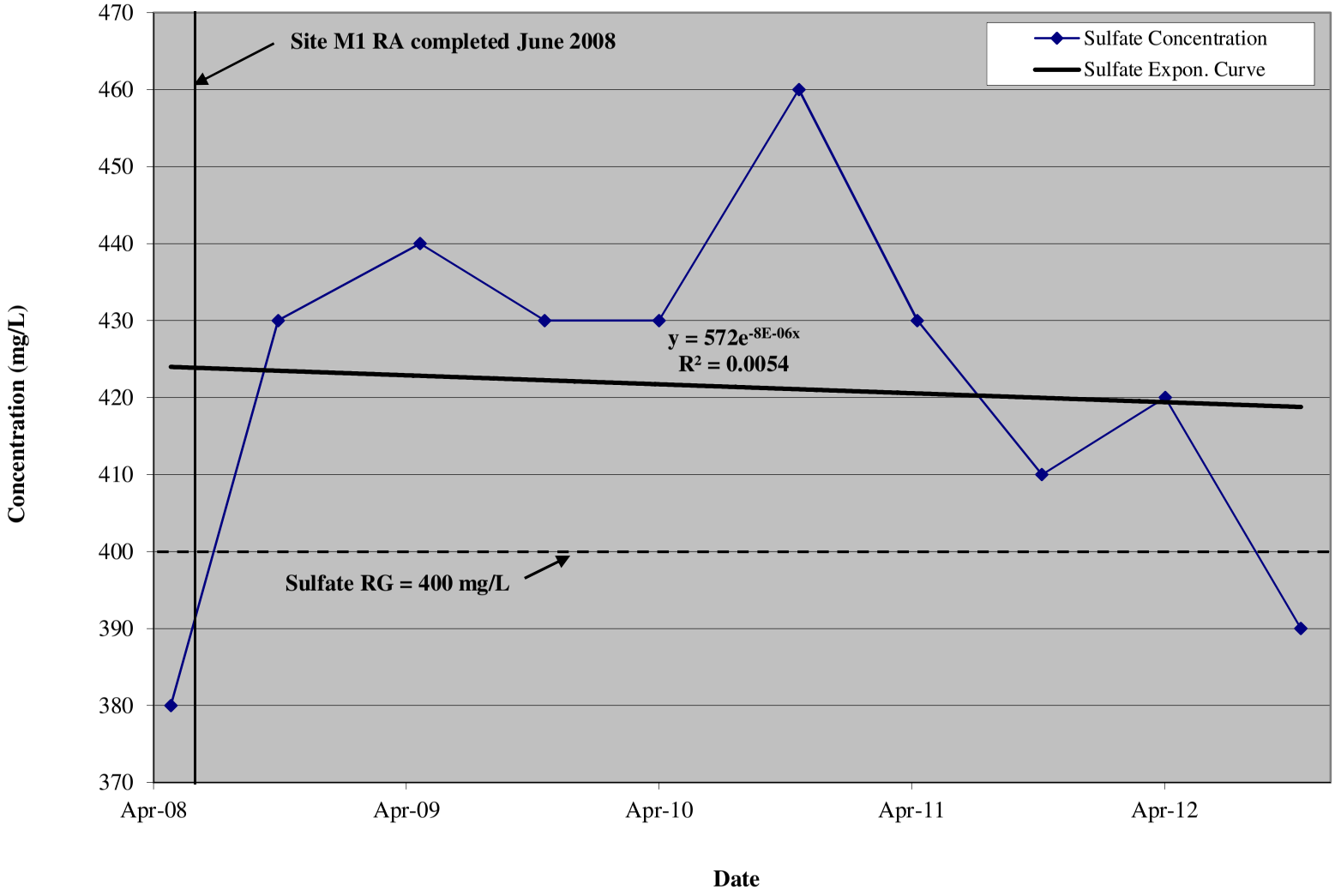
Site M1 - MW641
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\11-15_M1 Trend Analysis.xls(MW641 Sulfate)

Graph 15

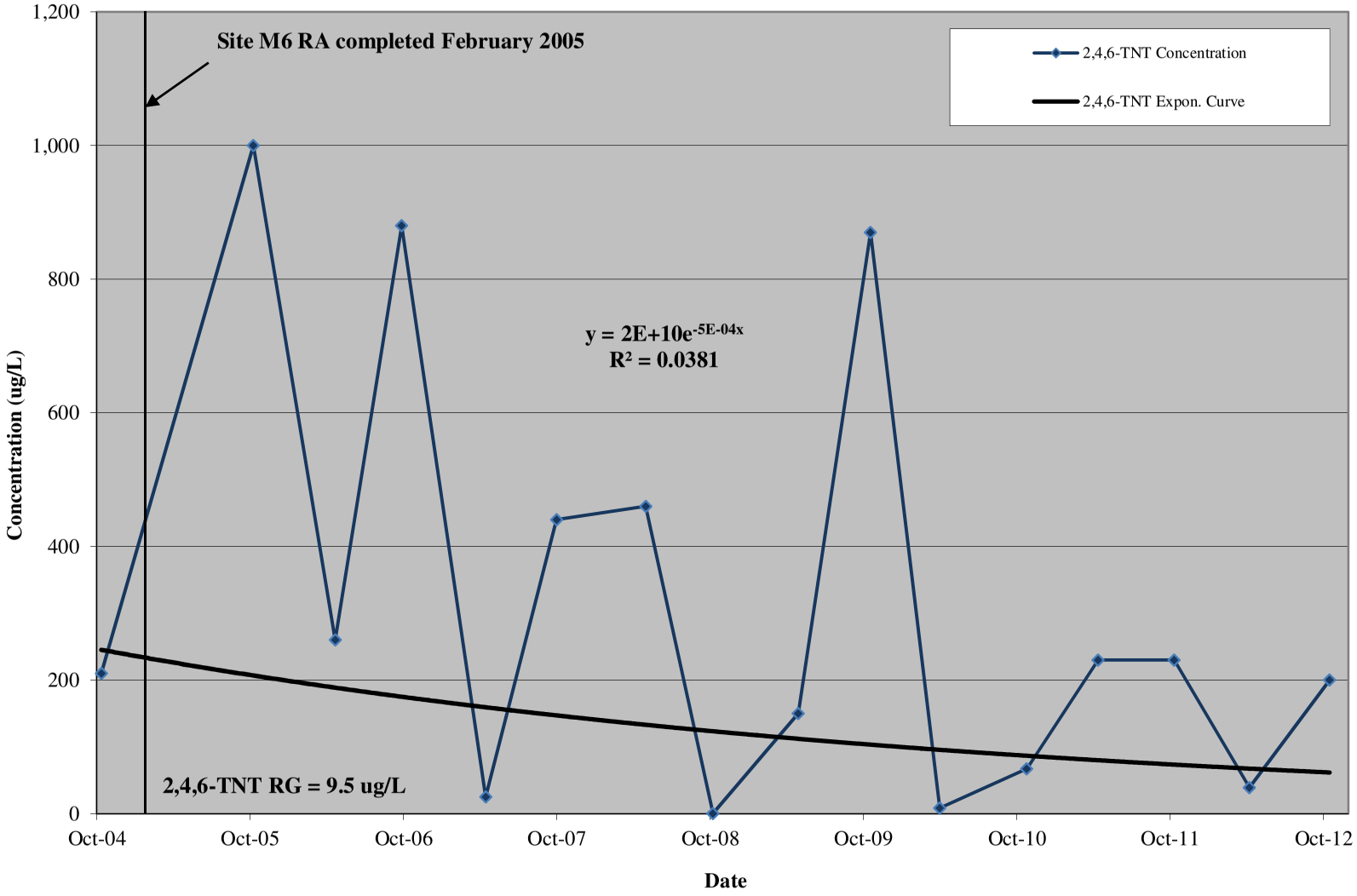
Site M1 - MW642
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\11-15_M1 Trend Analysis.xls(MW642 Sulfate)

Graph 16

Site M6 - MW212R
First Order Decay Rate Constant Estimation - 2,4,6-TNT
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
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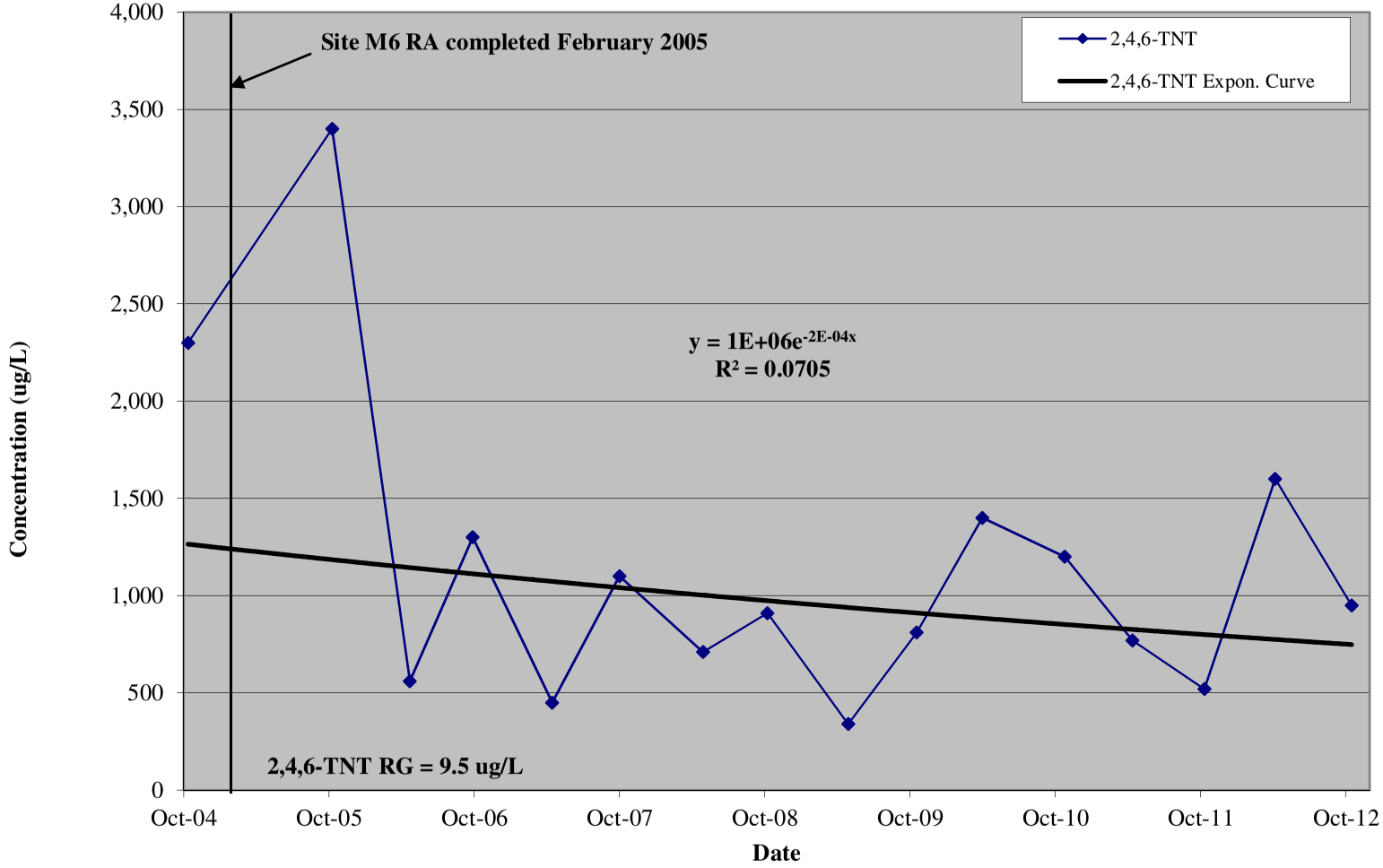
Graph 17

Site M6 - MW652
First Order Decay Rate Conatant Estimation - 2,4,6-TNT
Third Five-Year Review Report
Joliet Army Ammunition Plant



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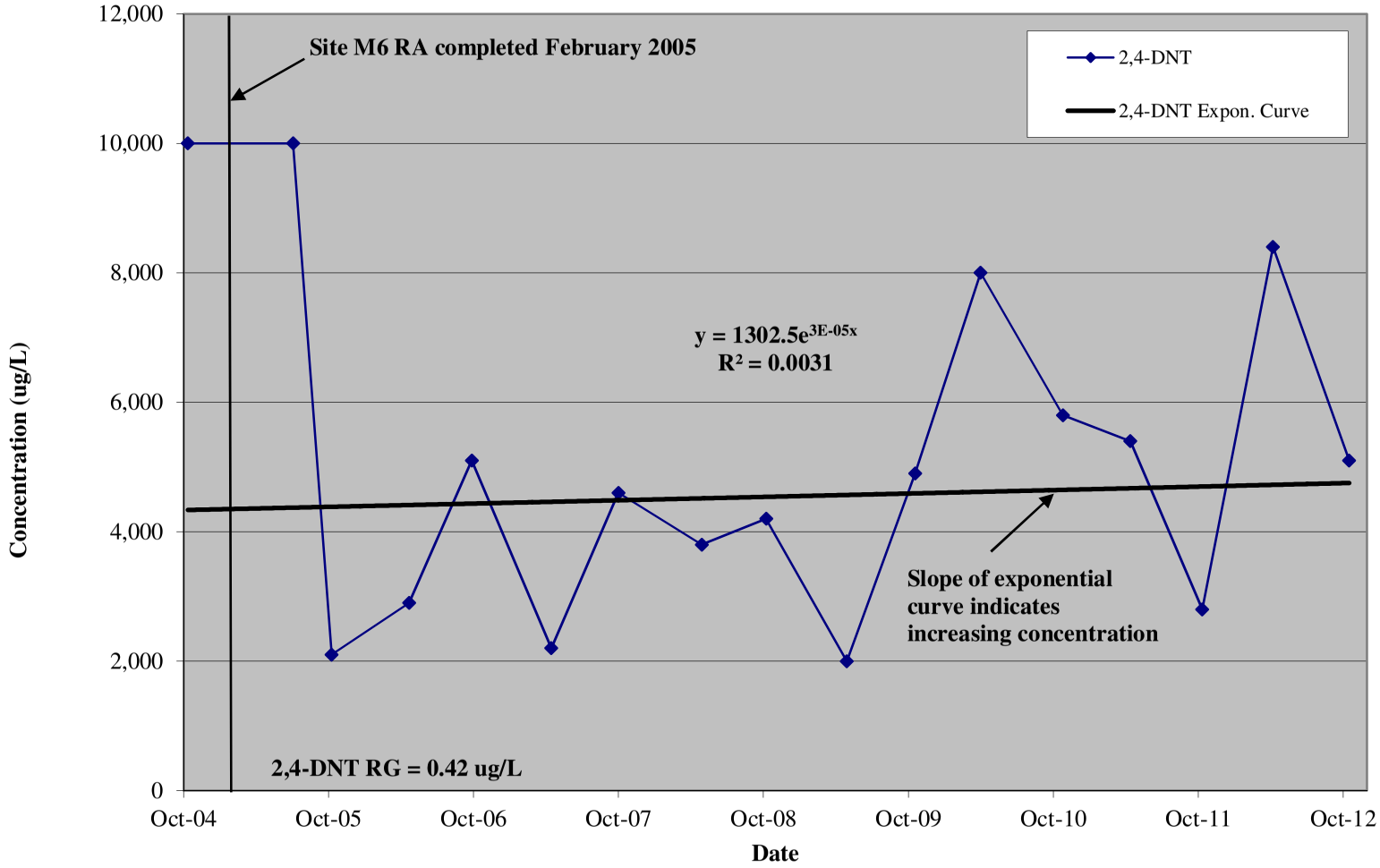
Graph 18

Site M6 - MW652
First Order Decay Rate Constant Estimation - 2,4-DNT
Third Five-Year Review Report
Joliet Army Ammunition Plant



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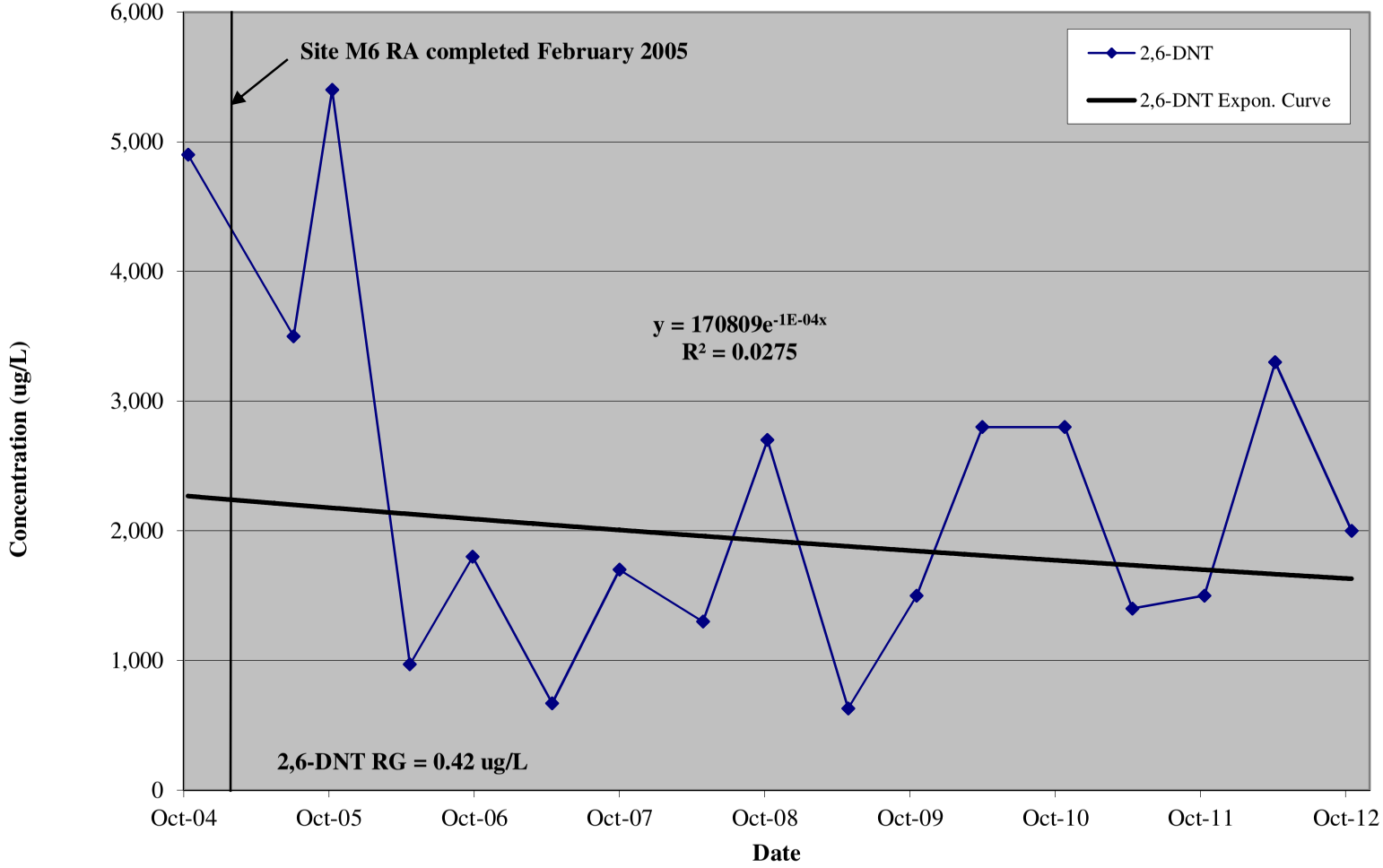
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\17-20_M6 MW652 Trend Analysis.xls(MW652 2,4-DNT)

Graph 19

Site M6 - MW652
First Order Decay Rate Constant Estimation - 2,6-DNT
Third Five-Year Review Report
Joliet Army Ammunition Plant



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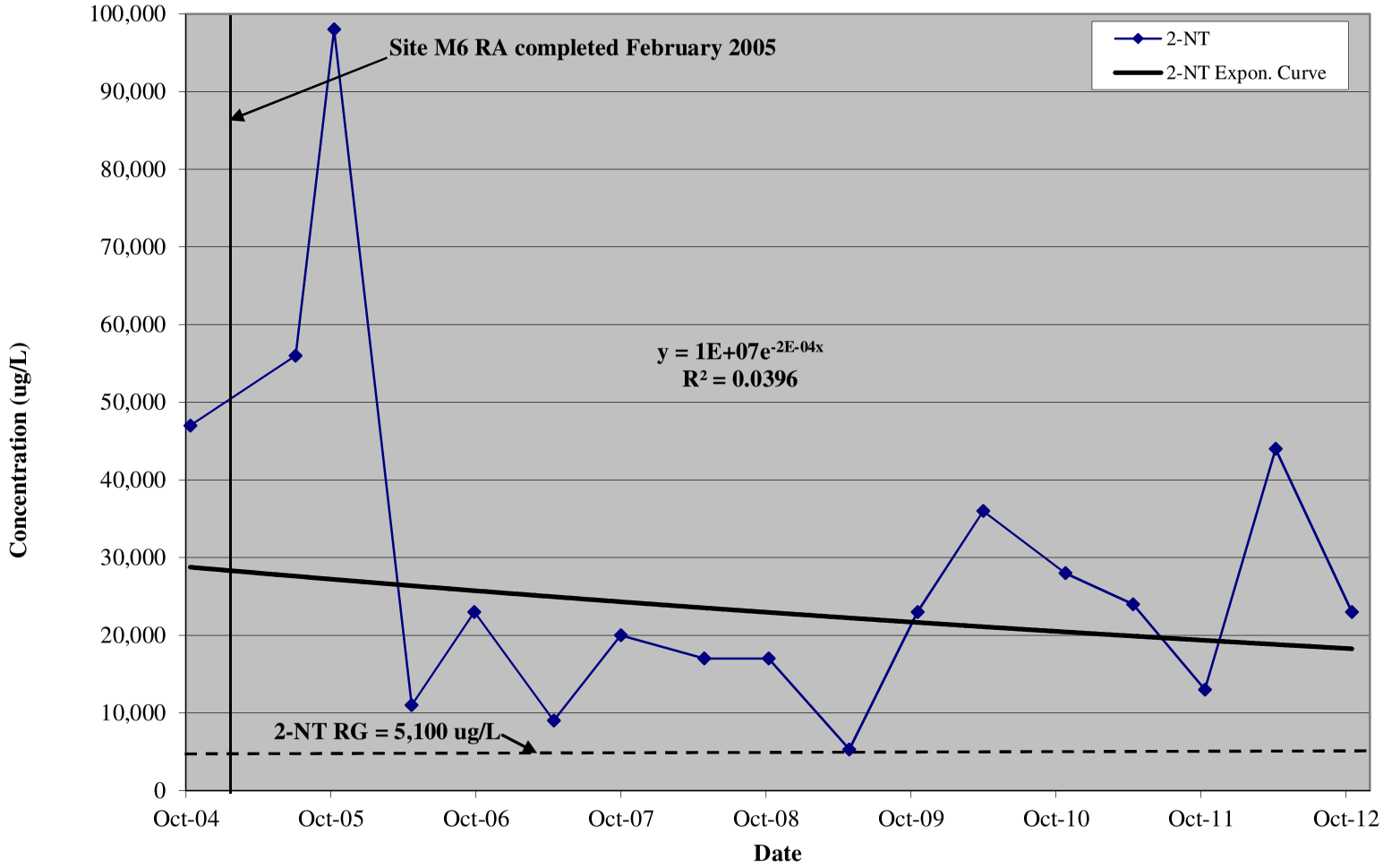
Graph 20

Site M6 - MW652
First Order Decay Rate Constant Estimation - 2-NT
Third Five-Year Review Report
Joliet Army Ammunition Plant



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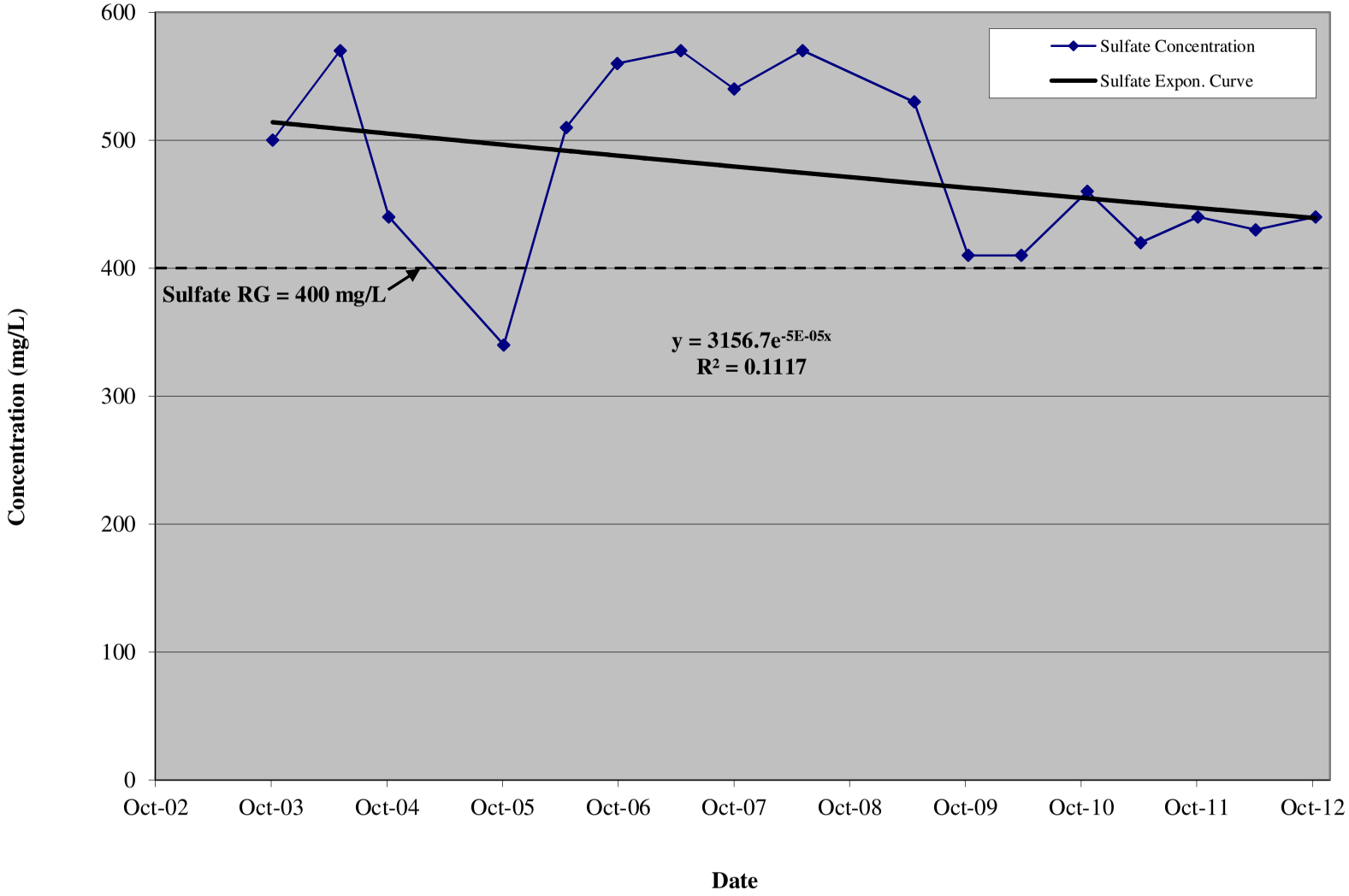
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\17-20_M6 MW652 Trend Analysis.xls(MW652 2-NT)

Graph 21

Site M8 - MW330
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



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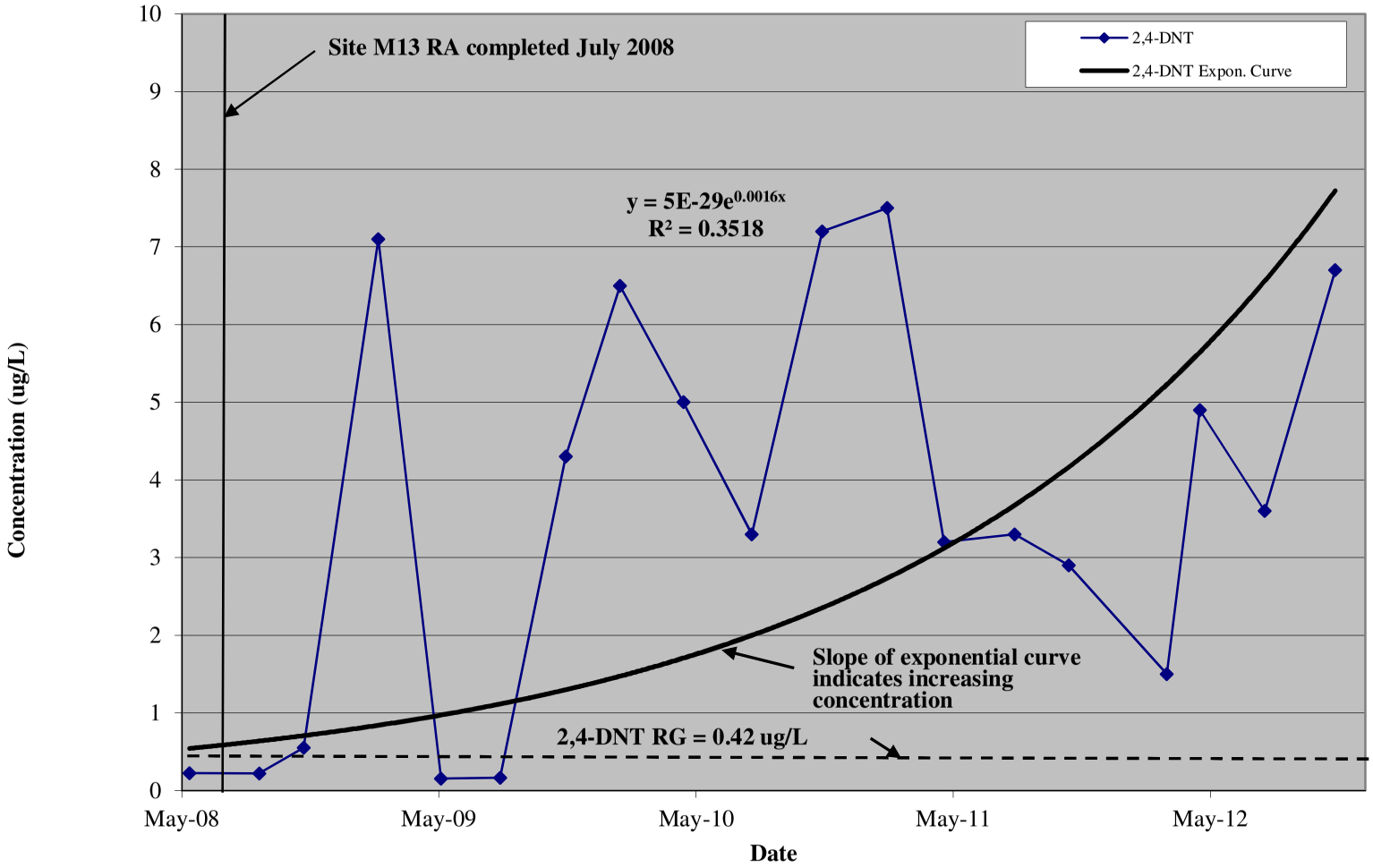
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\21_M8 Trend Analysis_not revised.xls(MW330 Sulfate)

Graph 22

Site M13 - MW362
First Order Decay Rate Constant Estimation - 2,4-DNT
Third Five-Year Review Report
Joliet Army Ammunition Plant

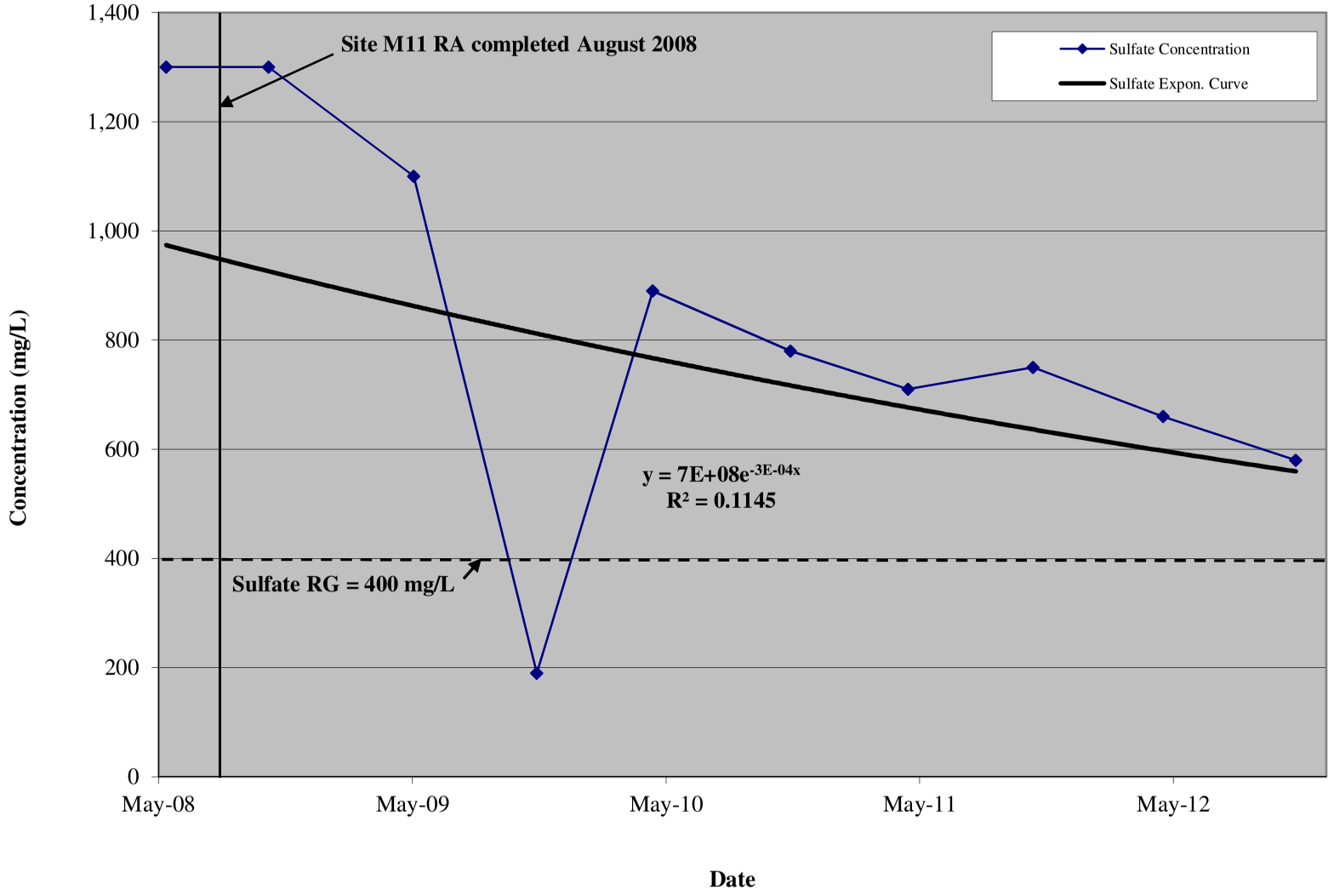


RJR/rjr/CRS
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\22_M13 Trend Analysis.xls(MW362 2,4-DNT)

Landfill M11
Trend Graphs

Graph 23

Site M11 - MW335
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



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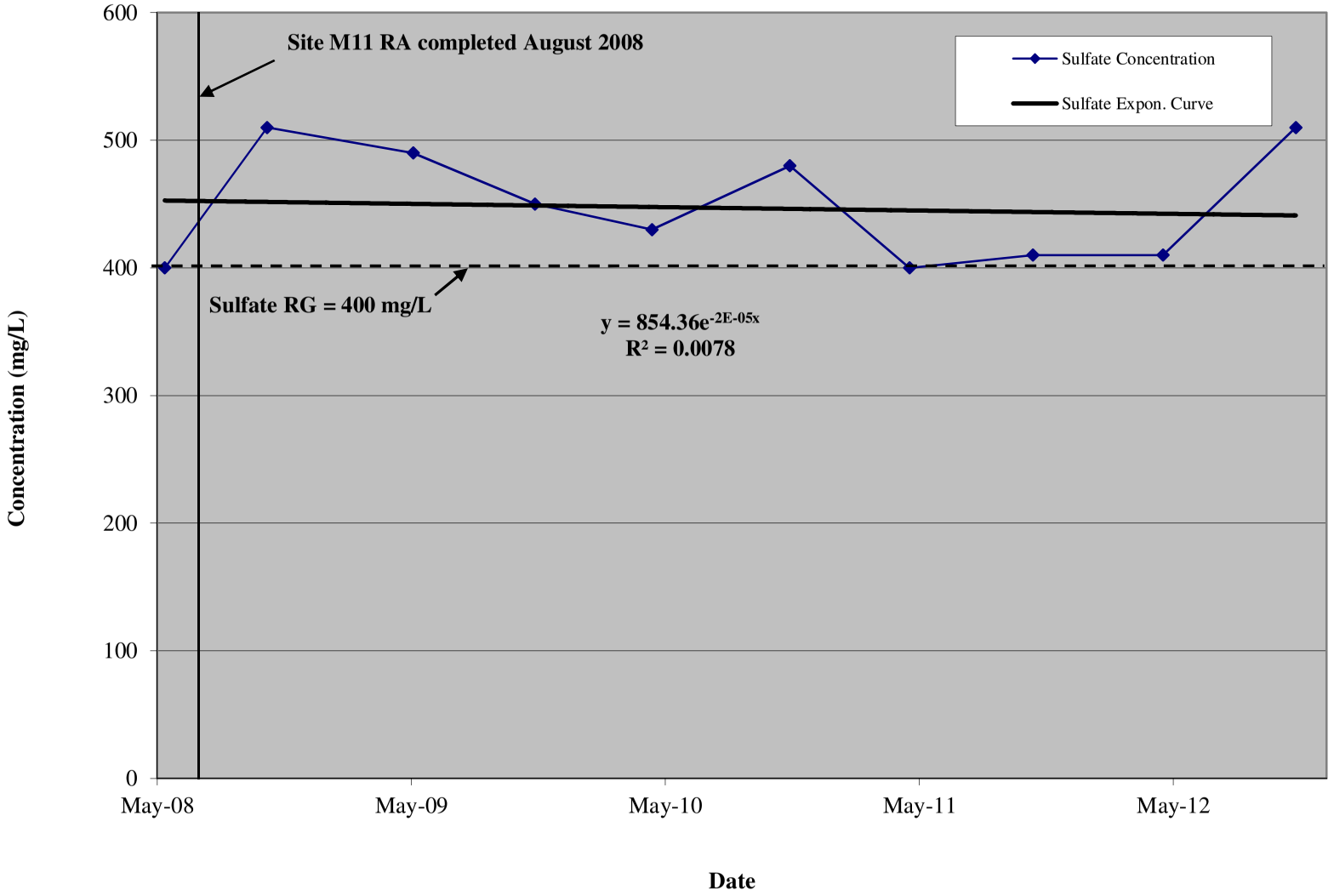
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\23-25_M11 Trend Analysis.xls(MW335 Sulfate)

Graph 24

Site M11 - MW336
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



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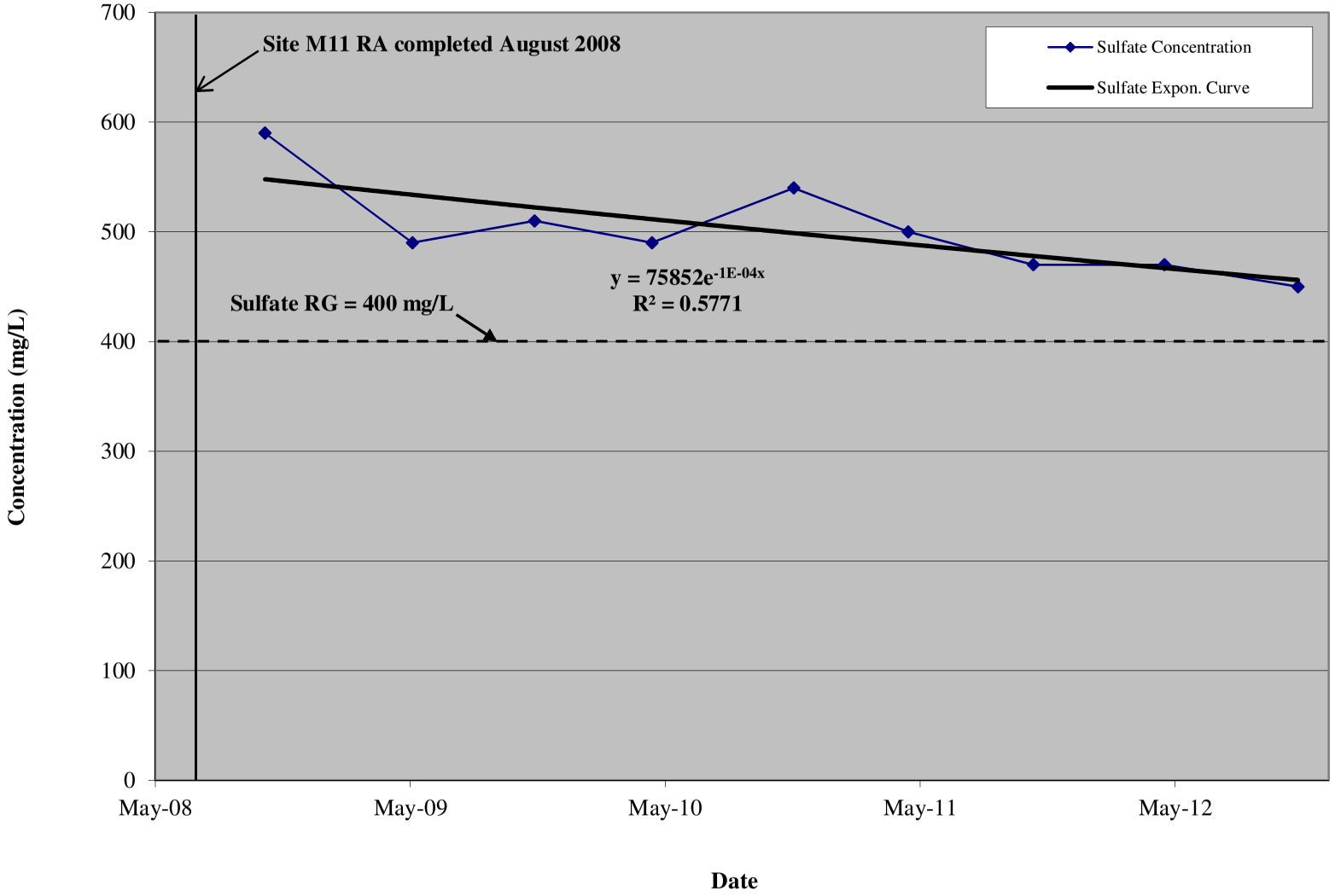
\\usdet1s02\jobs\JOLIET 2014\Third Five-Year Review\Attachment 1 - Trend Graphs\23-25_M11 Trend Analysis.xls(MW336 Sulfate)

Graph 25

Site M11 - MW805
First Order Decay Rate Constant Estimation - Sulfate
Third Five-Year Review Report
Joliet Army Ammunition Plant



RJR/rjr/CRS
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Example Calculation

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EXPECTED CLEAN-UP TIME: EXAMPLE CALCULATION

The following example calculation illustrates the use of existing groundwater quality data to project future contaminant reduction rates. This analysis calculates the projected time at which the concentration of a selected compound in a selected well is reduced to its RG. However, based on the variability of the data, primarily due to seasonal fluctuations, the calculated cleanup times are only an estimate based on the data available. This particular example pertains to the reduction of RDX in well MW173 at Site L1 (Figure 6-1). The end result of this calculation is shown in Table A1-4.

The contaminant reduction equation is based on the first order decay equation that describes biological degradation processes. This general equation is

$$C_t/C_0 = e^{-kt}$$

where

C_t = concentration at time t
C_0 = concentration at time zero
k = decay rate
t = time t

This equation was then fit using a regression analysis to available concentration vs. time data for RDX (see Graph 3 for data for well MW173 at Site L1).

Equation 1

Contaminant Reduction Equation: $C = 300000000000e^{-6E-04t}$

Where: C = contaminant concentration at time t (µg/L)
t = time after maximum concentration

In this regression analysis, the spreadsheet calculates a correlation coefficient (R^2). The closer R^2 is to 1.0, the greater the field data fit the first order decay equation describing biological decay. An R^2 value equal to 1.0 is an exact fit, and values which approach zero suggest a very poor fit. R^2 values are displayed on the plots used for the expected clean-up time analysis. R^2 values range between approximately 0.1 and 0.5, mainly due to seasonal variations in the data. At MW173 the R value is 0.3134

The goal of this analysis is to determine the time (T) at which the contaminant concentration reaches the site RG. Therefore, the contaminant reduction equation is solved for time (T) and Equation 1 becomes:

Equation 2

$$T = \frac{Ln\left(\frac{C}{3000000000000}\right)}{-0.0006}$$

In its simplest form, Equation 2 gives the concentration (C) at any time (T). With a few modifications, this relationship will yield the time (from present date) to clean-up. The information required for this calculation is obtained from Graph 3.

Explosives Compound:	RDX
Maximum Concentration (C_o):	15 µg/L
Date of Initial Concentration (To):	2007
Remediation Goal (C_{RG}):	2.6 µg/L

The following steps are performed to arrive at the time required for reduction of the contaminant to the site RG.

Step 1: Determine the time (T) required for the maximum observed (initial) concentration (C_o) to degrade to the RG (C_{RG}) for that particular compound. This is accomplished by using Equation 2 and calculating the difference in time (T_{total}) between a concentration at a selected point in time (C_{t1} at time t1) and the RG (C_{RG}). This relationship is as follows:

Equation 3

$$T_{total} = \frac{Ln\left(\frac{C_{RG}}{300000000000}\right)}{-0.0006} - \frac{Ln\left(\frac{C_{T1}}{300000000000}\right)}{-0.0006}$$

Using C_{t1} = 15 µg/L in 2007, results in:

$$= \frac{Ln\left(\frac{2.6\ \ ug/L}{500000000}\right)}{-0.0004} - \frac{Ln\left(\frac{17\ \ ug/L}{500000000}\right)}{-0.0004}$$

$T_{total} \cong 8$ years after 2007

Note: T_{total} represents the clean-up time in years past the time of C_{t1} (2007).

Step 2: Compute the time from the current reporting date (2012) to the time at which the RG is met. This would be:

Time from 2012 = T_{total} - (2012-2007)

This example calculation would be:

8 yrs – 5 yrs = 3 years from 2012

The end result of this example calculation shows that RDX at well MW173 (Site L1) may degrade to the site RG of 2.6 µg/L in approximately 3 years from the current reporting date, or in the year 2015 (Table A1-4). Based on the variability of the data, primarily due to seasonal fluctuations, the calculated cleanup times are only an estimate based on the data available. It should be noted that this is an approximation only and that there are several other variables not considered in this analysis that may alter the future trend in contaminant reduction.

RJR/rjr/CRS
P:\JOLIET 2014\Third Five-Year Review\Attachment 1 - Estimated Clean-up Time Example Calculation\Example Calculation.docx

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ATTACHMENT 2

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ATTACHMENT 3

DECISION DOCUMENT SUMMARIES

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Table A3-1 Decision Document Summary
SRU 1 - Explosives in Soil
Sites L1, L7, L8, L9, L10, L14, L16, M2, M3, M5, M6 and M7

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, HMX, RDX and Tetryl COCs in soil for the individual sites are listed in Table 5-2 (Page 5-7)
Land Use:	**Current:** Sites L1, L7, L8, L9, L10, L14, M2 and M3 are owned by the U.S. Army and not being used; sites M5, M6 and M7 are industrial **Future:** Sites L1, L7, L8, L9, L10, L14, M2 and M3 will become part of the Midewin National Tallgrass Prairie (MNTP); sites M5, M6, and M7 will remain industrial
Remedial Action Objectives:	**Sites L16, M5, M6, and M7:** Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes **Sites L1, L7, L8, L9, L10, L14, M2 and M3:** Eliminate soil contamination as a source of groundwater contamination and prevent the migration of contaminants (page 6-6)
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	**Industrial:** Not intended for ecological development **MNTP:** To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Listed in Table 6-2 (pages 6-7 to 6-9); final remedial goals were established for sites L16, M5, M6, and M7; interim remedial goals were established for sites L1, L7, L8, L9, L10, L14, M2 and M3
Remedy Chosen:	Alternative 3 – Bioremediation

Table A3-1 Decision Document Summary
SRU 1 - Explosives in Soil
Sites L1, L7, L8, L9, L10, L14, L16, M2, M3, M5, M6 and M7

Components of the Remedy:	• Building demolition • Soil excavation, transportation and confirmatory sampling • Soil preparation • Bioremediation • Backfilling, regarding, and revegetating • Soil disposal • Treatment area decommissioning • Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

Table A3-2 Decision Document Summary
SRU 2 - Metals in Soil
Sites L2, L3, L5, L11, L23A, M3, M4 and M12

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Metals:** Arsenic, beryllium, lead and cadmium COCs in soil for the individual sites are listed in Table 5-4 (Page 5-12)
Land Use:	**Current:** Sites L2, L3, L5, L23A, M3 and M4 are owned by the U.S. Army and not being used; Site L11 is industrial; Site M12 is part of the MNTP **Future:** Sites L2, L3, L5, L23A, M3 and M4 will become part of the MNTP; Site L11 will remain industrial; Site M12 will remain part of the MNTP
Remedial Action Objectives:	**Site L11:** Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes **Sites L2, L3, L5, L23A M3, M4 and M12:** Eliminate soil contamination as a source of groundwater contamination and prevent the migration of contaminants (page 6-6)
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	**Industrial:** Not intended for ecological development **MNTP:** To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Listed in Table 6-2 (pages 6-7 to 6-9); final remedial goals were established for Site L11; interim remedial goals were established for sites L2, L3, L5, L23A, M3, M4 and M12
Remedy Chosen:	Alternative 4 – Excavation and Disposal
Components of the	• Soil excavation, transportation, and confirmatory sampling

Table A3-2 Decision Document Summary
SRU 2 - Metals in Soil
Sites L2, L3, L5, L11, L23A, M3, M4 and M12

Remedy:	• Soil preparation • Backfilling, regarding, and revegetating • Soil disposal • Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

Table A3-3 Decision Document Summary
SRU 3 - Explosives and Metals in Soil
Sites L2, L3, M5 and M6

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, RDX and Tetryl **Metals:** Arsenic, beryllium and lead COCs in soil for the individual sites are listed in Table 5-6 (Page 5-13)
Land Use:	**Current:** Sites L2 and L3 are owned by the U.S. Army and not being used; sites M5 and M6 are industrial **Future:** Sites L2 and L3 will become part of the MNTP; sites M5 and M6 will remain industrial
Remedial Action Objectives:	**Sites M5 and M6:** Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes **Sites L2 and L3:** Eliminate soil contamination as a source of groundwater contamination and prevent the migration of contaminants (page 6-6)
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	**Industrial:** Not intended for ecological development **MNTP:** To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Listed in Table 6-2 (pages 6-7 to 6-9); final remedial goals were established for sites M5 and M6; interim remedial goals were established for sites L2 and L3
Remedy Chosen:	Alternative 3 – Bioremediation and Disposal Alternative 5 – Excavation and Disposal

Table A3-3 Decision Document Summary
SRU 3 - Explosives and Metals in Soil
Sites L2, L3, M5 and M6

Components of the Remedy:	• Soil excavation, transportation, and confirmatory sampling • Soil preparation • Treatment determination • Bioremediation • Backfilling, regarding, and revegetating • Soil disposal • Treatment area decommissioning • Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

Table A3-4 Decision Document Summary
SRU 4 - PCBs in Soil
Sites L1, L5, L7, L8, L9, L10 and L17

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**PCBs:** PCB 1254 and PCB 1260 COCs in soil for the individual sites are listed in Table 5-8 (Page 5-16)
Land Use:	**Current:** Sites L1, L5, L7, L8, L9 and L10 are owned by the U.S. Army and not being used; Site L17 is industrial **Future:** Sites L1, L5, L7, L8, L9 and L10 will become part of the MNTP; Site L17 will remain industrial
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	**Industrial:** Not intended for ecological development **MNTP:** Hazardous substances were not found to significantly impact the aquatic and terrestrial ecological systems (page 6-4)
Clean-up Goals:	Final remedial goals listed in Table 6-2 (pages 6-7 to 6-9) were established for all sites
Remedy Chosen:	Alternative 5 – Excavation and Incineration and/or Disposal
Components of the Remedy:	• Structure demolition • Soil excavation, transportation, and confirmatory sampling • Backfilling, regarding, and revegetating excavated areas • Soil incineration or disposal • Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

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Table A3-5 Decision Document Summary
SRU 5 - Organics in Soil
Sites L1 and L5

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Organics:** Total petroleum hydrocarbons **SVOCs:** Benzo(a)pyrene **Metals:** Arsenic, beryllium and lead COCs in soil for the individual sites are listed in Table 5-10 (Page 5-18)
Land Use:	**Current:** Both sites are owned by the U.S. Army and not being used **Future:** MNTP
Remedial Action Objectives:	Eliminate soil contamination as a source of groundwater contamination and prevent the migration of contaminants (page 6-6)
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Interim remedial goals listed in Table 6-2 (pages 6-7 to 6-9) were established for both sites
Remedy Chosen:	Alternative 6 – Excavation and Disposal
Components of the Remedy:	• Structure demolition • Soil excavation, transportation, and confirmatory sampling • Backfilling, regarding, and revegetating excavated areas • Soil disposal • Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

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Table A3-6 Decision Document Summary
SRU 6 – Landfills
Sites L3, L4, M1, M9, M11 and M13

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 2,4-DNT and 2,6-DNT **Pesticides:** Chlordane **SVOCs:** Benzo(a)pyrene **Metals:** Arsenic and lead **Special Parameters:** Phosphate COCs for each site are identified in Table 5-12 (page 5-21)
Land Use:	**Current:** Sites L3, L4, M1 and M11 are owned by the U.S. Army and not being used; sites M9 and M13 are industrial **Future:** Sites L3, L4, M1 and M11will become part of the MNTP; sites M9 and M13 will remain industrial
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	**Industrial:** Not intended for ecological development **MNTP:** To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Remedial goals listed in Table 6-2 (pages 6-7 to 6-9) were established for all sites
Remedy Chosen:	Alternative 3 – Capping (Sites L3, M11 and M13) Alternative 4 – Excavation and Disposal (Sites L4, M1 and M9)

Table A3-6 Decision Document Summary
SRU 6 – Landfills
Sites L3, L4, M1, M9, M11 and M13

Components of the Remedy:	**Alternative 3:** • Surface regrading • Cap construction • Establishment of a maintenance and monitoring program • Institutional controls (deed restrictions on land and soils) **Alternative 4:** • Landfill excavation • Waste testing and segregation • Waste disposal • Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

Table A3-7 Decision Document Summary
SRU 7 – Sulfur
Sites M8 and M12

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	Sulfur
Land Use:	**Current:** Site M8 is industrial and Site M12 is part of the MNTP **Future:** As above
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	**Industrial:** Not intended for ecological development **MNTP:** Hazardous substances were not found to significantly impact the aquatic and terrestrial ecological systems (page 6-4)
Clean-up Goals:	Final remedial goals listed in Table 6-2 (pages 6-7 to 6-9) were established for both sites
Remedy Chosen:	Alternative 3 – Removal and Recycle or Disposal
Components of the Remedy:	• Soil excavation, transportation, and confirmatory sampling • Backfilling, regrading, and revegetating excavated areas • Sulfur recycle or disposal • Institutional controls
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

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Table A3-8 Decision Document Summary
No Further Action
Sites L6 and M16

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Site L6:** Total petroleum hydrocarbons, PCBs, and base neutral acid organic compounds (BNAs) **Site M16:** BNAs, pesticides and metals
Land Use:	**Current:** L6 is a county landfill and M16 is industrial **Future:** As above
Remedial Action Objectives:	Remedial actions were completed prior to the ROD
Receptors:	Recreational users and industrial workers (page 6-2)
Human Health Exposure Pathway:	Dermal contact and incidental ingestion (page 6-2)
Ecological Risk:	The sites are not intended for ecological development
Clean-up Goals:	The remedial actions attained the soil-industrial remedial goals listed in Table 6-2 (pages 6-7 to 6-9)
Remedy Chosen:	No further action
Components of the Remedy:	Institutional controls (deed restrictions on land and soils)
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

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Table A3-9 Decision Document Summary
GRU 1 – Explosives in Groundwater

Sites L1, L2, L3 and L14

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT and RDX COCs in groundwater for the individual sites are listed in Table 5-16 (page 5-25)
Land Use:	**Current:** The sites are owned by the U.S. Army and not being used **Future:** MNTP
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	Recreational users, industrial workers, and hypothetical resident (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation of vapors while showering (page 6-2)
Ecological Risk:	To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Final remedial goals listed in Table 5-16 (page 5-25) and Table 6-2 (pages 6-7 to 6-9) were established for all sites
Remedy Chosen:	Alternative 2 – Limited Action
Components of the Remedy:	• Establishment of groundwater management zones (GMZs) • Source removal (SRU remedial actions) • Institutional controls (deed restrictions on groundwater use) • Site inspections • Groundwater and surface water monitoring • Natural attenuation • Contingency plan implementation, if necessary
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

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Table A3-10 Decision Document Summary
GRU2 – Explosives and Other Contaminants in Groundwater
(Sites M1, M5, M6, M7, M8 and M13)

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, 2-NT, NB and RDX **Organics:** Tetrachloroethene **Metals:** Antimony, cadmium and iron COCs in groundwater for the individual sites are listed in Table 5-18 (page 5-27)
Land Use:	**Current:** Site M1 is owned by the U.S. Army and not being used; sites M5, M6, M7, M8 and M13 are industrial **Future:** Site M1 will become part of the MNTP; sites M5, M6, M7, M8 and M13 will remain industrial
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	Recreational users, industrial workers, and hypothetical resident (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation of vapors while showering (page 6-2)
Ecological Risk:	To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Final remedial goals listed in Table 5-18 (page 5-27) and Table 6-2 (pages 6-7 to 6-9) were established for all sites
Remedy Chosen:	Alternative 2 – Limited Action
Components of the Remedy	• Establishment of GMZs • Source removal (SRU remedial actions) • Institutional controls (deed restrictions on groundwater use) • Site inspections • Groundwater and surface water monitoring • Natural attenuation • Contingency plan implementation, if necessary

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Table A3-11 Decision Document Summary
GRU 3 – Volatile Organic Compounds in Groundwater
Sites M3 and M10

Decision Document Title:	RECORD OF DECISION FOR THE SOIL AND GROUNDWATER OPERABLE UNITS ON THE MANUFACTURING AND LOAD-ASSEMBLE-PACKAGE AREAS, NATIONAL PRIORITY LIST SITES (October 1998)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**VOCs:** Benzene and toluene COCs in groundwater for the individual sites are listed in Table 5-20 (page 5-29)
Land Use:	**Current:** Site M3 is owned by the U.S. Army and not being used; Site M10 is part of the MNTP **Future:** Site M3 will become part of the MNTP; Site M10 will remain MNTP
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of characteristically hazardous RCRA wastes
Receptors:	Recreational users, industrial workers, and hypothetical resident (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation of vapors while showering (page 6-2)
Ecological Risk:	To be established by a biological assistance technical group (page 6-5)
Clean-up Goals:	Final remedial goals listed in Table 5-20 (page 5-29) and Table 6-2 (pages 6-7 to 6-9) were established for both sites
Remedy Chosen:	Alternative 2 – Limited Action
Components of the Remedy:	• Establishment of GMZs • Source removal (SRU remedial actions) • Institutional controls (deed restrictions on groundwater use) • Site inspections • Groundwater and surface water monitoring • Natural attenuation • Contingency plan implementation, if necessary
ARARs:	Identified in Section 10.2 (pages 10-2 to 10-19)

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Table A3-12 Decision Document Summary
SRU 1 – Explosives in Soil
Sites L1, L2, L7, L8, L9, L10, L14 and M2

Decision Document Title:	RECORD OF DECISION FOR THE SOILS OPERABLE UNIT INTERIM SITES (June 2004)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, HMX and RDX COCs in soil for the individual sites are listed in Table 5-2 (page 5-5)
Land Use:	**Current:** All sites are owned by the U.S. Army and not being used **Future:** All sites will become part of the MNTP
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	**Human Health Risk Assessment:** MNTP workers and visitors (page 6-1) **Ecological Risk Assessment:** Plants, invertebrates in soil, mammals, birds and herpetofauna that consume plants, mammals, birds and herpetofauna that consume invertebrates, mammals, birds and herpetofauna that consume other animals, and Federal and State threatened and endangered species (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation (page 6-1)
Ecological Risk:	Toxicity reference values (TRVs) were developed for the ecological receptors based on different degrees of protection (a no adverse observed effects level and a lowest observed adverse effects level). The TRVs were combined with exposure assessments to develop a range of cleanup values for each COC (page 6-2)
Clean-up Goals:	Remedial goals are listed in Table 6-1 (page 6-4)
Remedy Chosen:	Alternative 3 – Excavation/Treatment
Components of the Remedy:	• Building demolition • Pre-sampling, soil excavation, transportation, and confirmatory sampling • Soil preparation • Treatment

Table A3-12 Decision Document Summary
SRU 1 – Explosives in Soil
Sites L1, L2, L7, L8, L9, L10, L14 and M2

	• Backfilling, regrading, and revegetating excavated areas • Soil disposal • Treatment area decommissioning • Land transfer documentation
ARARs:	Identified in Section 11.2 (pages 11-3 to 11-10)

Table A3-13 Decision Document Summary
SRU 2 – Metals in Soil
Sites L2, L3, L5, L23A, M4 and M12

Decision Document Title:	RECORD OF DECISION FOR THE SOILS OPERABLE UNIT INTERIM SITES (June 2004)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Metals:** Arsenic, cadmium, copper and lead COCs in soil for the individual sites are listed in Table 5-4 (page 5-9)
Land Use:	**Current:** Sites L2, L3, L5, L23A, and M4 are owned by the U.S. Army and not being used; Site M12 is part of the MNTP **Future:** All sites will become or remain part of the MNTP
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	**Human Health Risk Assessment:** MNTP workers and visitors (page 6-1) **Ecological Risk Assessment:** Plants, invertebrates in soil, mammals, birds and herpetofauna that consume plants, mammals, birds and herpetofauna that consume invertebrates, mammals, birds and herpetofauna that consume other animals, and Federal and State threatened and endangered species (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation (page 6-1)
Ecological Risk:	TRVs were developed for the ecological receptors based on different degrees of protection (a no adverse observed effects level and a lowest observed adverse effects level). The TRVs were combined with exposure assessments to develop a range of cleanup values for each COC (page 6-2).
Clean-up Goals:	Remedial goals are listed in Table 6-1 (page 6-4)
Remedy Chosen:	Alternative 3 – Excavation/Disposal
Components of the Remedy:	• Pre-sampling, soil excavation, transportation, and confirmatory sampling • Soil preparation • Backfilling, regrading, and revegetating excavated areas • Soil disposal

Table A3-13 Decision Document Summary
SRU 2 – Metals in Soil
Sites L2, L3, L5, L23A, M4 and M12

	• Treatment area decommissioning • Land transfer documentation
ARARs:	Identified in Section 11.2 (pages 11-3 to 11-10)

Table A3-14 Decision Document Summary
SRU 3 – Explosives and Metals in Soil
Sites L3 and M3

Decision Document Title:	RECORD OF DECISION FOR THE SOILS OPERABLE UNIT INTERIM SITES (June 2004)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Explosives:** 1,3,5-TNB, 2,4,6-TNT and RDX **Metals:** Arsenic and lead COCs in soil for the individual sites are listed in Table 5-6 (page 5-11)
Land Use:	**Current:** All sites are owned by the U.S. Army and not being used **Future:** All sites will become part of the MNTP
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	**Human Health Risk Assessment:** MNTP workers and visitors (page 6-1) **Ecological Risk Assessment:** Plants, invertebrates in soil, mammals, birds and herpetofauna that consume plants, mammals, birds and herpetofauna that consume invertebrates, mammals, birds and herpetofauna that consume other animals, and Federal and State threatened and endangered species (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation (page 6-1)
Ecological Risk:	Toxicity reference values were developed for the ecological receptors based on different degrees of protection; a no adverse observed effects level and a lowest observed adverse effects level. The TRVs were combined with exposure assessments to develop a range of cleanup values for each COC (page 6-2)
Clean-up Goals:	Remedial goals are listed in Table 6-1 (page 6-4)
Remedy Chosen:	Alternative 3 – Excavation/Disposal
Components of the	• Pre-sampling, soil excavation, transportation, and confirmatory sampling

Table A3-14 Decision Document Summary
SRU 3 – Explosives and Metals in Soil
Sites L3 and M3

Remedy:	• Soil preparation • Treatment • Backfilling, regrading, and revegetating excavated areas • Soil disposal • Land transfer documentation
ARARs:	Identified in Section 11.2 (pages 11-3 to 11-10)

Table A3-15 Decision Document Summary
SRU 5 – Organics in Soil
Sites L1 and L5

Decision Document Title:	RECORD OF DECISION FOR THE SOILS OPERABLE UNIT INTERIM SITES (June 2004)
Regulatory Framework:	CERCLA NPL
Chemicals of Concern:	**Organics:** Naphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorine, indeno(1,2,3-cd)pyrene, pyrene, and total petroleum hydrocarbons COCs in soil for the individual sites are listed in Table 5-8 (page 5-12)
Land Use:	**Current:** All sites are owned by the U.S. Army and not being used **Future:** All sites will become part of the MNTP
Remedial Action Objectives:	Mitigate, minimize threats to, and provide adequate protection of human health and the environment (page 6-5) by: • Cleaning up contaminants to site-specific and chemical specific remediation goals • Preventing human and environmental exposure to contamination at concentrations above the remediation goals • Eliminating soil contamination as a continuing source of groundwater contamination • Preventing the migration of contaminants • Removal of any characteristically hazardous RCRA wastes
Receptors:	**Human Health Risk Assessment:** MNTP workers and visitors (page 6-1) **Ecological Risk Assessment:** plants, invertebrates in soil, mammals, birds, herpetofauna that consume plants, mammals, birds, and herpetofauna that consume invertebrates, mammals, birds and herpetofauna that consume other animals, and Federal and State threatened and endangered species (page 6-2)
Human Health Exposure Pathway:	Dermal contact, ingestion, and inhalation (page 6-1)
Ecological Risk:	Toxicity reference values were developed for the ecological receptors based on different degrees of protection; a no adverse observed effects level and a lowest observed adverse effects level. The TRVs were combined with exposure assessments to develop a range of cleanup values for each COC (page 6-2)
Clean-up Goals:	Remedial goals are listed in Table 6-2 (page 6-11)
Remedy Chosen:	Alternative 3 – Excavation/Treatment

Table A3-15 Decision Document Summary
SRU 5 – Organics in Soil
Sites L1 and L5

Components of the Remedy:	• Building demolition • Pre-sampling, soil excavation, transportation, and confirmatory sampling • Soil preparation • Treatment • Backfilling, regrading, and revegetating excavated areas • Soil disposal • Treatment area decommissioning • Land transfer documentation
ARARs:	Identified in Section 11.2 (pages 11-3 to 11-10)

ATTACHMENT 4

SITE INSPECTION CHECKLISTS

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SOU Inspection Checklists

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Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L1

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L1*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 2004 ROD. SRU4 (PCBs) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD. SRU5 (organics) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-1)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L1

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1 and SRU5: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 for Phase 2 Remedial Action Soils Operable Unit* (MWH August 2006). SRU4: *Final PCB Sites RA Closure Report* (MWH, December 2001). Treatment logs are available for SRU1 and SRU5 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the remedies for SRU1, SRU4, and SRU5 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L1

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. The gate to Site L1 was chained and locked shut, but there was a hole in the site fence large enough to provide access to trespassers.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A

Remarks: Public access restriction signs are posted, see Photo 2.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois,* (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L1

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site but there is a gravel entrance driveway. JOAAP roads outside of the site consist of bituminous concrete pavement that are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not used and contains vacant structures from previous LAP operations. Open areas of the site contain grassland and scrub-brush.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedies for Site L1 included excavation and bioremediation of SRU1 and SRU5 soils and excavation and off-site disposal of SRU4 soils. The purpose of these remedies was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent the migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met; the remedial actions are complete. This site will be transferred to the USDA/FS for inclusion in the MNTP, but transfer has not yet taken place.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedy at Site L1 other than monitoring of LUCs, ICs, and deed restrictions. Groundwater monitoring is performed pursuant to GRU1.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L2

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L2*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (explosives) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 2004 ROD. SRU2 (metals) – contaminated soils were remediated by excavation and off-site disposal according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-2)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L2

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1 and SRU2 soils: *Final Closure Report Sites L2, L5, L23A, M3, M4, and M12 for Phase 2 Remedial Action Soils Operable Unit* (MWH October 2009). Treatment logs are available for SRU1 treated soils. SRU2 soils were disposed of at the Prairie View RDF.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the Site L2 soils remedy for SRU1 and SRU2 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L2

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. Site L2 is not surrounded by a fence.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: A sign on Chicago Road indicates that the area is closed.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L2

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not used and consists of open grass land and scrub-brush. A sign on Chicago Road indicates that the area is closed.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L2 soils included the excavation, bioremediation, and disposal of SRU1 soils, and the excavation and off-site disposal of SRU2 soils. The purpose of these remedies was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes other than those contained within SRU6 landfills. Contaminated soils were removed, and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedies at Site L2 other than monitoring LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L3*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: SRU2 (metals) – contaminated soils were remediated by excavation and disposal according to the 2004 ROD. SRU3 (comingled explosives and metals) – contaminated soils were remediated by excavation and bioremediation, and excavation and off-site disposal according to the 2004 ROD. Debris from Site L3 containing MEC and contaminated soil from Site L2 were consolidated on Site L3 and covered with a RCRA Subtitle C cap.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-3)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) | Site Manager/Commander's Representative (Title) | 15-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) | Environmental Manager (Title) | 15-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: SRU2 and SRU3 soils: *Final Site L3 Closure Report* (MWH 2010). Treatment logs are available for SRU1 treated soils. SRU2 soils were disposed of at the Prairie View RDF. Inspection and maintenance logs are provided in annual and semi-annual monitoring reports for JOAAP (refer to Attachment 2).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits_____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Quarterly monitoring for explosives and Target Analyte List metals as documented in annual reports for 2009, 2010, 2011, and 2012.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A
Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility (Toltest Inc.)
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. The gate was chained shut with no lock. A chain-link and barbed-wire fence with postings is present between the north side of the landfill and Central Road. The fence does not exist on the west side of the landfill and it can be accessed from the east bank of Prairie Creek. A lock was not present on the landfill gate.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A

Remarks: The entire LAP Area is surrounded by a perimeter fence.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Post-closure landfill monitoring in accordance with Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c Part 724 (30-year period)
Frequency Quarterly
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached

The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☒ N/A

Remarks: There are no roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

B. Other Site Conditions

Remarks: The site is not used and contains a closed landfill. The landfill vegetative cover consists of grass that did not exhibit signs of stress and woody vegetation. Groundwater monitoring wells are situated within and around the site.

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths: _____ Widths: _____ Depths: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent: _____ Depth: _____
   Remarks: Eroded and displaced rip-rap was observed on the west side of the landfill.

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: Riprap is present at the toe of slope around the entire landfill

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent: _____ Height: _____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent _____
☐ Ponding ☐ Location shown on site map Areal extent _____
☐ Seeps ☐ Location shown on site map Areal extent _____
☐ Soft subgrade ☐ Location shown on site map Areal extent _____

Remarks: Prairie Creek is located adjacent to the site (northwest side)

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent: _____

Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☒ N/A

Remarks: _____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A

Remarks: _____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒N/A

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☒ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☒ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks: See Five-Year Review report Section 6.3.

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks: See Five-Year Review report Section 6.3.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L3

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Site L-3 is a 3.3 acre landfill located on the east bank of Prairie Creek. The site received contaminated fill and soil. The remedy consisted of consolidating contaminated fill and soils into a single area and constructing a cap over the fill/soils. The remedy was implemented in 2007 and completed in 2008.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Post-closure monitoring is performed in accordance with IAC Title 5, Subtitle G, Chapter 1, Subchapter c Part 724 (30-year period). The following activities are conducted quarterly:

1) sampling and analysis of groundwater for explosives and metals
2) sampling and analysis of surface water for explosives and metals
3) landfill cover inspection and maintenance

Semi-annual and annual reports are issued by the O&M contractor.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

Eroded and displaced rip-rap was observed on the west side of the landfill.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Opportunities for optimization are discussed in semi-annual and annual monitoring reports.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L4

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L4*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU6 (Landfill) – landfilled materials were excavated and disposed off site according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-4)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L4

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU6: *Final Remedial Action Completion Report for Soils operable Unit Number 6 – L4 Landfill* (MKM September 2007).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the Site L4 soils remedy other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L4

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L4

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is vacant and contains open grass land and wetlands. Trees and scrub-brush are present in riparian areas of Prairie Creek and a tributary to the creek.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L4 included excavation and off-site disposal of SRU6 soils and landfilled materials. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes. Fill and contaminated soils were removed and the remedial action objectives were met. The remedial action is complete. This site will be transferred to the USDA/FS for inclusion in the MNTP, but transfer has not yet taken place.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedies at Site L4 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L5

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L5*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU2 (Metals) – contaminated soils were remediated by excavation and disposal according to the 2004 ROD; SRU4 (PCB) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD; SRU5 (organics) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-5)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency
   Contact
   Name Title Date Phone no.
   Problems, suggestions; ☐ Report attached

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independent of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L5

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU2 and SRU5: *Final Closure Report Sites L2, L5, L23A, M3, M4, and M12 for Phase 2 Remedial Action Soils Operable Unit* (MWH October 2009), SRU4: *Final PCB Sites RA Closure Report* (MWH December 2001). Treatment logs from the BTF are available for SRU5 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the Site L5 soils remedy for SRU2, SRU4, and SRU5 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L5

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. The site is surrounded by a fence with locked gate.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L5

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L5 soils included excavation and offsite disposal of SRU2 soils, excavation, bioremediation, and disposal of SRU5 soils, and excavation and disposal of SRU4 soils. The purpose of these remedies was to clean up the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and to not leave behind RCRA characteristic wastes other than those contained within SRU6 landfills. Contaminated soils were removed, and the remedial action objectives were met. The remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at Site L5 other than monitoring LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L6

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L6*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other Soils contaminated with petroleum hydrocarbons, PCBs, and semi-volatile organic compounds (base/neutral acids) were excavated and disposed offsite in 1997, prior to the RODs.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) | Site Manager/Commander's Representative (Title) | 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) | Environmental Manager (Title) | 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L6

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: *Final Report, Removal Action Site L6/Group 70 Area, Joliet Army Ammunition Plant, Wilmington, Illinois* (IT March 1998).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the Site L6 soils remedy other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L6

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. The site is owned by Will County, IL and is adjacent to the Will County Landfill. Access to the site is restricted.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property is owned by Will County, IL

3. **Land use changes off site** ☒ N/A

Remarks: The Will County Landfill is adjacent to the site.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L6

VI. GENERAL SITE CONDITIONS				
A. Roads	☒ Applicable	☐ N/A		
1. **Roads damaged**	☐ Location shown on site map	☒ Roads adequate	☐ N/A	
Remarks:				
B. Other Site Conditions				
Remarks: None				

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Soils contaminated with petroleum hydrocarbons, PCBs, and semi-volatile organics (base/neutral acids) were excavated and disposed off-site in 1997, prior to the 1998 ROD. PCB contaminated soils were removed to levels below 1 mg/kg. Remaining COCs were removed to the industrial remedial goals established in the 1998 ROD. Site L6 was identified as a 'No Further Action' site in the 1998 ROD. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required at Site L6 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L7

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L7*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD. SRU4 (PCBs) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-6)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L7

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2* (MWH August 2006). SRU4: *Final PCB Sites RA Closure Report* (MWH December 2001). Treatment logs from the BTF are available for SRU5 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the Site L7 soils remedy other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L7

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. The site is surrounded by a fence, no signs of damage were observed.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L7

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are narrow, paved roads on the site that were used for access to buildings. The roads are in fair condition but are becoming overgrown with road-side vegetation. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not being used; it is predominately vacant and contains remnant structures. Areas surrounding the structures are overgrown and consist of grassland and scrub-brush.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedies included excavation, treatment (at the BTF), and disposal of SRU1 soils/concrete and excavation and off-site disposal of SRU4 soils/concrete. The purpose of these remedies was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, and prevent the migration of contaminants. Contaminated soils were removed and the remedial action objectives were met. The remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at Site L7 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L8

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L8*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD. SRU4 (PCBs) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-7)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L8

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2* (MWH August 2006). SRU4: *Final PCB Sites RA Closure Report* (MWH December 2001). Treatment logs from the BTF are available for SRU5 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the Site L8 soils remedy other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached
From Date	To Date	Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L8

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. The site is surrounded by a fence, no signs of damage were observed.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L8

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are narrow, paved roads on the site that were used for access to buildings. The roads are in fair condition but are becoming overgrown with road-side vegetation. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not being used; it is predominately vacant and contains remnant structures. Areas surrounding the structures are overgrown and consist of grassland and scrub-brush.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedies included excavation, treatment (at the BTF), and disposal of SRU1 soils and excavation and off-site disposal of SRU4 soils/concrete. The purpose of these remedies was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, and prevent the migration of contaminants. Contaminated soils were removed and the remedial action objectives were met. The remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at Site L7 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L9

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L9*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD; SRU4 (PCB) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-8)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L9

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 for Phase 2 Remedial Action Soils Operable Unit* (MWH August 2006). SRU4: *Final PCB Sites RA Closure Report* (MWH December 2001). Treatment logs from the BTF are available for SRU1 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☒ Other: There is no O&M related to the Site L9 remedy for SRU1 and SRU4 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L9

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. Site L9 is also surrounded by a perimeter fence.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L9

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are narrow, paved roads on the site that were used for access to buildings. The roads are in fair condition but are becoming overgrown with road-side vegetation. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks The site is not being used; it is predominantly vacant and contains remnant LAP structures. Areas surrounding the structures are overgrown and consist of grass land and scrub-brush.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L9 included the excavation and bioremediation of SRU1 soils and the excavation and off-site disposal of SRU4 soils. The purpose of the RA was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete. Site L9 is awaiting transfer to the USDA/FS for inclusion in the MNTP for recreational/prairie use.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedies at Site L9 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L10

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L10*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD. SRU4 (PCB) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-9)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L10

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 for Phase 2 Remedial Action Soils Operable Unit* (MWH 2006b), SRU4: *Final PCB Sites RA Closure Report* (MWH 2001b). Treatment logs from the BTF are available for SRU1 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site L10 remedy for SRU1 and SRU4 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L10

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. Site L10 is also surrounded by a perimeter fence.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L10

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are narrow, paved roads on the site that were used for access to buildings. The roads are in fair condition but are becoming overgrown with road-side vegetation. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not being used. It is predominantly vacant and contains remnant LAP structures. Areas surrounding the structures are overgrown and consist of grass land and scrub-brush.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L10 included excavation, bioremediation, and disposal of SRU1 soils, and the excavation and off-site disposal of SRU4 soils. The purpose of the RA was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and not leave behind any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete. Site L10 is awaiting transfer to the USDA/FS for inclusion in the MNTP for recreational/prairie use.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedies at Site L10 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None –

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None –

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L11

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L11*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU2 (Metals) – contaminated soils were remediated by excavation and disposal according to the1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (report Figure 5-10)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L11

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU2: *Final Closure Report Sites L11/L16* (MWH December 2003)

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site L11 remedy for SRU2 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L11

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. A security fence also surrounds the site.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A

Remarks: The entire IOUEL training facility is enclosed by a fence that restricts public access.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☐ N/A

Remarks: Site L11 is owned by the International Union of Operating Engineers Local (IOUEL) 150 and is used as a heavy equipment operator training school. A 342,000 square feet training facility is located on IOUEL property adjacent to the site.

3. **Land use changes off site** ☐ N/A

Remarks: See above.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L11

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: On-site roads were not inspected because the property is privately owned. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy applied to Site L11 soils included excavation and off-site disposal of munitions/explosives and SRU2 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and not leave behind any RCRA characteristic wastes. Munitions/explosives and contaminated soils were removed and disposed off site. The remedial action objectives were met and the remedial action is complete. Site L11 is now owned by IOUEL Local 150 and is used as a heavy equipment operator training facility.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedy at Site L11 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L14

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L14*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-11)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 15-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L14

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 for Phase 2 Remedial Action Soils Operable Unit* (MWH August 2006).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site L14 remedy for SRU1 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L14

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition. Site L14 is also surrounded by a perimeter fence.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L14

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are narrow, paved roads on the site that were used for access to buildings. The roads are in fair condition but are becoming overgrown with road-side vegetation. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not being used; it is predominantly vacant and contains remnant LAP structures. Areas surrounding the structures are overgrown and consist of grass land and scrub-brush.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L14 included excavation and bioremediation of SRU1 soils. The purpose of the RA was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete. Site L9 is awaiting transfer to the USDA/FS for inclusion in the MNTP for recreational/prairie use.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedy at Site L14 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L16

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L16*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-12)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) | Site Manager/Commander's Representative (Title) | 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) | Environmental Manager (Title) | 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L16

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L11/L16, Joliet Army Ammunition Plant (JOAAP) Will County, Illinois* (MWH 2003d). Treatment logs from the BTF are available for SRU1 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site L16 remedy for SRU1 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date)	To _____ (Date)	_____ (Total cost)	☐ Breakdown attached
From _____ (Date)	To _____ (Date)	_____ (Total cost)	☐ Breakdown attached
From _____ (Date)	To _____ (Date)	_____ (Total cost)	☐ Breakdown attached
From _____ (Date)	To _____ (Date)	_____ (Total cost)	☐ Breakdown attached
From _____ (Date)	To _____ (Date)	_____ (Total cost)	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L16

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former LAP area is surrounded by a perimeter fence that is in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: None noted

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The property has not been transferred to the USDA/FS.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L16

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: Gravel roads are present on the site. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not being used. It is predominantly vacant and consists of grass land and scrub-brush. Former Load-Assemble-Package structures are present in the west-central portion of the site.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for the site included the excavation, bioremediation, and disposal of SRU1 soils. The purpose of the RA was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and to rmove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete. The site is awaiting transfer to the USDA/FS for inclusion in the MNTP for recreational/ prairie use.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L17

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L17*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU4 (PCB) – contaminated soils were remediated by excavation and off-site disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-13)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L17

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU4: *Final PCB Sites RA Closure Report* (MWH 2001b).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site L17 remedy for SRU1 and SRU4 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L17

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former Load-Assembly Package area is surrounded by a perimeter fence that is in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L17

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are narrow roads on the site that were used for access during load-assemble-package operations. The roads are in fair condition but are becoming overgrown with road-side vegetation. JOAAP roads outside of the site consist of bituminous concrete pavement and are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: The site is not being used; it is vacant and contains open grass land and scrub-brush. The site is owned by the Joliet Arsenal Development Authority.

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for Site L17 included excavation and off-site disposal of SRU4 soils. The purpose of the RA was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, and prevent the migration of contaminants. Contaminated soils were removed and the remedial action objectives were met. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedy at Site L17 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L23A

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site L23A*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL0210090049 (Load-Assemble-Package Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU2 (Metals) – contaminated soils were remediated by excavation and disposal according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-14)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☒ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency
   Contact
   Name Title Date Phone no.
   Problems, suggestions; ☐ Report attached

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L23A

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU2: *Final Closure Report Sites L2, L5, L23A, M3, M4, and M12 for Phase 2 Remedial Action Soils Operable Unit* (MWH October 2009)

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU RA for Site L23A other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L23A

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The JOAAP former LAP area is surrounded by a perimeter fence that is in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: None identified

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☐ N/A

Remarks: The property is vacant and consists of open grass land and scrub-brush.

3. **Land use changes off site** ☐ N/A

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site L23A

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement.

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for the site included the excavation and disposal of SRU2 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and to not leave behind RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedies at the site other than monitoring LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M1

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M1*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU6 (Landfill) – contaminated soils were excavated and disposed off site according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-15)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☒ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M1

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU6: *Final M1 Remedial Action Completion Report Soils Operable Unit M1 Southern Ash Pile* (MKM 2009c).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU RA for the site other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M1

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant and not being used. It is dominated by grass land vegetation with wetlands present.

3. **Land use changes off site** ☐ N/A

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M1

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement.

B. Other Site Conditions

Remarks None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for the site included the excavation and disposal of SRU6 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and to remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M2

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M2*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (Explosives) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-16)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☒ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M2

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1: *Final Closure Report Sites L1, L7, L8, L9, L10, L14, and M2 for Phase 2 Remedial Action Soils Operable Unit* (MWH 2006b). Treatment logs are available for SRU1 and SRU5 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU RA for the site other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M2

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☐ N/A

Remarks: The site is vacant and not being used. It is dominated by grass land vegetation with some scrub brush and small trees present.

3. **Land use changes off site** ☐ N/A

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M2

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☒ N/A

Remarks: There are no paved roads on Site M2. JOAAP roads outside of the site consist of bituminous concrete pavement.

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for the site included excavation and bioremediation of SRU1 soils. The purpose of the action was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and to remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M3

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M3*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (explosives) - contaminated soils were remediated by excavation and bioremediation according to the 2004 ROD. SRU2 (metals) and SRU3 (combined explosives and metals) – contaminated soils were remediated by excavation and disposal according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-17)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M3

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1, SRU2, and SRU3: *Final Closure Report Sites L2, L5, L23A, M3, M4, and M12 for Phase 2 Remedial Action Soils Operable Unit* (MWH 2009). Treatment logs are available for SRU1 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU remedy for SRU1, SRU2, and SRU3 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M3

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant and contains constructed wetlands within and adjacent to the remediated area. Surrounding areas consist of open grass land.

3. **Land use changes off site** ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M3

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement.

B. Other Site Conditions

Remarks None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for the site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy included excavation and bioremediation of SRU1 soils and excavation and disposal of SRU2 and SRU3 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove RCRA characteristic wastes. Contaminated soils were removed, and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M4

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M4*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU2 (metals)-contaminated soils were remediated by excavation and off-site disposal according to the 2004 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-18)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) | Site Manager/Commander's Representative (Title) | 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) | Environmental Manager (Title) | 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M4

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU2: *Final Closure Report Sites L2, L5, L23A, M3, M4, and M12 for Phase 2 Remedial Action Soils Operable Unit* (MWH 2009).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU remedy for SRU1, SRU2, and SRU3 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M4

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant and consists of open grass land and scrub-brush.

3. **Land use changes off site** ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M4

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement.

B. Other Site Conditions

Remarks None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for the site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy included excavation and off-site disposal of SRU2 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M5

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M5*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (explosives) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 1998 ROD. SRU3 (explosives and metals) – contaminated soils were remediated by bioremediation and disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-20)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M5

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1 and SRU3 soils: *Final Site M5Closure Report, Former Tetryl Production Area Joliet Army Ammunition Plant, Wilmington, Illinois* (MWH 2000). Treatment logs are available for SRU1 and SRU3 treated soils.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site M5 remedy for SRU1 and SRU3 soils other than monitoring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M5

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The site is enclosed with a fence that surrounds the entire CenterPoint Intermodal facility.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: Access to the CenterPoint Intermodal facility is controlled by security guards and an electronic security system.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☒ N/A

Remarks: The site is an intermodal facility that includes a rail spur, roadways for truck traffic, and large warehouses. A stormwater detention basin is present in the western portion of the site. Further west the site is undeveloped and consists of open grass land and a rectangular pond.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M5

3. **Land use changes off site** ☐ N/A

Remarks: Surrounding areas have been developed for industrial/commercial activities.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: Concrete roads are present throughout the site for the intermodal facility.

B. Other Site Conditions

Remarks None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for the site included excavation and bioremediation of SRU1 and SRU3 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soils remedy at Site M5 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M6

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M6*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (explosives) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 1998 ROD. SRU3 (explosives and metals) – contaminated soils were remediated by bioremediation and disposal and excavation and disposal according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-20)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M6

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1 and SRU3 soils: *Final Closure Report Site M6 Soils Operable Unit* (MWH 2006a). Treatment logs are available for SRU1 and SRU3 treated soils. As-built drawings are located in the completion report.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There is no O&M related to the Site M6 remedy for SRU1 and SRU3 soils other than monitoring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M6

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: None

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: None

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant and not being used. It contains remnant JOAAP structures, roads, and utility appurtenances. Prairie grasses and scrub-brush dominate open areas.

3. **Land use changes off site** ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M6

VI. GENERAL SITE CONDITIONS			
A. Roads	☒ Applicable	☐ N/A	
1. **Roads damaged**	☒ Location shown on site map	☒ Roads adequate	☐ N/A
Remarks:			
B. Other Site Conditions			
Remarks None			

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy included excavation and bioremediation of SRU1 soils and excavation and bioremediation or off-site disposal of SRU3 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent the migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the soil remedy at Site M6 other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M7

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M7*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU1 (explosives) – contaminated soils were remediated by excavation and treatment (bioremediation) according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-21)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M7

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU1 soils: *Final Closure Report Site M7* (MWH 2003c). Treatment logs are available for SRU1 treated soils. As-built drawings are located in the completion report.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the site remedy for SRU1 soils other than monitoring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M7

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☐ N/A

Remarks: The site is not being used. The north end contains remnant JOAAP structures; the central and southern sections are vacant. Open areas contain grass land and scrub-brush.

3. **Land use changes off site** ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M7

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy included excavation and bioremediation of SRU1 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M8

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M8*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other Sulfur was removed from surficial soils and recycled/disposed off site. The remediation of sulfur was required by the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency
   Contact
   Name Title Date Phone no.
   Problems, suggestions; ☐ Report attached

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M8

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the site remedy for sulfur in soils other than monitoring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M8

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☒ N/A

Remarks: The site is enclosed with a fence that surrounds the Burlington Northern SantaFe (BNSF) intermodal facility.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: Access to the BNSF intermodal facility is restricted by a security fence and electronic security system.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☐ N/A

Remarks: The site is an intermodal facility that includes rail spurs, roadways for truck traffic, and warehouses.

3. **Land use changes off site** ☐ N/A

Remarks: The surrounding area has been developed for industrial/commercial activities.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M8

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: Concrete roads are present throughout the site for the intermodal facility.

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy included removal of sulfur in surficial soils at the site pursuant to the 1998 ROD. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M9

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M9*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU6 (Landfill) – contaminated soils were excavated and disposed off site according to the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-22)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☒ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M9

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU6: *Final M9 Remedial Action Completion Report Northern Ash Pile* (MKM 2007c).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU RA for the site other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M9

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant and not being used. It is dominated by grass land vegetation with wetlands present.

3. **Land use changes off site** ☐ N/A

Remarks: The surrounding area has been developed for industrial/commercial activities.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M9

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. A large paved area is adjacent to (east of) the site. It is part of the BNSF intermodal facility.

B. Other Site Conditions

Remarks None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy for the site included the excavation and disposal of SRU6 soils. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. Remedial actions are complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M11*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other Soil and debris from two areas of the site (the south area and the northeast area) were excavated and consolidated into one area (the northwest area).

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-23)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 15-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 15-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☒ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: *Final M11 Remedy In Place Report* (MKM 2009a). Inspection and maintenance logs are provided in annual and semi-annual groundwater monitoring reports prepared for JOAAP (refer to Attachment 2).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits_____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Quarterly monitoring for explosives, metals, VOCs, SVOCs, nitrate-N, and sulfate as documented in annual reports for 2009, 2010, 2011, and 2012.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A
Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility (Toltest Inc.)
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place

Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A
Remarks: The perimeter fence is in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks: Warning signs are posted at the gate and along the perimeter fence.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks:

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks: Site roads are unpaved or consist of bituminous concrete pavement. They are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths: _____ Widths: _____ Depths: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: Riprap is present at the toe of slope around the entire landfill.

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent: _____ Height: _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident

☒ Wet areas	☒ Location shown on site map	Areal extent	_____
☐ Ponding	☐ Location shown on site map	Areal extent	_____
☐ Seeps	☐ Location shown on site map	Areal extent	_____
☐ Soft subgrade	☐ Location shown on site map	Areal extent	_____

   Remarks: Reconstructed wetlands are located east and west of the landfill

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent: _____
Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☐ N/A

   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

   Remarks: _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

   Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A

   Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒N/A

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A

   Remarks: _____

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A

   Remarks: Geocomposite used for cover drainage; outlet is keyed into riprap at landfill perimeter.

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

   Remarks: See Five-Year Review report Section 6.6.

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A

   Remarks: See Five-Year Review report Section 6.6.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M11

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

M11 north is a 7.8-acre landfill located in the southwestern portion of the JOAAP former manufacturing area. The landfill was a former gravel pit that was filled with waste while JOAAP was active. Waste from an adjacent landfill (M11 south) was consolidated into M11 north during the remedial action. Treated soil from site M4 was also used as backfill. A RCRA Subtitle cap was placed on the M11 north landfill.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Post-closure monitoring is performed in accordance with IAC Title 5, Subtitle G, Chapter 1, Subchapter c Part 724 (30-year period). The following activities are conducted quarterly:

1) sampling and analysis of groundwater for explosives, metals, volatile organic compounds, semi-volatile organic compounds, nitrate-N, and sulfate

2) landfill cover inspection and maintenance

Semi-annual and annual reports are issued by the O&M contractor.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M12

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M12*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other SRU2 (metals) - contaminated soils were excavated and disposed off site in accordance with the 2004 ROD. SRU7 (sulfur) – sulfur was removed and disposed off site in accordance with the 1998 ROD.

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-17)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M12

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: SRU2 and SRU7: *Final Closure Report - Sites L2, L5, L23A, M3, M4, and M12 for Phase 2 Remedial Action Soils Operable Unit* (MWH 2009).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the SOU remedy for SRU1, SRU2, and SRU3 soils other than ensuring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached
From_____ (Date) To_____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M12

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☒ N/A

Remarks: The site is vacant and contains remnant structures associated with previous manufacturing operations. Surrounding areas consist of open grass land.

3. **Land use changes off site** ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M12

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: There are no paved roads on the site. JOAAP roads outside of the site consist of bituminous concrete pavement.

B. Other Site Conditions

Remarks None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the SOU remedy for the site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The SOU remedy included excavation and off-site disposal of SRU2 soils and the removal and off-site disposal of SRU7 sulfur. The purpose of the remedy was to remediate the site to RGs, prevent human and environmental exposure to contaminant concentrations above RGs, eliminate soil contamination as a source of groundwater contamination, prevent the migration of contaminants, and remove any RCRA characteristic wastes. Contaminated soils were removed and the remedial action objectives were met. The remedial action is complete.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required by the SOU remedy at the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M13*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~65° F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☒ Site map attached (see report Figure 5-25)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 15-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 15-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A

Remarks: *Final M13 Remedy In Place Report Guaranteed Fixed Price Remediation Performance Based Contract for Environmental Restoration Services at Joliet Army Ammunition Plant* (MKM 2009b). Inspection and maintenance logs are provided in annual and semi-annual monitoring reports for JOAAP (refer to Attachment 2).

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits_____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Quarterly monitoring for explosives, metals, VOCs, SVOCs, nitrate-N, and sulfate as documented in annual reports for 2009, 2010, 2011, and 2012.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility (Toltest Inc.)
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place

Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The perimeter fence is in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A

Remarks: A warning sign is posted at the landfill gate.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks:

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks: There are no roads on site. Off-site roads consist of bituminous concrete pavement; they are adequate for site inspection, monitoring, and maintenance activities.

B. Other Site Conditions

Remarks: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths: _____ Widths: _____ Depths: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent: _____ Depth: _____
   Remarks: _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: Riprap is present at the toe of slope around the entire landfill

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent: _____ Height: _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent _____
☒ Ponding	☒ Location shown on site map	Areal extent _____
☐ Seeps	☐ Location shown on site map	Areal extent _____
☐ Soft subgrade	☐ Location shown on site map	Areal extent _____

   Remarks: A small pond/wetland is located east of the landfill

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
   Areal extent: _____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☐ N/A

   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

   Remarks: _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

   Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A

   Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒N/A

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A

   Remarks: _____

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A

   Remarks: Geocomposite used for cover drainage; outlet is keyed into riprap at landfill perimeter

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

   Remarks: See Five-Year Review report Section 6.5

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A

   Remarks: See Five-Year Review report Section 6.5

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: None

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

M13 is an approximate 10.8 acre landfill located in the north central portion of the JOAAP former manufacturing area. Previous disposal activities included scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. A RCRA Subtitle D cap was installed on the landfill. Groundwater monitoring is also conducted.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M13

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Post-closure monitoring is performed in accordance with IAC Title 5, Subtitle G, Chapter 1, Subchapter c Part 724 (30-year period). The following activities are conducted quarterly:

1) sampling and analysis of groundwater for explosives, metals, volatile organic compounds, semi-volatile organic compounds, nitrate-N, and sulfate

2) landfill cover inspection and maintenance

Semi-annual and annual reports are issued by the O&M contractor.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M16

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Site M16*	**Date of inspection:** *16-April-2013*
Location and Region: *Wilmington, Will County Illinois*	**EPA ID:** *IL7213820460 (Manufacturing Area)*
Agency, office, or company leading the five-year review: *US Army Corps of Engineers, Buffalo District*	**Weather/temperature:** Overcast/partly sunny, ~55° F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other No further action (1998 Record of Decision)

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☒ at office ☐ by phone Phone no. 815-423-2870
   Problems, suggestions; ☐ Report attached None

2. **O&M staff** Gary Reside (Toltest Inc.) (Name) Environmental Manager (Title) 16-April-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 812-709-1220
   Problems, suggestions; ☐ Report attached None

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.
   Other interviews were conducted independently of the site visit/inspection. See Attachment 6 for interview records.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M16

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

Remarks: Site Safety and Health Plan prepared by monitoring/maintenance contractor (Toltest, Inc.) pursuant to Contract W91ZLK-05-D0012, Delivery Order 0001 with U.S. Army Environmental Command.

The remainder of Section III has not been included because it is not applicable to the soils remedial action for this site.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility (Toltest Inc.)
☐ Other: There are no O&M activities related to the site remedy for sulfur in soils other than monitoring adherence to LUCs, ICs, and deed restrictions.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: Not Available ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M16

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☒ N/A

Remarks: The site is enclosed with a fence that surrounds the Burlington Northern SantaFe (BNSF) intermodal facility.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: Access to the BNSF intermodal facility is restricted by a security fence and electronic security system.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self-reporting
Frequency Conducted for this five-year review.
Responsible party/agency U.S. Army
Contact Arthur M. Holz (Name) Site Manager/Commander's Representative (Title) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
The *Annual Summary Report Site Wide Deed Restriction Implementation Joliet Army Ammunition Plant Will County, Illinois*, (URS Corporation Nov 2013) indicates that the ICs are being implemented and complied with.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. **Land use changes on site** ☐ N/A

Remarks: The site is an intermodal facility that includes rail spurs, roadways for truck traffic, and warehouses.

3. **Land use changes off site** ☐ N/A

Remarks: The surrounding area has been developed for industrial/commercial activities.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant Site (JOAAP)
Site M16

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: Concrete roads are present throughout the site for the intermodal facility.

B. Other Site Conditions

Remarks: None

NOTE: Sections VII through X were removed from this checklist because they are not applicable to the remedy for soils on this site.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The site was designated for no further action pursuant to the 1998 ROD.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No O&M activities are required for the site other than monitoring of LUCs, ICs, and deed restrictions.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

GOU Inspection Checklists

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Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L1

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GRU1 – L1*	**Date of inspection:** *13 April 2013*
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL0210090049
Agency, office, or company leading the five-year review: *Toltest/MWH*	**Weather/temperature:** *Pt. cloudy, windy, 60° F*

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L1

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L1

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Public Access to LAP allowed via Midewin National Tallgrass Prairie.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L1

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Frequent monitoring by USDA
Frequency
Responsible party/agency USAEC

Contact	Art Holz	Site Manager	10 April 2013	815-423-2870
	Name	Title	Date	Phone no.

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident
Remarks: Hole in chain-link fencing of entry gate.

2. **Land use changes on site** ☐ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks Site becoming heavily vegetated.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L1

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

   Remarks: See Five-Year Review report Section 6.3.

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A

   Remarks: See Five-Year Review report Section 6.3.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater with exceedances of RDX, 1,3,5-TNB, and 2,4,6-TNT. The natural attenuation remedy is expected to naturally reduce concentrations within the established groundwater management zone (GMZ) boundary to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution. Observed concentrations of RDX and 1,3,5-TNB appear to be decreasing as time from completion of the soil remedy increases. The trend in concentration of 2,4,6-TNT at monitoring well MW131 appear to be increasing. However, seasonal fluctuations in concentration provide an R2 value less than 0.1. Therefore the identified trend is unreliable.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L1

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The location of MW131 relative to the former source area may indicate the increase in concentration is the result of a "slug" of the constituent migrating in the aquifer as a result of the soil source removal action completed. Therefore, concentrations should show a decreasing trend as time increases. The plumes of constituents are well within the GMZ boundary. Therefore, there is no risk at this time of exceedances in groundwater migrating outside of the GMZ boundary.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NA

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

If seasonal fluctuations in concentrations stabilize the semi-annual sampling will be reduced to annual. Additionally, if warranted, individual monitoring wells will be removed from the long-term monitoring Compliance monitoring well MW401 was removed from LTM beginning spring 2012 due to upgradient early warning monitoring wells not having RG exceedances. Early warning monitoring well MW173 designation changed to in-plume due to MW173 being located with MW172 and observed upward vertical gradients. Early warning monitoring well MW172 was removed from LTM beginning spring 2012 due to upgradient early warning monitoring wells not having RG exceedances.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L2

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GRU1 – L2*	**Date of inspection:** *8 April 2013*
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL0210090049
Agency, office, or company leading the five-year review: *Toltest/MWH*	**Weather/temperature:** *Sunny, 75° F*

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L2

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L2

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Public Access to LAP allowed via Midewin National Tallgrass Prairie.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L2

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Frequent monitoring by USDA
Frequency
Responsible party/agency USAEC

Contact	Art Holz	Site Manager	10 April 2013	815-423-2870
	Name	Title	Date	Phone no.

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L2

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

   Remarks: See Five-Year Review report Section 6.3.

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A

   Remarks: See Five-Year Review report Section 6.3.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater with exceedances of RDX. The natural attenuation remedy is expected to naturally reduce concentrations within the established groundwater management zone (GMZ) boundary to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution. At Site L2 there are RDX exceedances at source area monitoring well MW404 only. There has been an increase in the RDX concentration since 2009 which is likely due to a "slug" resulting from increased infiltration during the RA, which has migrated to this location in the timeframe since the RA was completed.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L2

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The location of MW404 relative to the former source area may indicate the increase in concentration since 2009 is the result of a "slug" of the constituent migrating in the aquifer as a result of the soil source removal action completed. Therefore, concentrations should decrease as time increases. The plume of RDX is well within the GMZ boundary. Therefore, there is no risk at this time of exceedances in groundwater migrating beyond the GMZ boundary.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NA

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Seasonal fluctuations in concentrations are stable with the highest concentrations being detected in fall. In accordance with the LTM Plan, Site L2 has been removed from semi-annual sampling and is sampled in fall only, which was initiated in 2012. In-plume monitoring well MW501 was removed from LTM beginning in fall 2011 in accordance with the LTM Plan for not having TAL metals RG exceedance for 4 rounds. Compliance monitoring well MW810 was removed from LTM beginning in fall 2012 due to upgradient early warning monitoring wells not having RG exceedances.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GOU1 – L3*	**Date of inspection:** *10 April 2013*
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL0210090049
Agency, office, or company leading the five-year review: *TolTest/MWH*	**Weather/temperature:** *40 ^{o} F*

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems, suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☒ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Access along Prairie Creek is not fenced _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Frequent monitoring by USDA

Frequency

Responsible party/agency USAEC

Contact	Art Holz	Site Manager	10 April 2013	815-423-2870
	Name	Title	Date	Phone no.

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☒ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks

2. **Land use changes on site** ☐ N/A

Remarks:

3. **Land use changes off site** ☐ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : Rip Rap along Prairie creek needs work_____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☐ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
   Areal extent_____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☒ N/A
   Remarks _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A
   Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☒N/A

F. Cover Drainage Layer ☐ Applicable ☒ N/A

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☒ Location shown on site map ☒ Siltation not evident
   Areal extent _____ Depth _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☒ Vegetation does not impede flow
Areal extent_____ Type _____
Remarks _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent_____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☒ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data ☒ Applicable ☐ N/A

1. Monitoring Data
☒ Is routinely submitted on time ☒ Is of acceptable quality

1. **Monitoring Wells** (natural attenuation remedy)
☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks: See Five-Year Review report Section 6.3.

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L3

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater. Routine monitoring is conducted for metals and explosives. Exceedances have been detected for RDX. The natural attenuation remedy is expected to naturally reduce concentrations to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution. Observed concentrations of RDX appear to be increasing at MW412, MW630, and MW633. However, at MW412 the greatest concentration high was reached during the RA in May 2008 and has been decreasing as time from completion of the remedy increases. However, seasonal fluctuations in concentration provide an R2 value less than 0.1 at MW412. Therefore the identified trend is unreliable. At MW633 the greatest concentration high was reached in April 2010 and has been decreasing since. The distance from the source area and timeframe suggests the peak in concentration may be the result of disturbances during the RA. Increasing trend has been indicated at MW630 with the greatest concentration observed in April 2011. Concentrations have decreased significantly since.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Concentrations should show a decreasing trend as time increases. The plume of RDX in groundwater is a small area . Therefore, there is no risk at this time of exceedances in groundwater migrating outside of the GMZ.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NA-

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Monitoring wells M3 and MW632 have been removed from the monitoring program. Metals analysis has been removed from monitoring wells MW410. Surface water sampling location SW004 was reduced to spring sampling only. If concentrations stabilized in a given season a recommendation for a change to annual sampling only will be provided. Additional RA activities are being considered for Landfill L3.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

I. SITE INFORMATION	
Site name: *Joliet Army Ammunition Plant GRU1 – L14*	**Date of inspection: 8 April 2013**
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL0210090049
Agency, office, or company leading the five-year review: *Toltest/MWH*	**Weather/temperature: Sunny, 75 deg.**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Public Access to LAP allowed via Midewin National Tallgrass Prairie.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Frequent monitoring by USDA
Frequency
Responsible party/agency USAEC
Contact Art Holz (Name) Site Manager (Title) 10 April 2013 (Date) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☒ N/A
Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface ☐ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☐ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
   Areal extent_____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent_____ Depth_____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type_____ Areal extent_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent_____ Depth_____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent_____ Depth _____
   Remarks: _____

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size_____
   Remarks: _____

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☐ N/A
   Remarks _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
   Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☐N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☐ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____ ☐ Erosion not evident
   Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
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3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site L14

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks: _____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks : _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks : _____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : _____

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
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E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : All wells in good repair.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater with exceedances of RDX,. The natural attenuation remedy is expected to naturally reduce concentrations within the established groundwater management zone (GMZ) boundary to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution. Observed concentrations of RDX appear to be declining in in-plume monitoring wells MW511 and MW512. However, fluctuations is concentration at MW512 provide an R2 value less than 0.1. Therefore, the identified trend is unreliable.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The plume of RDX is well within the GMZ boundary. Therefore, there is no risk at this time of exceedances in groundwater migrating outside of the GMZ boundary.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.
NA

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Joliet Army Ammunition Plant
Site L14

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Seasonal fluctuations in concentrations are stable. Therefore, the semi-annual sampling was reduced to annual in fall when concentrations are highest. Additionally, in-plume monitoring well MW508 has been removed from LTM due to no RG exceedances and compliance monitoring wells MW603 and MW604 have been removed from LTM due to no RG exceedances at upgradient early warning well H7.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M1

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GRU2 – M1*	**Date of inspection: 11 April 2013**
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL7213820460
Agency, office, or company leading the five-year review: *Toltest/MWH*	**Weather/temperature: Rainy, 45 deg.**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M1

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M1

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Public Access allowed via Midewin National Tallgrass Prairie

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M1

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Frequent monitoring by USDA
Frequency
Responsible party/agency USAEC
Contact Art Holz (Name) Site Manager (Title) 10 April 2013 (Date) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks:

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Joliet Army Ammunition Plant
Site M1

B. Other Site Conditions

Remarks : General surficial site work completed by Midewin National Tallgrass Prairie evident including removal of debris grate within Prairie Creek, mowing and shrub removal, and removal of surface water drainage conveyance structures.

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface ☐ Applicable ☒ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth _____
Remarks:

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks:

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth _____
Remarks :

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
Areal extent_____ Depth _____
Remarks :

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks:

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks:

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent_____ Height _____
Remarks:

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent _____
☐ Ponding ☐ Location shown on site map Areal extent _____
☐ Seeps ☐ Location shown on site map Areal extent _____
☐ Soft subgrade ☐ Location shown on site map Areal extent _____
Remarks:

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Joliet Army Ammunition Plant
Site M1

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks: _____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth _____
Remarks: _____

5. **Obstructions** Type _____ ☐ No obstructions
☐ Location shown on site map Areal extent _____
Size_____
Remarks: _____

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6. **Excessive Vegetative Growth** Type _____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks _____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks _____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☐N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks _____

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Site M1

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☐ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____ ☐ Erosion not evident
   Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks _____

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Joliet Army Ammunition Plant
Site M1

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

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Joliet Army Ammunition Plant
Site M1

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks: _____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks : _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks : _____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : _____

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M1

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : Removal of surface water drainage conveyance structures is creating an increase in surface water at locations within Site M1. Several monitoring wells are routinely surrounded by surface water during wet seasons. All wells in good repair.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater with exceedances of sulfate. The natural attenuation remedy is expected to naturally reduce concentrations within the established groundwater management zone (GMZ) boundary to below the remedial goal over time through various fate and transport mechanisms including dispersion and dilution. Observed concentrations of sulfate in groundwater appear to be decreasing as time from completion of the soil remedy increases, as evidenced by the reduction in groundwater concentrations at source area monitoring well MW107. The reduction in groundwater sulfate concentration at the source area indicates an effective source removal remedy as evidenced by the plume detaching from the source area. The trend in concentration of sulfate at source area monitoring wells MW231 and MW640 (which are located further downgradient from the source area than monitoring well MW107) are increasing, likely due to a "slug" resulting from increased infiltration during the RA, which has migrated to these locations in the timeframe since the RA was completed .

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The location of MW231 and MW640 relative to the former source area may indicate the increase in concentration is the result of a "slug" of the constituent migrating in the aquifer as a result of the soil source removal action completed. Therefore, concentrations should show a decreasing trend as the "slug" migrates downgradient as time increases. The plumes of constituents are well within the GMZ boundary. Therefore, there is no risk at this time of exceedances in groundwater migrating outside of the GMZ boundary.

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Joliet Army Ammunition Plant
Site M1

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. NA
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. If seasonal fluctuations in concentrations stabilize the semi-annual sampling will be reduced to annual. Additionally, if warranted, individual monitoring wells will be removed from the long-term monitoring program.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GRU3 – M3*	**Date of inspection: 10 April 2013**
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL7213820460
Agency, office, or company leading the five-year review: *Toltest/MWH*	**Weather/temperature: Rainy, 40 deg.**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Public access to M3 allowed via Midewin National Tallgrass Prairie.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Frequent monitoring by USDA
Frequency
Responsible party/agency USAEC
Contact Art Holz (Name) Site Manger (Title) 10 April 2013 (Date) 815-2-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface ☐ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☐ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
   Areal extent_____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent_____ Depth_____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type_____ Areal extent_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent_____ Depth_____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent_____ Depth _____
   Remarks: _____

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size_____
   Remarks: _____

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☐ N/A
   Remarks _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
   Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☐N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☐ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____ ☐ Erosion not evident
   Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks: _____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks : _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks : _____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : _____

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M3

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Groundwater monitoring at Site M3 in-plume well MW233 and compliance well MW352 was discontinued beginning fall 2011 in compliance with the LTM Plan due to no detections. Additionally, sampling at Site M5 compliance wells MW112 and MW113, located within Site M3, was discontinued beginning spring 2012 due to the wells being downgradient of Site M5, which was removed from LTM beginning fall 2011.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

LTM monitoring discontinued.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NA

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

LTM monitoring discontinued.

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Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant Landfill M11*	**Date of inspection: 10 April 2013**
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL7213820460
Agency, office, or company leading the five-year review: TolTest	**Weather/temperature: 40 degrees**

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☒ Readily available ☒ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs on fencing _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self reporting
Frequency Quarterly by Contractor
Responsible party/agency USAEC
Contact Art Holz (Name) Site Manager (Title) 10 April 2013 (Date) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☒ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☐ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
   Areal extent_____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

C. Letdown Channels ☐Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent_____ Depth_____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type_____ Areal extent_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent_____ Depth_____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent_____ Depth _____
   Remarks: _____

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size_____
   Remarks: _____

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
Site M11

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive
   ☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☒ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☐ N/A
   Remarks _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
   Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A
   Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☒N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks _____

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F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☐ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____ ☐ Erosion not evident
   Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks _____

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3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth _____
Remarks _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

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3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks: _____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks : _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks : _____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : _____

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

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E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater. Routine monitoring is conducted for VOCs, SVOCs, metals, explosives, and indicator parameters (sulfate and nitrate). Exceedances have been detected for sulfate. The natural attenuation remedy is expected to naturally reduce concentrations to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution. Observed concentrations of sulfate appear to be decreasing as time from completion of the remedy increases. However, seasonal fluctuations in concentration provide an R2 value less than 0.1 at MW336. Therefore the identified trend is unreliable.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Concentrations should show a decreasing trend as time increases. The plume of sulfate in groundwater encompasses a small area . Therefore, there is no risk at this time of exceedances in groundwater migrating outside of the study area.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NA

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D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Concentrations are stable and predictable. Therefore, in accordance with the LTM Plan, the semi-annual sampling was reduced to annual in fall.

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Joliet Army Ammunition Plant
Site M13

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GOU2 – M13*	**Date of inspection: 10 April 2013**
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL7213820460
Agency, office, or company leading the five-year review: *TolTest*	**Weather/temperature: 40 degrees**

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.

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III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

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IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☒ Readily available ☒ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: _____

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B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs on fencing

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self-reporting
Frequency Quarterly
Responsible party/agency USAEC
Contact Art Holz (Name) Site Manager (Title) 10 April 2013 (Date) 815-423-2870 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☒ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☒ N/A
Remarks:

3. **Land use changes off site** ☒ N/A
Remarks:

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VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
   Remarks: _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: Some woody growth found and removed

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

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8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent _____
☐ Ponding ☐ Location shown on site map Areal extent _____
☐ Seeps ☐ Location shown on site map Areal extent _____
☐ Soft subgrade ☐ Location shown on site map Areal extent _____
Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
Areal extent_____
Remarks: _____

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth _____
Remarks: _____

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5. **Obstructions** Type _____ ☐ No obstructions
☐ Location shown on site map Areal extent _____
Size_____
Remarks: _____

6. **Excessive Vegetative Growth** Type _____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks _____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive
☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks _____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks _____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A
Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☒N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks _____

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3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
☐ Siltation not evident
Remarks _____

2. **Erosion** Areal extent _____ Depth _____ ☐ Erosion not evident
Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
Remarks _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement _____ Vertical displacement _____
Rotational displacement _____
Remarks _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks _____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☒ Location shown on site map ☐ Siltation not evident
Areal extent _____ Depth _____
Remarks Ditch to the south not properly draining _____

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2. **Vegetative Growth** ☒ Location shown on site map ☐ N/A
☒ Vegetation does not impede flow
Areal extent_____ Type _____
Remarks _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent_____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth _____
Remarks _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks _____

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2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks: _____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks : _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks : _____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : _____

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D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks : _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater. Routine quarterly monitoring is conducted for VOCs, SVOCs, metals, explosives, and indicator parameters (sulfate and nitrate). Observed concentrations of 2,4-DNT at downgradient monitoring well MW362 have increased since completion of the RA. However, seasonal fluctuations in concentration provide an R2 value less than 0.1 at MW362. Therefore the identified trend is unreliable. The natural attenuation remedy is expected to naturally reduce concentrations to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Concentrations should show a decreasing trend as time increases. The plume of 2,4-DNT in groundwater encompasses a small area . Therefore, there is no risk at this time of exceedances in groundwater migrating beyond the GMZ.

C. Early Indicators of Potential Remedy Problems

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Joliet Army Ammunition Plant
Site M13

	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. NA
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Monitoring wells AEHA14R and AEHA15 have been removed from the LTM as they were problematic and not located in an area providing sufficient downgradient data from Landfill M13. A replacement monitoring well has been recommended to be installed along the midpoint of the southern landfill boundary.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

I. SITE INFORMATION

Site name: *Joliet Army Ammunition Plant GRU2 – MFG (M5, M6, M7, and M8)*	**Date of inspection: 10 April 2013**
Location and Region: *Wilmington IL, Region 5*	**EPA ID:** IL7213820460
Agency, office, or company leading the five-year review: *Toltest/MWH*	**Weather/temperature: Rainy, 40 deg.**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
   Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Reports attached.

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks :

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks:

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other: _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available (not available)

From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: Sites M5, M6, M7, and M8 controlled and gated by BNSF.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by)Area patrolled by BNSF
Frequency
Responsible party/agency USAEC
Contact Art Holz Site Manager 10 April 2013 815-423-2870
Name Title Date Phone no.

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☒ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks:

3. **Land use changes off site** ☐ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface ☐ Applicable ☐ N/A

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth _____
   Remarks : _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth _____
   Remarks : _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent _____
   ☐ Ponding ☐ Location shown on site map Areal extent _____
   ☐ Seeps ☐ Location shown on site map Areal extent _____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent _____
   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
   Areal extent_____
   Remarks: _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
   Remarks: _____

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent_____ Depth_____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type_____ Areal extent_____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent_____ Depth_____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent_____ Depth _____
   Remarks: _____

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size_____
   Remarks: _____

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance
   ☐ N/A
   Remarks _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

4. **Leachate Extraction Wells**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
   Remarks _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
   Remarks _____

E. Gas Collection and Treatment ☐ Applicable ☐N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☐ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____ ☐ Erosion not evident
   Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks _____

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (*e.g.*, chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks: _____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks : _____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks : _____

5. **Treatment Building(s)**
☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : _____

D. Monitoring Data ☐ Applicable ☒ N/A

1. Monitoring Data
☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

E. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. **Monitoring Wells** (natural attenuation remedy)
☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks : Compliance monitoring well MW116 needs locking cover repaired.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks : NA

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedial action implemented is natural attenuation for groundwater with exceedances of sulfate at M8, and 2,4-DNT, 2,6-DNT, 2-NT, and 2,4,6-TNT at site M6. The natural attenuation remedy is expected to naturally reduce concentrations within the established groundwater management zone (GMZ) boundary to below the remedial goal over time through various fate and transport mechanisms including degradation, dispersion, and dilution.

Observed concentrations of all compounds appear to be decreasing as time from completion of the soil remedy increases. However, seasonal fluctuations in concentration provide an R2 value less than 0.1 at most locations. Therefore the identified trends are unreliable.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Identified plumes are very localized and well within the GMZ boundary. Concentrations should continue to decrease as time increases. Therefore, there is no risk at this time of exceedances in groundwater migrating outside of the GMZ boundary.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.
NA

Five-Year Review Site Inspection Checklist
Joliet Army Ammunition Plant
MFG Area

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. If seasonal fluctuations in concentrations stabilize the semi-annual sampling will be reduced to annual. Sites M5, and M7 have been removed from the LTM Program due to no longer having groundwater RG exceedances. However, monitoring well MW124R continues to be sampled as an early warning well as for Site M6 as part of the LTM Program. Compliance monitoring wells MW115 and MW116 have been removed from LTM due to upgradient early warning wells with no RG exceedances. Cadmium was removed from analysis at early warning well MW123R beginning in fall 2010 due to no detections.

ATTACHMENT 5

SITE PHOTOGRAPHS

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PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site L1

Photo No. 1
(16-April-2013)

Description:

View west of gated entrance

Photo No. 2
(16-April-2013)

Description:

View south from Chicago Road showing sign restricting public access

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site L2

Photo No. 3
(16-April-2013)

Description:

View southwest of remediated area

Photo No. 4
(16-April-2013)

Description:

View northwest of remediated area

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites L2/L3

Photo No. 5
(16-April-2013)

Description:

Site L2; view west of remediated area

Photo No. 6
(16-April-2013)

Description:

Site L3; view south from Central Road showing perimeter fence and landfill

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site L3

Photo No. 7
(16-April-2013)

Description:

View east of landfill cap

Photo No. 8
(16-April-2013)

Description:

View southeast of landfill cap

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site L3

Photo No. 9
(16-April-2013)

Description:

View northwest of landfill cap and monitoring well

Photo No. 10
(16-April-2013)

Description:

View southwest of landfill cap

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites L3/L5

Photo No. 11
(16-April-2013)

Description:

Site L3; view north of Prairie Creek upstream of the site

Photo No. 12
(16-April-2013)

Description:

Site L5; view east of remediated area

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites L5/L9

Photo No. 13
(16-April-2013)

Description:

Site L5; view north of remediated area

Photo No. 14
(16-April-2013)

Description:

Site L9; view northeast showing site entrance

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites L11/L23A

Photo No. 15
(16-April-2013)

Description:

Site L11; view west of remediated area

Photo No. 16
(16-April-2013)

Description:

Site L23A; remediated area

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site M1

Photo No. 17
(16-April-2013)

Description:

View southwest of remediated area

Photo No. 18
(16-April-2013)

Description:

View southeast of remediated area

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites M2/M3

Photo No. 19
(16-April-2013)

Description:

Site M2; view northwest of remediated area

Photo No. 20
(16-April-2013)

Description:

Site M3; view south of remediated area

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site M6

Photo No. 21
(16-April-2013)

Description:

View west of remediated area

Photo No. 22
(16-April-2013)

Description:

View southwest of remediated area

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites M7/M11

Photo No. 23
(16-April-2013)

Description:

Site M7; view north of remediated area

Photo No. 24
(16-April-2013)

Description:

Site M11; view north of landfill and site entrance

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site M11

Photo No. 25
(16-April-2013)

Description:

View east of standing water at base of landfill

Photo No. 26
(16-April-2013)

Description:

View southwest of fence at landfill perimeter

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site M11

Photo No. 27
(16-April-2013)

Description:

View southeast showing landfill toe of slope (foreground) and wetlands (background)

Photo No. 28
(16-April-2013)

Description:

View north showing landfill cap and gas vents

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Sites M11/M13

Photo No. 29
(16-April-2013)

Description:

Site M11; view north of sign at landfill gate

Photo No. 30
(16-April-2013)

Description:

Site M13; view east of landfill cap and gas vent

PHOTOGRAPHIC RECORD
Joliet Army Ammunition Plant

Site M13

Photo No. 31
(16-April-2013)

Description:

View west of gate and sign at landfill entrance

Photo No. 32
(16-April-2013)

Description:

View north of landfill cap

ATTACHMENT 6

INTERVIEW RECORDS

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1. What is your overall impression of the project? **As a recipient of 455 acres of land for use as a landfill, we are pleased. The project has been a big success this far, with few issues. Our operator, Waste Management, has been very flexible to be ready whenever the Army or Forest Service needs to bring waste that meets the nonhazardous waste criteria.**

2. Do you feel well informed about the project activities and progress? **Yes.**

3. What affects have project operations had on the surrounding community? **I believe they have been positive. The community & the federal government are enjoying significant cost disposal savings, due to a local option to dispose of waste & the federal government paying $0 to dispose of their waste from JOAAP. The landfill has provided the County and local taxing bodies with a significant revenue source.**

4. Are you aware of any community concerns regarding the project or its operation and administration? **If so, please give details. No.**

5. Are you aware of any complaints being filed about the remediated sites and/or project? If so, was a response by your agency and/or company required? **No.**

6. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing or emergency responses from local authorities? If so, please give details. **No, however the Forest Service may know (since I understand they employ a security guard).**

7. Have there been any unusual or unexpected activities or occurrences at the site related to historical contamination or remediation activities? **None that I am aware of.**

8. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office/organization/company regarding historical contamination and remediation activities? **None related to remediation, however the IEPA, Waste Management & the County all inspect the site regularly.**

9. Have there been any instances or observations of contamination remaining at the site? **Nothing significant that I am aware of.**

10. Are you aware of any changes regarding, or concerns about, the institutional controls and/or access controls at the site? **No. We have a few deed restrictions, however they have not been altered since the deed was accepted.**

11. Are you aware of any projected land use changes within or surrounding the site? **If so, please give details. None.**

12. Do you have any comments, suggestions, or recommendations regarding the project management or operations? **Nothing at this time. Thank you for the opportunity to comment.**

Proposed individuals slated for interviews:

Dean Olson
Division Director
Will County Land Use
Resource Recovery & Energy Division
58 E. Clinton Street, Suite 500
Joliet, IL 60432
Phone: (815) 774-7891
Fax: (815) 722-3410
email: dolson@willcountygreen.com

Ms. Dolores Kaitschuck
Midewin Forest Service, Region 9
Midewin National Tallgrass Prairie
30239 S. State Route 53,
Wilmington, IL 60481
Phone: (815) 423-2161
Fax: 815/423-6376
Email: dkaitschuck@fs.fed.us

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ATTACHMENT 7

ARAR EVALUATION

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ARAR Evaluation

BACKGROUND

Section 121 (d)(2)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) specifies that remedial actions must meet federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. To-Be-Considered criteria (TBCs) are non-promulgated advisories and guidance that are not legally binding, but should be considered in determining the necessary level of cleanup for protection of human health or the environment.

The final remedy selected for the site was designed to meet all chemical-specific, action-specific, and location-specific ARARs and consider all TBCs. Chemical-specific ARARs are health- or risk-based numerical values for individually listed contaminants in specific media. Action-specific ARARs are technology- or activity-based limitations or requirements that are selected to accomplish a remedy. Location-specific ARARs are restrictions placed on the concentration of chemicals or conduct of operations based on the location of a site.

OBJECTIVE

This evaluation is prepared to address Question B of the statement of service, "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?"

Soil and groundwater are the environmentally-impacted media on the Joliet Army Ammunition Plant (JOAAP). Therefore, changes in standards (based upon chemical-specific ARARs) for both soil and groundwater identified in the 1998 and 2004 Records of Decision (RODs) were evaluated as part of this evaluation. Additionally, action- and location-specific ARARs were reviewed. The ARAR evaluation pertaining to these media are presented in the following sections.

CHEMICAL-SPECIFIC ARARs (Soil)

Table 5-1 of this report identifies RGs for contaminants of concern (COCs) in soil as listed in the 1998 and 2004 RODs. The only standard (chemical-specific ARAR) used to develop RGs for soil at JOAAP was for polychlorinated biphenyls (PCBs). As highlighted in Table A.7-1, all other soil RGs at JOAAP were developed using risk-based concentrations, which is the subject of the evaluation in Attachment 8.

The only chemical-specific ARAR used to develop RGs for soil at JOAAP was the Toxic Substances Control Act (TSCA) [40 CFR 761]. The 1998 ROD identifies PCB cleanup standards established under 40 CFR 761.120 (1997) for non-restricted access areas as 10 mg/kg (10 ppm); for all surface soil (top 10 inches of soil) is 1 mg/kg (1 ppm).

On June 29, 1998, the United States Environmental Protection Agency (USEPA) promulgated its PCB Mega Rule (40 CFR 761.61). The Mega Rule established PCB cleanup standards and procedures for soil and other PCB-contaminated material. The PCB cleanup standards for high occupancy areas under 40 CFR 761.61(a)(4)(i)(A), which are applicable for Soil Remedial Unit (SRU)-4 (PCBs in soil) sites (i.e., L1, L5, L7, L8, L9, L10, and L17) at JOAAP, are as follows:

"The cleanup level for bulk PCB remediation waste in high occupancy areas is ≤1 ppm without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations >1 ppm and ≤10 ppm shall be covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section."

The PCB standard for soil in the PCB Mega Rule is, therefore, more stringent than the RG-based value listed in 40 CFR 761.120 (1997) since PCBs between 1 and 10 ppm now require a cap to be protective.

This change in cleanup standard for PCBs in soil, based upon the 1998 promulgation of the PCB Mega Rule, does not affect protectiveness of the remedy for SRU-4 (PCBs in soil) sites at JOAPP. Post-remedial action confirmation samples collected from all SRU-4 sites indicated that residual PCBs met the 1ppm limit for unrestricted use, with the exception of one sample at Site L10, Transformer 3A-2 (1.4 mg/kg), and one sample at Site L7, Transformer 1-6 (1.1 mg/kg) (MWH 2001, MWH 2009).

Table 6-3 of the 1998 ROD indicated that PCBs were detected in excess of RGs at no further action (NFA) Site L6. PCBs in soil at Site L6 were remediated in 1997 to meet pre-1998 ROD RGs. The PCB RG used for remedial action was 1 ppm for surface soil (top 12 inches) and 10 mg/kg below. Since the PCB Mega Rule-based RG is more stringent (i.e. 1 ppm at all depths unless capped appropriately), the confirmation sample results (post-remedial action) were reviewed. Table 2.4 of the Final Report, U.S. Department of Defense Removal Action, L6/Group 70 Area (International Technology Corporation 1998) indicated that residual PCBs met the current 1 ppm RG with the exception of a 1.2 ppm detect in time critical unit number 5 (pit in Building 70-2). This slight exceedance of the PCB RG in soil does not affect the protectiveness of the soil remedy at Site L6.

CHEMICAL-SPECIFIC ARARs (Groundwater)

Table 6-1 of this report identifies RGs for COCs in groundwater as listed in the 1998 ROD. The ARAR-based RGs for groundwater were established as the IEPA Class I (35 IAC 620.410) and Class II (35 IAC 620.420) groundwater standards, as highlighted in Table A.7-1, for potable and industrial uses, respectively. When IEPA standards were not available, risk-based concentrations were developed and used as the RGs.

A review of toxicity and risk assessment methodology changes to risk-based groundwater RGs is included in Attachment 8. Although IEPA Class I (35 IAC 620.410c) and II (35 IAC 620.420c) groundwater standards were promulgated for explosives in October 2012, the evaluation regarding their protectiveness was based upon the 1998 ROD risk-based RGs and included in the risk assessment and toxicity evaluation in Attachment 8.

Table A.7-2 summarizes changes to the ARAR-based groundwater RGs since the 1998 ROD.

- IEPA Class I groundwater standards changed for two constituents; arsenic and 1,1-dichloroethane.
- The Class I groundwater standard for arsenic decreased from 50 µg/L to 10 µg/L since the 1998 ROD. Although the current Class I standard for arsenic is more stringent than the RG used for the 1998 ROD, this change does not affect the current or future protectiveness of the groundwater remedy. Arsenic is not a primary contaminant of concern in groundwater as listed in Table 4-1 of the 1998 ROD. In addition, arsenic has not been detected in Class I groundwater above the current IEPA Class I groundwater standard of 10 µg/L according to the *2011 Final Annual Groundwater Monitoring Report* (Toltest 2013).
- The Class I groundwater standard for 1,1-dichloroethane increased from 700 µg/L to 1,400 µg/L since the 1998 ROD. Since the current Class I standard for 1,1-dichloroethane is less stringent than that used for the 1998 ROD, this change does not affect the current or future protectiveness of the groundwater remedy.

IEPA Class II groundwater standards changed for three constituents; silver, 1,1-dichloroethane, and trichloroethene.

- The Class II groundwater RG for silver from the 1998 ROD was 511 µg/L. There is no standard for silver in the current list of IEPA Class II groundwater standards. This change does not affect the current or future protectiveness of the groundwater remedy.
- The Class II groundwater standard for 1,1-dichloroethane increased from 3,500 µg/L to 7,000 µg/L since the 1998 ROD. Since the current Class II standard for 1,1-dichloroethane is less stringent than that used for the 1998 ROD, this change does not affect the current or future protectiveness of the groundwater remedy.
- The Class II groundwater RG for trichloroethene from the 1998 ROD was 25 µg/L. There is no standard for trichloroethene in the current list of IEPA Class II groundwater standards. This change does not affect the current or future protectiveness of the groundwater remedy.

Changes listed above to the IEPA Class I (35 IAC 620.410) and Class II (35 IAC 620.420) groundwater standards since the 1998 ROD do not affect the current or future protectiveness of the groundwater remedy at JOAAP.

National Primary Drinking Water Regulations (40 CFR 141.61-62) are also applicable for Class I Groundwater in GRUs 2 and 3. Changes to these groundwater standards for applicable organic and inorganic compounds do not affect the current or future protectiveness of the groundwater remedy at JOAAP.

It should be noted that since groundwater management zones (GMZs), or three-dimensional areas containing groundwater being managed to mitigate impairment according to the Illinois Administrative Code (IAC), were established for each groundwater OU site identified in the 1998 ROD, alternative groundwater standards (35 IAC 620.450) are applicable to all groundwater COCs within the GMZ. Therefore, if, after completion of the groundwater remedy of monitored natural attenuation, the standard to release COCs in groundwater can exceed Class I or II groundwater quality standards if:

- To the extent practical, the exceedance has been minimized and beneficial use has been returned
- Any threat to public health or the environment has been minimized

It was determined that surface water does not pose a risk to health and the environment; therefore, it is not addressed further as a contaminated media. However, groundwater may discharge to surface water and cause localized detections of COCs in surface water under certain conditions at some sites within the Groundwater Operable Unit (OU). In order to protect surface water bodies (Prairie Creek, Jackson Creek, and Grant Creek) at JOAAP, surface water in these groundwater discharge areas must comply with Illinois Water Quality Standards (35 IAC 302, Subparts B (General Water Quality Standards) and D (Secondary Contact and Indigenous Aquatic Life Standards)) for the chemical COCs in groundwater. Groundwater discharge to surface water occurs at GRU 1 (explosives in groundwater) Sites L1, L2, and L3 and GRU 2 (explosives and other contaminants in groundwater) Site M1.

Table 5-16 of the 1998 ROD identifies primary groundwater COCs from GRU 1 Sites L1, L2, and L3 as explosives; 1,3,5-TNB, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, and RDX. Table 5-18 of the 1998 ROD identifies the primary groundwater COC from GRU 1 Site M1 as 2,6-DNT. Sulfate was added to the list of primary groundwater COCs for Site M1 in the *Explanation of Significance Difference Site M1 – Southern Ash Pile* (USACE 2003).

Current Illinois Water Quality Standards (35 IAC 302) (effective on May 16, 2013 for Subpart B and May 24, 1996 for Subpart D) vary from ARAR-based concentrations listed in Table 10-1 of the 1998 ROD (for the primary groundwater COCs listed above) as shown in the Assessment of ARAR-Based Water Quality Standards located in Table A7-3.

Illinois water quality standards changed for two of the primary COCs in groundwater at GRU 1 Sites L1, L2, and L3 and GRU 2 Site M1; 1,3,5-TNB and 2,4-DNT.

- The Illinois water quality standard for 1,3,5-TNB increased from 15 µg/L to 30 µg/L since the 1998 ROD. However, this standard was not calculated according to the regulations due to limited data. Therefore, this value should be used for advisory purposes such as establishing "reasonable potential". Since the current standard for 1,3,5-TNB is less stringent than that used for the 1998 ROD, this change does not affect the current or future protectiveness of the groundwater remedy.
- The Illinois water quality standard for 2,4-DNT decreased from 330 µg/L to 320 µg/L since the 1998 ROD. The IEPA-Derived Water Quality Criteria (updated on April 4, 2013) for 2-4 DNT is slightly more stringent than the water quality standard listed in Table 10-1 of the 1998 ROD. Since there is no numeric standard for 2,4-DNT in 35 IAC 302, IEPA derived a water quality criterion to protect aquatic life. This does not impact current or future protectiveness of surface water bodies at GRU 1 Site L1, where 2,4-DNT is a primary COC in groundwater, since the current concentrations of 2,4-DNT in groundwater and surface water are well below the IEPA-derived water quality standard of 320 µg/L, according to the *2011 Final Annual Groundwater Monitoring Report* (Toltest, 2013).

Changes listed above to the Illinois Water Quality Standards (35 IAC 302, Subparts B and D) since the 1998 ROD do not affect the current or future protectiveness of the groundwater remedy at JOAAP.

ACTION-SPECIFIC ARARs (Soil)

Action-specific ARARs for soil are listed in Section 10.2.1.2 of the 1998 ROD and Section 11.2.1 of the 2004 ROD. As shown in Table A.7-1, a majority of the activity-based limitations or requirements selected to accomplish a remedy (action-specific ARARs) no longer apply since JOAAP is in the operation and maintenance phase and no further federal remedial actions are anticipated. A summary of the remaining active action-specific ARARs for the Soils OU at JOAPP (i.e. currently required for the protectiveness of the Soil OU remedy) is discussed below.

Action-Specific ARARs (Site M13):

Site M13 contains an 8-acre former gravel pit that was filled with a variety of non-hazardous industrial debris and wastes. Soil contaminants of concern include beryllium, lead, and benzo(a)pyrene. No RCRA hazardous waste was identified at Site M13. The selected soil remedy for the SRU-6 Site M13 outlined in the 1998 ROD was the construction of a RCRA Subtitle D cap over the waste fill area to minimize infiltration or precipitation and to also prevent human exposure to contaminated materials in the landfills. In addition, security fencing with warning signs would be installed around the perimeter of the site. A post-closure long-term monitoring (groundwater) and long-term operation (maintenance/repair) program would be established to monitor the M13 landfill. Lastly, legal restrictions on uncontrolled excavation and land use to minimize human contact with landfill materials will be specified in the deed for the M13 landfill.

Post-closure requirements to ensure the protectiveness of the soils remedy for Site M13 are mandated by the following action-specific ARARs:

- Standards for New Solid Waste Landfills: Post closure Maintenance [35 IAC 811.111]
    - Long-term care of the RCRA Subtitle D (non-hazardous waste) landfill cap includes quarterly inspections of the cap, vegetation, and drainage structures for the first 5 years and annual inspections for an additional 10 years.
- Standards for New Solid Waste Landfills: Groundwater Monitoring Programs [35 IAC 811.319]
    - Long-term groundwater monitoring requirements for the RCRA Subtitle D (non-hazardous waste) landfill for 15 years after completion of closure.
- Tiered Approach to Corrective Action Objectives: Institutional Controls [35 IAC 742.1000-1015]
    - Institutional control requirements since remediation objectives for Site M13 are based upon the functioning of an engineered barrier.

The SRU-6 remedy at Site M13 is required to comply with the post-closure, action-specific ARARs listed above to prevent human exposure to these wastes, and to prevent potential migration of contaminants from these areas into the groundwater. There have been no changes

to requirements of these action-specific ARARs that would impact the protectiveness of the remedy.

Action-Specific ARARs (Sites L3 and M11):

Site L3 is a demolition area that includes large quantities of buried waste materials in berms along Prairie Creek that are contaminated with lead, chlordane, 2,6-DNT and phosphate above the RGs. The Site L3 contains unexploded ordnance, which are classified as RCRA characteristic wastes (RCRA waste code D003) because of their reactivity.

Site M11 is a large 70-acre former gravel pit that was filled with construction debris and other materials contaminated with arsenic and lead above the RGs. RCRA characteristic hazardous waste is present at Site M11 in the form of TCLP-extractable lead.

The selected soil remedy for the SRU-6 Sites L3 and M11 outlined in the 1998 ROD was the construction of a RCRA Subtitle C cap over the waste fill area to minimize infiltration or precipitation and to also prevent human exposure to contaminated materials in the landfills. In addition, security fencing with warning signs would be installed around the perimeter of the site.

A post-closure long-term monitoring (groundwater) and long-term operation (maintenance/repair) program would be established to monitor the L3 and M11 landfills. Lastly, legal restrictions on uncontrolled excavation and land use to minimize human contact with landfill materials will be specified in the deed for the L3 and M11 landfills.

Post-closure requirements to ensure the protectiveness of the SRU-6 soils remedy for Sites L3 and M11 are mandated by the following action-specific ARARs:

- Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities: Closure and Post-Closure Care [35 IAC 724.216, .217, and .219]
    - Long-term care of the RCRA Subtitle C (hazardous waste) landfill cap includes quarterly inspections of the cap, vegetation, and drainage structures for the first 5 years and annual inspections for an additional 25 years.
- Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities: Releases from Solid Management Units [35 IAC 724.190 et seq.]
    - Long-term groundwater monitoring requirements for the RCRA Subtitle C (hazardous waste) landfill for 30 years after completion of closure.
- Tiered Approach to Corrective Action Objectives: Institutional Controls [35 IAC 742.1000-1015]
    - Institutional control requirements since remediation objectives for Sites L3 and M11 are based upon the functioning of an engineered barrier.

The soil remedy at Sites L3 and M11 is required to comply with the post-closure, action-specific ARARs listed above to prevent human exposure to these wastes, and to prevent potential migration of contaminants from these areas into the groundwater. There have been no changes to requirements of these action-specific ARARs that would impact the protectiveness of the remedy.

It should be noted that the soil remedy implemented for the remaining SRU-6 (Landfill) Sites (L4, M1, and M9) was excavation and off-site disposal. Therefore, no further ARAR-based protectiveness requirements are warranted for these sites.

ACTION-SPECIFIC ARARs (Groundwater)

Action-specific ARARs for groundwater are listed in Section 10.2.2.2 of the 1998 ROD. As shown in Table A.7-1, a majority of the activity-based limitations or requirements selected to accomplish a remedy (action-specific ARARs) no longer apply since JOAAP is in the operation and maintenance phase and no further federal remedial actions are anticipated. A summary of the remaining active action-specific ARARs for the Groundwater OU at JOAPP (i.e. currently required for the protectiveness of the Groundwater OU remedy) is discussed below.

Action-Specific ARARs (GRUs 1, 2, and 3):

Groundwater management zones (GMZs) were established for each groundwater OU site identified in the 1998 ROD (i.e. GRUs 1, 2, and 3). These GMZs were designed to mitigate impairment to groundwater according to the Illinois Administrative Code. The monitoring and analytical requirements in 35 IAC 620.510 are action-specific groundwater ARARs. This state regulation states that representative samples shall be taken from locations as specified in a corrective action process for sites within GMZs and specifies sampling and analytical procedures and reporting requirements that must be followed.

ACTION-SPECIFIC ARARs (Soil and Groundwater)

Action-Specific ARARs (All SOU and GOU Sites and No Further Action Sites L6 and M16):

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Hazardous Substance Response [40 CFR 300.430] indicates that institutional controls should be used to prevent or limit exposure to hazardous substances, pollutants, or contaminants. This regulation is applicable to all SOU and GOU Sites and No Further Action Sites L6 and M16 since institutional controls were included as a component of the remedies at these sites. Institutional controls will be continued for these sites until concentrations of hazardous substances are reduced to levels that allow doe UU/UE and regulatory agreement is reached.

Action-Specific ARARs (All SOU and GOU Sites and No Further Action Sites L6 and M16):

The Tiered Approach to Corrective Action Objectives: Institutional Controls [35 IAC 742.1000-1015] states:

"Institutional controls in accordance with this Subpart must be placed on the property when remediation objectives are based on any of the following assumptions:

1) *Industrial/Commercial property use*
2) *Target cancer risk greater than 1 in 1,000,000*
3) *Target hazard quotient greater than 1*
4) *Engineered barriers*
5) *The point of human exposure is located at a place other than at the source*

6) *Exclusion of exposure routes*
7) *A diffusion only mode of contaminant transport for the indoor inhalation exposure route*
8) *Use of an indoor inhalation building control technology*
9) *For the indoor inhalation exposure route, the presence of a building with a full concrete slab-on-grade or a full concrete basement floor and walls, or*
10) *Any combination of the above."*

This regulation is applicable to SRU-6 (Landfill) Sites L3, M11, and M13 since remediation objectives were based upon the assumption of engineered barriers. This regulation is also applicable to all SOU sites where industrial/commercial land use was assumed (Sites L6, L11, L16, L17, M5, M6, M7, M8, M9, M13, and M16). This regulation is not applicable to sites transferred to the United States Department of Agriculture (USDA) (Sites L1, L2, L3, L4, L5, L7, L8, L9, L10, L14, L23A, M1, M2, M3, M4, M11, and M12) for use as the Midewin National Tallgrass Prairie since an ecological/recreational (not industrial/commercial) land use was assumed. However, this regulation is relevant and appropriate for these sites since 35 IAC 742.1012 specifically addresses the transfer of Federal land requiring land use restrictions to another Federal agency.

LOCATION-SPECIFIC ARARs (Soil and Groundwater)

Location-specific ARARs for JOAAP are listed in Sections 10.2.1.3 (soil) and 10.2.2.3 (groundwater) of the 1998 ROD and Section11.2.2 (soil) of the 2004 ROD. As shown in Table A.7-1, a majority of the location-specific ARARs, although they remain applicable to JOAPP, are not required to ensure the protectiveness of the soil remedy. The only exception is land use restrictions mandated by the Illinois Land Conservation Act of 1995.

In accordance with the Illinois Land Conservation Act of 1995, P.L. 104-106, Div. B, Title 29, Feb 10, 1996, the US Army will transfer JOAAP land to various Federal, state, and local jurisdictions as follows:

- USDA (Sites L1, L2, L3, L4, L5, L7, L8, L9, L10, L14, L23A, M1, M2, M3, M4, M11, and M12)
- Department of Veterans Affairs
- Will County, Illinois (Site L6)
- State of Illinois (Sites L11, L16, L17, M5, M6, M7, M8, M9, and M13)

Land use restrictions to protect human health and the environment will ensure land use is consistent with the requirements of the Illinois Land Conservation Act of 1995 as follows. Formal deeds were not recorded for JOAAP property transferred to another federal Agency (i.e. USDA), however, applicable land use restrictions are included in US Army conveyance documents (Environmental Condition of Property and Letters of Assignment) and incorporated into the USDA official land management plan for the site; the Prairie Plan and amendments.

- USDA to establish the Midewin National Tallgrass Prairie – cannot be used for industrial or residential use
- Department of Veterans Affairs to establish a Veteran's Cemetery
- Will County, Illinois to establish the municipal Will County Landfill

- State of Illinois to establish industrial parks - cannot be used for residential use

ARAR EVALUATION CONCLUSIONS

There are no new or modified ARARs that would affect the cleanup levels or current or future protectiveness of the soils or groundwater remedies at JOAPP. All remedial action of the SOU and GOU are complete and JOAAP is in the operation and maintenance phase. No further federal remedial actions of the SOU or GOU are anticipated.

A summary of the remaining active ARARs for the SOU and GOU at JOAPP (i.e. currently required for the protectiveness of the SOU and GOU remedies) are as follows and listed in Table A.7-1.

Chemical-Specific ARARs

SOU Sites:

- Toxic Substances Controls Act (TSCA) [40 CFR 761] for SRU-4 Sites

GOU Sites:

- Groundwater Quality Standards for Class I (35 IAC 620.410) and Class II (35 IAC 620.420) Groundwater at GRUs 2 and 3
- National Primary Drinking Water Regulations (40 CFR 141.61-62) for Class I Groundwater in GRUs 2 and 3
- Alternative Groundwater Quality Standards (35 IAC 620.450) for GRUs 1, 2, and 3

Action-Specific ARARs

SOU Sites:

- Standards for New Solid Waste Landfills [35 IAC 811] for SRU-6 Site M13
- Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities [35 IAC 724] for SRU-6 Sites L3 and M11

SOU and GOU Sites:

- Tiered Approach to Corrective Action Objectives [35 IAC 742] for institutional controls at all SOU and GOU Sites and No Further Action Sites L6 and M16
- NCP Hazardous Substance Response (40 CFR 300.430) for institutional controls at all SOU and GOU Sites and No Further Action Sites L6 and M16

Location-Specific ARARs

SOU and GOU Sites:

- Illinois Land Conservation Act [Public Law 104-106, Title 29 (US Congress 1996)] stipulating land use for sites that have been transferred or planned to be transferred to the:

- USDA (Sites L1, L2, L3, L4, L5, L7, L8, L9, L10, L14, L23A, M1, M2, M3, M4, M11, and M12) to establish the Midewin National Tallgrass Prairie – cannot be used for industrial or residential use
- Department of Veterans Affairs to establish a Veteran's Cemetery
- Will County, Illinois (Site L6) to establish the municipal Will County Landfill
- State of Illinois (Sites L11, L16, L17, M5, M6, M7, M8, M9, and M13) to establish industrial parks - cannot be used for residential use

Table A7-1
ARARs FOR THE JOLIET ARMY AMMUNITION PLANT (JOAAP)

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Chemical-Specific ARARs[1]				
Soil Operable Unit				
Toxic Substances Control Act (TSCA) 40 CFR 761.125	Soil contaminated by the spill will be decontaminated to 10 ppm PCBs by weight provided that soil is excavated to a minimum depth of 10 inches. The excavated soil will be replaced with clean soil, i.e., containing less than 1 ppm PCBs, and the spill site will be restored (e.g., replacement of turf). TSCA applies to spills that occur after May 4, 1987.	Relevant and Appropriate	Soil Remedial Unit (SRU) 4 (PCBs in Soil) Sites L1, L5, L7, L8, L9, L10, and L17	Not applicable since PCB spills likely occurred prior to May 4, 1987. Relevant and appropriate to establish cleanup goals for PCBs in soil.
TSCA 40 CFR 761.61	The cleanup level for bulk PCB remediation waste in high occupancy areas is ≤1 ppm without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations >1 ppm and ≤10 ppm shall be covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section. TSCA applies to spills that occur after May 4, 1987.	Relevant and Appropriate	Soil Remedial Unit (SRU) 4 (PCBs in Soil) Sites L1, L5, L7, L8, L9, L10, and L17	Not applicable since PCB spills likely occurred prior to May 4, 1987. Relevant and appropriate to establish cleanup goals for PCBs in soil.

[1] Cleanup goals for the remainder of the contaminants of concern for the Soil Operable Unit (OU) at JOAAP were developed using a risk-based (not ARAR-based) approach.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Chemical-Specific ARARs[2]				
Groundwater Operable Unit				
Groundwater Quality Standards for Class I: Potable Resource Groundwater 35 IAC 620.410	Groundwater quality standards for inorganic chemicals (620.410 a), organic chemicals (620.410 b), and complex organic chemical mixtures (620.410 d)	Applicable	<u>GRU 2 – Sulfate, Volatile Organic Compounds (VOCs), and Metals</u> Sites M1, M5, M6, M7, M8, and M13 <u>GRU 3 - VOCs</u> Sites M3 and M10 (Western and Central)	Class I and II groundwater standards are potentially applicable to contaminants of concern (COCs) present in the Silurian Dolomite (shallow bedrock) and glacial drift/till (shallow overburden) aquifers, respectively. These standards are applicable if, after completion of the groundwater remedy of monitored natural attenuation, the concentrations of COCs in groundwater (as determined by groundwater monitoring) are less than or equal to these standards. Otherwise, the standards will be modified in accordance with substantive requirements in 35 IAC 620.450.
Groundwater Quality Standards for Class II: General Resource Groundwater 35 IAC 620.420	Groundwater quality standards for inorganic chemicals (620.420 a), organic chemicals (620.420 b), and complex organic chemical mixtures (620.410 d)	Applicable		

[2] Class I (35 IAC 620.410) and Class II (35 IAC 620.420) groundwater quality standards were used as the remediation goals (RGs) for potable and industrial uses, respectively. Current Class I and II groundwater quality standards (effective on October 5, 2012) vary from ARAR-based concentrations listed in Table 6-2 of the 1998 ROD as shown in the Assessment of ARAR-Based Groundwater RGs located in Table A7-2. When standards were not available (e.g., for explosives), risk-based concentrations (RBCs) were developed and used as the RGs. The RBC calculations assumed that groundwater would be used by an industrial worker/park employee and used the 1×10^{-6} level for carcinogens and 1.0 level for non-carcinogens.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Chemical-Specific ARARs (continued)				
Groundwater Operable Unit				
Alternative Groundwater Quality Standards 35 IAC 620.450	Alternative groundwater quality standards for chemical constituents within groundwater management zones (GMZs).	Applicable	GRU 1 - Explosives Sites L1, L2, L3, and L4 GRU 2 – Explosives and Other Contaminants Sites M1, M5, M6, M7, M8, and M13 GRU 3 – VOCs Sites M3 and M10 (Western and Central)	GMZs for both the overburden and shallow bedrock (Silurian Dolomite) aquifers were established for each Groundwater OU site identified in the 1998 ROD. Therefore, these standards are applicable to all groundwater COCs in GRUs 1, 2, and 3.
General Use and Secondary Contact and Indigenous Aquatic Life Water Quality Standards 35 IAC 302 Subparts B and D[3]	General use (Subpart B) and secondary contact and indigenous aquatic life (Subpart D) water quality standards for chemical constituents.	Relevant and Appropriate	Surface Water Discharge from: GRU 1 - Explosives Sites L1, L2, and L3 GRU 2 – Explosives and Other Contaminants Site M1	Not applicable since surface water was determined to pose no unacceptable risk to human health and the environment. Relevant and appropriate for surface water at GRU sites where there is a potential for contaminated groundwater to discharge to surface water.

[3] Water quality standards were used to protect surface water bodies (Prairie Creek, Jackson Creek, and Grant Creek) from contaminants discharging from shallow groundwater at JOAAP. Groundwater discharge to surface water occurs at Sites L1, L2, L3, and M1. Current water quality standards (effective on October 5, 2012) for primary groundwater contaminants at these sites vary from ARAR-based concentrations listed in Table 10-1 of the 1998 ROD as shown in the Assessment of ARAR-Based Water Quality Standards located in Table A7-3.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Chemical-Specific ARARs (continued)				
Groundwater Operable Unit				
National Primary Drinking Water Regulations: Maximum Contaminant Level Goals and Maximum Residual Disinfectant Level Goals 40 CFR 141.61-62	Health-based standards (maximum contaminant levels or MCLs) for organic (141.61) and inorganic (141.62) contaminants in public drinking water systems.	Relevant and Appropriate	GRU 2 – Explosives and Other Contaminants Sites M1, M5, M6, M7, M8, and M13 GRU 3 - VOCs Sites M3 and M10 (Western and Central)	Relevant and appropriate for groundwater contaminants of concern in the Silurian Dolomite (also known as the shallow bedrock aquifer). MCLs for Relevant Organics in Class I Groundwater: Benzene (5 µg/L) Chlorobenzene (100 µg/L) Ethylbenzene (700 µg/L) Tetrachloroethene (5 µg/L) Toluene (1,000 µg/L) Trichloroethene (5 µg/L) Xylenes (10,000 µg/L) MCLs for Relevant Inorganics in Class I Groundwater: Antimony (6 µg/L) Arsenic (10 µg/L) Cadmium (5 µg/L) Chromium (100 µg/L) Nitrate/Nitrite (10,000 µg/L)

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Action-Specific ARARs[4]				
Soil Operable Unit				
Standards For Owners And Operators Of Hazardous Waste Treatment, Storage, And Disposal Facilities: Closure and Post-Closure Care 35 IAC 724.216, 35 IAC 724.217, and 35 IAC 724.219	Long-term care requirements for RCRA Subtitle C (hazardous waste) landfill caps including maintenance, groundwater monitoring, security requirements, and institutional controls for 30 years after completion of closure.	Applicable	SRU 6 (Landfills) Sites L3 and M11	Long-term care of the landfill cap includes quarterly inspections of the cap, vegetation, and drainage structures for the first 5 years and annual inspections for the remaining 25 years. Additionally, long-term care requires a groundwater monitoring program, engineering controls (fencing), and land use restrictions to avoid disturbance of the landfills.
Standards For Owners And Operators Of Hazardous Waste Treatment, Storage, And Disposal Facilities: Releases from Solid Management Units 35 IAC 724.190 et seq.	Long-term care groundwater monitoring requirements for RCRA Subtitle C (hazardous waste) landfill caps for 30 years after completion of closure.	Applicable	SRU 6 (Landfills) Sites L3 and M11	Long-term groundwater monitoring requirements for the RCRA Subtitle C landfill are detailed in the *Long Term Monitoring Plan* (Toltest 2010) and changes to the program are captured in annual groundwater monitoring reports.

[4] Additional action-specific ARARs were identified in the 1998 and 2004 Records of Decision (RODs) for the Soil OUs at JOAAP. Since all remedial action for the soil OUs are complete (i.e. this site is in the operation and maintenance phase), these additional action-specific ARARs are no longer relevant to this site.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Action-Specific ARARs (continued)				
Soil Operable Unit				
Standards For New Solid Waste Landfills: Postclosure Maintenance 35 IAC 811.111	Long-term care maintenance requirements for RCRA Subtitle D (non-hazardous waste) landfill caps for 15 years after completion of closure.	Applicable	SRU 6 (Landfills) Site M13	Long-term care of the RCRA Subtitle D landfill cap includes quarterly inspections of the cap, vegetation, and drainage structures for the first 5 years and annual inspections for an additional 10 years.
Standards For New Solid Waste Landfills: Groundwater Monitoring Programs 35 IAC 811.318 and 35 IAC 811.319(a)	Long-term care groundwater monitoring requirements for RCRA Subtitle D (non-hazardous waste) landfill caps for 15 years after completion of closure.	Applicable	SRU 6 (Landfills) Site M13	Long-term groundwater monitoring requirements for the RCRA Subtitle D landfill are detailed in the *Long Term Monitoring Plan* (Toltest 2010) and changes to the program are captured in annual groundwater monitoring reports.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Action-Specific ARARs (continued)				
Soil and Groundwater Operable Units				
Tiered Approach to Corrective Action Objectives (TACO): Institutional Controls 35 IAC 742.1000-1015	Institutional controls in accordance with this Subpart must be placed on the property when remediation objectives are based on any of the following assumptions: 1) Industrial/Commercial property use; 2) Target cancer risk greater than 1 in 1,000,000; 3) Target hazard quotient greater than 1; 4) Engineered barriers; 5) The point of human exposure is located at a place other than at the source; 6) Exclusion of exposure routes; 7) A diffusion only mode of contaminant transport for the indoor inhalation exposure route; 8) Use of an indoor inhalation building control technology; 9) For the indoor inhalation exposure route, the presence of a building with a full concrete slab-on-grade or a full concrete basement floor and walls; or 10) Any combination of the above.	Applicable for some SOU/GOU Sites Relevant and Appropriate for other SOU/GOU Sites	<u>Applicable to engineered barrier sites</u>: SRU 6 (Landfills): Sites L3, M11, and M13 <u>Applicable to industrial/commercial property use sites</u>: SOU Sites: L6, L11, L16, L17, M5, M6, M7, M8, M9, M13, and M16 GOU Sites: M5, M6, M7, M8, M10, and M13 <u>Relevant and appropriate for transfer of Federal property for eco/prairie land use:</u> SOU Sites: L1, L2, L3, L4, L5, L7, L8, L9, L10, L14, L23A, M1, M2, M3, M4, M11, and M12 GOU Sites: L1, L2, L14, M1, M3, and M10	Applicable to SRU 6 sites (L3, M11, and M13) since remediation objectives were based on the assumption of engineered barriers. Applicable to SOU sites where industrial/commercial property use was assumed (Sites L6, L11, L16, L17, M5, M6, M7, M8, M9, M13, and M16). Applicable to GOU Sites where industrial/commercial property use was assumed (Sites M5, M6, M7, M8, M10, and M13). Not applicable to transfer of Federal Property for eco/prairie purposes since industrial/ commercial property use is not assumed. However, relevant and appropriate for these sites since 35 IAC 742.1012 applies to Federally owned property where land use controls are placed via a memorandum of understanding. Land use restrictions for property that was transferred from the U.S. Army to the USDA/FS were incorporated into the USDA/FS official land management plan for the site (The Prairie Plan) and amendments.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Action-Specific ARARs				
Soil and Groundwater Operable Units				
National Oil and Hazardous Substances Pollution Contingency Plan (NCP): Hazardous Substance Response 40 CFR 300.430(a)(1)(iii)(D)	EPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances, pollutants, or contaminants.	Applicable	SRU 1 (Explosives) Sites L1, L2, L7, L8, L9, L10, L14, L16, M2, M3, M5, M6, and M7 SRU 2 (Metals) Sites L2, L3, L5, L11, L23A, M3, M4, and M12 SRU 3 (Explosives and Metals) Sites L2, L3, M3, M5, and M6 SRU 5 (Organics) Sites L1, and L5 SRU 6 (Landfills) Sites L3, L4, M1, M9, and M11 SRU 7 (Sulfur) Sites M8, M12, and M13 No Further Action Sites L6 and M16 All GOU Sites: Sites L1, L2, L3, L14, M1, M3, M5, M6, M7, M8, M10 (Western & Central) and M13	Applicable since intuitional controls were included as part of the long-term remedies and are required to ensure their protectiveness. The selected remedial goals (RGs) and remedial action objectives for the soil OU at JOAAP were designed to be protective of human and ecological receptors based on the intended land use, and were not intended for unlimited exposure and unrestricted use scenarios. The chosen remedy of monitored natural attenuation (MNA) for the groundwater OU relies on institutional controls prohibiting the withdrawal and consumption of contaminated groundwater until contaminant concentrations achieve RGs at points of compliance. While property remains in active Army ownership, the Army will be responsible for maintaining institutional controls. After transfer, the responsibility of ensuring the property meets land use performance objectives will shift to the new property owner(s) or user(s). Note: Institutional controls are not required for SRU-4 (PCBs in soil) since the unrestricted use cleanup level of 1 ppm (1 mg/kg) for total PCBs under 40 CFR 761.61 was used during remedial action.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Action-Specific ARARs[5]				
Groundwater Operable Unit				
Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites USEPA OSWER Directive 9200.4-17P (April 1999)	EPA policy regarding the use of monitored natural attenuation (MNA) for the remediation of contaminated soil and groundwater at sites administered by USEPA's Office of Solid Waste and Emergency Response (OSWER)	To Be Considered Guidance	All Groundwater OU Sites	Not an ARAR since it's a policy, and not a regulation. To be considered for the long-term remedy of MNA for groundwater OU sites.
Groundwater Quality: Monitoring and Analytical Requirements 35 IAC 620.510	States that representative samples shall be taken from locations as specified in a corrective action process for sites within the groundwater management zone (GMZ) and specifies sampling and analytical procedures and reporting requirements that must be followed.	Applicable	All Groundwater OU Sites	Applicable since the establishment of a GMZ (per 35 IAC 620.250) and groundwater monitoring were included as part of the long-term remedy for the Groundwater OU Sites and are required to ensure their protectiveness.

[5] Additional action-specific ARARs were identified in the 1998 Record of Decision (ROD) for the Groundwater OUs at JOAAP. Since this site is in the operation and maintenance phase, these additional action-specific ARARs are no longer relevant to this site.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs				
Illinois Land Conservation Act of 1995 Title XXIX of Public Law 104-106, Div. B, Title 2901-2932, Feb. 10, 1996	Stipulates the conversion of Joliet Army Ammunition Plant land to 1) the United States Department of Agriculture to establish the Midewin National Tallgrass Prairie, 2) the Department of Veterans Affairs to establish a Veteran's Cemetery, 3) Will County, Illinois to establish the Will County Landfill, and 4) the State of Illinois to establish industrial parks.	Applicable	Applicable to all JOAAP sites transferred to the USDA/FS - Sites L1, L2, L3, L4, L5, L7, L8, L9, L10, L14, L23A, M1, M2, M3, M4, M11, and M12, Department of Veterans Affairs, Will County, Illinois – Site L6, and State of Illinois - Sites L11, L16, L17, M5, M6, M7, M8, M9, and M13.	Deed restrictions are applicable to protect human health and the environment by ensuring land use is consistent with the requirements of the Illinois Land Conservation Act of 1995 (i.e. USDA – Midewin National Tallgrass Prairie, Department of Veterans Affairs – Veteran's cemetery, Will County – County landfill, and State of Illinois – industrial parks).
Migratory Bird Treaty Act 16 USC 703-711	Establishes federal responsibility for the protection of the international migratory bird resources and requires consultation with the United States Fish and Wildlife Service to ensure that proposed actions do not unnecessarily impact migratory birds.	To Be Considered Guidance	All JOAAP Sites	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact migratory birds. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to protect all migratory birds; such as the endangered Upland Sandpiper that utilize the habitat at JOAAP.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs(continued)				
Endangered Species Act of 1973 16 USC § 1531 et seq. 50 CFR Parts 17, 402 Illinois Endangered Species Protection Act 520 ILCS 10/2, 10/3, 10/5.5, 10/7 17 IAC 1010.30, 1050.30, 1070, 1080 et seq. Illinois Endangered Species Protection Act, Illinois Department of Natural Resources 17 USC 1075	Requires that federal agencies ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify critical habitat. Requirements associated with the taking of animal, animal product, plant, or plant product unless in compliance with an approved conservation plan developed according to the pertinent requirements of 17 IAC 1080 et seq. Identifies the official list of Illinois endangered and threatened fauna and flora as adopted by the Illinois Endangered Species Protection Board. Consultation procedures for assessing impacts of agency actions on endangered and threatened species and natural areas.	To Be Considered Guidance	All JOAAP Sites	Not applicable since JOAAP is in the operation and maintenance phase and no future federal remedial actions are anticipated that would jeopardize threatened or endangered species or their habitat. Not relevant and appropriate since compliance with these regulations are not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered for the protection of the leafy prairie clover *(Dalea foliosa)*, federally endangered plant; for the protection of the Upland Sandpiper *(Bartramia longicauda)*, state-listed endangered bird of Illinois; and for the protection of several species classified as endangered, sensitive, or watch list species by the state of Illinois that have been identified at JOAAP.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs(continued)				
Protection of Wetlands - Executive Order 11990 40 CFR § 6.302(a) and 40 CFR § 6 Appendix A	Requires Federal agencies conducting certain activities to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists.	To Be Considered Guidance	All JOAAP Sites where wetlands are present	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact wetlands. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to minimize or avoid activity that adversely affects wetlands on JOAAP.
Floodplain Management - Executive Order 11988 40 CFR § 6.302(b) and 40 CFR § 6 Appendix A	Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.	To Be Considered Guidance	All JOAAP Sites in the 100-year floodplain	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact the 100-year floodplain. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to minimize or avoid activity that adversely affects the 100-year floodplain on JOAAP.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs(continued)				
National Historic Preservation Act of 1966 16 USC 470 et seq.	Establishes procedures to provide for preservation of scientific, historical, and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally-licensed activity or program on properties listed on or eligible for listing on the National Register of Historic Places.	To Be Considered Guidance	All JOAAP Sites	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact the historical significance of JOAAP. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to preserve JOAAP's historical significance as one of the first munitions facilities established in the United States after the outbreak of World War II in Europe. Its TNT manufacturing buildings represent the first of widely used industrial process, and are a highly intact historic-engineering type.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs(continued)				
Fish and Wildlife Coordination Act 16 USC § 661 et seq.	Requires coordination with the United States Fish and Wildlife Service when Federal actions result in the control or modification of a natural stream or body of water.	To Be Considered Guidance	All JOAAP sites near Prairie Creek, Kemery Lake, and Grant Creek	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact fish and wildlife resources at JOAAP. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to protect fish and wildlife resources in Prairie Creek, Kemery Lake, and Grant Creek.
Section 404 of the Clean Water Act 40 CFR Part 230 33 CFR Parts 320-330	Regulates the discharge of dredged or fill material into waters (including wetlands) of the United States.	To Be Considered Guidance	All JOAAP sites where wetlands are present	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact nearby water bodies, including wetlands. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to protect surface waters and wetlands.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs(continued)				
Native American Graves Protection and Repatriation Act 25 USC §3001, et seq. 43 CFR 10	Prioritizes ownership or control over Native American cultural items, including human remains, funerary objects and sacred objects, excavated or discovered on Federal or tribal lands.	To Be Considered Guidance	All JOAAP sites	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact Native American cultural items. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to protect the over 61 reported Native American archaeological sites located on JOAAP.
Archeological Resources Protection Act 16 USC 470aa-470mm	Prohibits unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources located on public lands unless such action is conducted pursuant to a permit.	To Be Considered Guidance	All JOAAP Sites	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact archeological resources at JOAAP. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to preserve archaeological resources at JOAAP.

Regulation(s)	Requirement(s)	ARAR Status	Compliance	Analysis
Location-Specific ARARs(continued)				
Section 10 of the Rivers and Harbors Act of 1899 33 USC 403, 33 CFR 320-330	Requires a permit for structures or work in or affecting navigable waters.	To Be Considered Guidance	All JOAAP Sites near navigable waters	Not applicable since no future federal remedial actions on JOAAP are anticipated that would impact navigable waters near JOAAP. Not relevant and appropriate since compliance with this regulation is not required to ensure the protectiveness of the remedy for the soil and/or groundwater OU(s). To be considered to protect navigable waters near JOAAP.

Table A7-2

ASSESSMENT OF ARAR-BASED GROUNDWATER REMEDIATION GOALS FOR THE JOLIET ARMY AMMUNITION PLANT (JOAAP)

Contaminant	1998 ROD IEPA Class I Groundwater RGs (µg/L)	Current IEPA Class II Groundwater RGs[1] (µg/L)	Have IEPA Class I Groundwater RGs Changed?	Are current IEPA Class I Groundwater RGs more stringent than 1998 RGs?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?	1998 ROD IEPA Class II Groundwater RGs (µg/L)	Current IEPA Class II Groundwater RGs[1] (µg/L)	Have IEPA Class I Groundwater RGs Changed?	Are current IEPA Class I Groundwater RGs more stringent than 1998 RGs?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?
Metals												
Antimony	6	6	No	-	-	-	24	24	No	-	-	-
Arsenic	**50**	**10**	**Yes**	**Yes**	**No[6]**	**No[2]**	200	200	No	-	-	-
Barium	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Beryllium	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Cadmium	5	5	No	-	-	-	50	50	No	-	-	-
Chromium (+3)	100	100	No	-	-	-	1,000	1,000	No	-	-	-
Chromium (+6)	100	100	No	-	-	-	1,000	1,000	No	-	-	-
Cobalt	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Copper	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Iron	5,000	5,000	No	-	-	-	5,000	5,000	No	-	-	-
Lead	7.5	7.5	No	-	-	-	100	100	No	-	-	-
Manganese	150	150	No	-	-	-	10,000	10,000	No	-	-	-
Mercury	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Nickel	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Selenium	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Silver	50	50	No	-	-	-	**511**	**NA**	**Yes**	**No**	**No**	**No**
Thallium	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Vanadium	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Zinc	5,000	5,000	No	-	-	-	10,000	10,000	No	-	-	-
Volatiles												
1,1,1-Trichloroethane	200	200	No	-	-	-	1,000	1,000	No	-	-	-
1,1,2-Trichloroethane	5	5	No	-	-	-	**50**	**25**	**Yes**	**Yes**	**No[7]**	**No[3]**
1,1-Dichloroethane	**700**	**1,400**	**Yes**	**No**	**No**	**No**	**3,500**	**7,000**	**Yes**	**No**	**No**	**No**
1,2-Dichloroethane	5	5	No	-	-	-	25	25	No	-	-	-
1,2-Dichloroethene	70	70	No	-	-	-	200	200	No	-	-	-

[6] This does not impact the current or future protectiveness of the groundwater remedy as arsenic is not a primary contaminant of concern in groundwater as listed in Table 4-1 of the 1998 ROD. Additionally, arsenic has not been detected in Class I groundwater above the current IEPA Class I Groundwater RG of 10 µg/L according to the *2011 Final Annual Groundwater Monitoring Report* (Toltest, 2013).

[7] This does not impact the current or future protectiveness of the groundwater remedy as 1,1,2-Trichloroethane is not a primary contaminant of concern in groundwater as listed in Table 4-1 of the 1998 ROD. Additionally, IEPA Class II groundwater standards apply to the glacial drift/till (also known as the shallow overburden aquifer), which is not capable of yielding usable quantities of water.

Table A7-2

ASSESSMENT OF ARAR-BASED GROUNDWATER REMEDIATION GOALS FOR THE JOLIET ARMY AMMUNITION PLANT (JOAAP)

Contaminant	1998 ROD IEPA Class I Groundwater RGs (µg/L)	Current IEPA Class II Groundwater RGs[1] (µg/L)	Have IEPA Class I Groundwater RGs Changed?	Are current IEPA Class I Groundwater RGs more stringent than 1998 RGs?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?	1998 ROD IEPA Class II Groundwater RGs (µg/L)	Current IEPA Class II Groundwater RGs[1] (µg/L)	Have IEPA Class I Groundwater RGs Changed?	Are current IEPA Class I Groundwater RGs more stringent than 1998 RGs?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?
Acetone	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Benzene	5	5	No	-	-	-	25	25	No	-	-	-
Chlorobenzene	100	100	No	-	-	-	500	500	No	-	-	-
Ethylbenzene	700	700	No	-	-	-	1,000	1,000	No	-	-	-
Tetrachloroethene	5	5	No	-	-	-	25	25	No	-	-	-
Toluene	1,000	1,000	No	-	-	-	2,500	2,500	No	-	-	-
Trichloroethene	5	5	No	-	-	-	**25**	**NA**	**Yes**	**No**	**No**	**No**
Xylenes	10,000	10,000	No	-	-	-	10,000	10,000	No	-	-	-
Semivolatiles												
1,2-Dichchlorobenzene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
1,3-Dichchlorobenzene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
1,4-Dichchlorobenzene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
2-Methylnaphthalene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
1,2,4-Trichlorobenzene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Acenaphthene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Acenaphthylene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Anthracene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Benzo(a)anthracene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Benzo(a)pyrene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Benzo(g,h,i)perylene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Benzo(b)fluoranthene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Benzo(k)fluoranthene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Bis(2-	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Chrysene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Dibenz(a,h)anthracene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Dibenzofuran	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Diethyl phthalate	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Di-n-butyl phthalate	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Di-n-octyl phthalate	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Fluoranthene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Fluorene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Hexachlorobenzene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Inden[1,2,3-cd]pyrene	NC	NC	-	-	-	-	NC	NC	-	-	-	-

Table A7-2

ASSESSMENT OF ARAR-BASED GROUNDWATER REMEDIATION GOALS FOR THE JOLIET ARMY AMMUNITION PLANT (JOAAP)

Contaminant	1998 ROD IEPA Class I Groundwater RGs (µg/L)	Current IEPA Class II Groundwater RGs[1] (µg/L)	Have IEPA Class I Groundwater RGs Changed?	Are current IEPA Class I Groundwater RGs more stringent than 1998 RGs?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?	1998 ROD IEPA Class II Groundwater RGs (µg/L)	Current IEPA Class II Groundwater RGs[1] (µg/L)	Have IEPA Class I Groundwater RGs Changed?	Are current IEPA Class I Groundwater RGs more stringent than 1998 RGs?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?
Naphthalene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Phenanthrene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Phenol	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Pyrene	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Anions												
Nitrate/Nitrite	10,000	10,000	No	-	-	-	100,000	100,000	No	-	-	-
Phosphate	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Phosphorus	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Sulfate	400,000	400,000	No	-	-	-	400,000	400,000	No	-	-	-
Pesticides, PCBs												
Chlordane	NC	NC	-	-	-	-	NC	NC	-	-	-	-
DDD	NC	NC	-	-	-	-	NC	NC	-	-	-	-
DDE	NC	NC	-	-	-	-	NC	NC	-	-	-	-
DDT	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Dieldrin	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Endrin	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Heptachlor	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Heptachlor epoxide	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Isodrin	NC	NC	-	-	-	-	NC	NC	-	-	-	-
PCB 1254	NC	NC	-	-	-	-	NC	NC	-	-	-	-
PCB 1260	NC	NC	-	-	-	-	NC	NC	-	-	-	-
Organics, Special												
TPH	NC	NC	-	-	-	-	NC	NC	-	-	-	-

IEPA Illinois Environmental Protection Agency
NA not available
NC chemical is not a contaminant of concern in given media
PCB polychlorinated biphenyl
RG remediation goal
ROD Record of Decision
µg/L micrograms per liter

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Table A7-3

ASSESSMENT OF ARAR-BASED SURFACE WATER QUALITY STANDARDS FOR THE JOLIET ARMY AMMUNITION PLANT (JOAAP)

Contaminant	1998 ROD Surface Water Quality Standards[8] (µg/L)	Current Surface Water Quality Standards[9] (µg/L)	Have Surface Water Quality Standards Changed?	Are current Surface Water Quality Standards more stringent than those listed in the 1998 ROD?	Does this affect current protectiveness of the remedy?	Does this affect future protectiveness of the remedy?
Explosives						
1,3,5-TNB	**15**	**(30)[10]**	**Yes**	**No**	**No**	**No**
2,4,6-TNT	75	75	No	-	-	-
2,4-DNT	**330**	**320**	**Yes**	**Yes**	**No[11]**	**No[4]**
2,6-DNT	150	150	No	-	-	-
RDX	500	500	No	-	-	-
Anions						
Sulfate	500,000	500,000	No	-	-	-

COC contaminant of concern
GRU groundwater remedial unit
IAC Illinois Administrative Code
IEPA Illinois Environmental Protection Agency
ROD Record of Decision
µg/L micrograms per liter

[8] Water Quality Standards from Table 10-1 of the 1998 ROD for primary groundwater COCs at GRU 1 Sites L1, L2, and L3 and GRU 2 Site M1 where there is the potential for groundwater to discharge to surface water.
[9] Illinois Water Quality Standards (35 IAC 302) (effective on May 16, 2013 for Subpart B (sulfate) and updated on April 4, 2013 for IEPA-Derived Water Quality Criteria (explosives)).
[10] Values enclosed by "( )" were not calculated according to the regulations due to limited data. These values should be used for advisory purposes such as establishing "reasonable potential".
[11] The IEPA-Derived Water Quality Criteria (updated on April 4, 2013) for 2-4 DNT is slightly more stringent than the water quality standard listed in Table 10-1 of the 1998 ROD. Since there is no numeric standard for 2,4-DNT in 35 IAC 302, IEPA derived a water quality criterion to protect aquatic life. This does not impact current or future protectiveness of surface water bodies at GRU 1 Site L1, where 2,4-DNT is a primary COC in groundwater, since the current concentrations of 2,4-DNT in groundwater and surface water are well below the IEPA-derived water quality standard of 320 µg/L, according to the *2011 Final Annual Groundwater Monitoring Report* (Toltest, 2013).

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ATTACHMENT 8

RISK ASSESSMENT AND TOXICOLOGY EVALUATION

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RISK ASSESSMENT AND TOXICOLOGY EVALUATION

This evaluation is prepared to help address Question B of the statement of service, "Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?" It was performed first for the Soils Operable Unit (SOU) sites, and then for the Groundwater Operable Unit (GOU) sites. For the SOU sites, both human health and ecological risk are considered. For the GOU sites, only human health is considered.

1.0 SOIL OPERABLE UNIT

Changes in standards were reviewed as part of Attachment 7, ARAR Evaluation. Except for PCBs, no standards (ARARs) were used in developing remediation goals (RGs) at JOAAP. All of the other RGs at the JOAAP Sites were developed using risk-based concentrations, which is the subject of the evaluation in this Attachment. Other action or location-specific ARARs are reviewed in Attachment 7.

This is the first review of toxicity and risk assessment methodology changes since the 1998 and 2004 RODs.

1.1 Human Health Risk-Based Remediation Goals

There are two primary documents that present the development of risk based RGs protective of human health for each of the sites associated with the JOAAP:

> OHM Corporation, 1996. Joliet Army Ammunition Plant, Will County, Illinois Preliminary Remediation Goals, Manufacturing (MFG) Area [and] Load-Assemble-Package (LAP) Area. April
>
> Human Health Work Group, 2000. Joliet Army Ammunition Plant Human Health Preliminary Remedial Goals, Midewin National Tallgrass Prairie. August

Sites that were identified for industrial land use, as well as sites with PCB contamination, were covered by RGs developed in the 1996 PRG document and presented in the1998 ROD. A subsequent evaluation of risk-based RGs for protection of human exposures that may occur to prairie workers or visitors to areas that would become part of the Midewin National Tallgrass Prairie (MNTP) was performed in 2000. However, the vast majority of the RGs chosen for that land use and presented in the 2004 ROD were developed for protection of ecological receptors because the ecological RGs were more stringent, with the exception of RGs for DNT and PAHs The RGs for these compounds were based on protection of human health in both the 1998 and 2004 RODs, with the RGs presented in the 1998 ROD being lower than those in the 2004 ROD. Therefore, this section regarding protection of human health will focus on the risk based RGs developed in 1996 for industrial use and documented in the 1998 ROD, as well as the sites for which the 1998 ROD PRGs were considered final because they are industrial use sites.

As explained in the document presenting the development of PRGs for protection of human health for industrial land use (OHM 1996), the PRGs were set in 1996 using the USEPA Region 3 October 1995 Risk Based Concentrations (RBCs) for protection of industrial receptors, using a

target cancer risk of 1 in a million (1E-06) incremental lifetime cancers and a hazard index of 1 for non-carcinogens. The 1996 PRG derivation document which preceded the 1998 ROD cited the USEPA's 1991 Standard Default Exposure Parameters for Risk Assessment (USEPA 1991). These exposure factors would have been used for the development of cleanup goals, as per the USEPA Region 3 October 1995 Risk Based Concentrations (RBCs). These exposure parameter values are provided in Table B-1 of the 1996 PRG derivation document (OHM 1996). For some constituents, adjustments were made to the USEPA RBCs for developing the PRGs for JOAAP. The adjustments include a capping of RGs at 10,000 milligrams per kilogram (mg/kg) for "low toxicity constituents" such as semi-volatile organic compounds (including explosives) and use of a surrogate compound for establishing the toxicity criteria for tetryl and its degradation products 2-amino-4,6-dinitrophenol (DNAP or picramic acid) for setting the cleanup goal for tetryl. In 1995, the USEPA Superfund Technical Support Center developed criteria for those compounds using 2,4-dinitrophenol (2,4-DNP) and the resulting DNAP risk-based value was selected to be the PRG for all three compounds (OHM 1996, Appendix C).

Since 1995, the USEPA Region 3 RBCs have evolved into the current version of the USEPA Regional Screening Levels (RSLs) (EPA May 2013a). The updated versions of the RSLs reflect revisions to the following risk-based components of the soil screening levels:

- Updates to toxicity criteria for various constituents (according to the hierarchy formalized in USEPA 2003)
- Revisions to methodology for assessing the risk from early life exposures to mutagenic carcinogens (USEPA 2005)
- Revisions to methodology for assessing risk from exposure via the dermal route (USEPA 2004)
- Revisions to methodology for assessing risk from exposure via inhalation (USEPA 2009)
- Updates of available exposure factor values used for estimating contaminant intakes for all types of exposure routes (USEPA 2011)

A comparison of the PRGs presented in the 1998 ROD is made to the 1995 USEPA Region 3 RBCs as well as the May 2013 version of the USEPA RSLs in Table A8-1. This table also presents the toxicity values and other assessment criteria associated with the May 2013 USEPA RSLs. Although the toxicity criteria did not change for 13 of the COCs, most of the COCs now have different risk based concentrations for protection of industrial land use. Twenty-one of the COCs now would have lower RGs for the industrial sites. However, not all the COCs occur on all the sites (Table A.8-2) and some of the new risk-based concentrations are actually greater than the 1998 PRGs. Therefore, the overall cumulative risk may still be within USEPA's established risk range of up to 1 in 10,000 incremental lifetime cancer risks and a hazard quotient of 1 for non-carcinogens (USEPA 1990). The evaluation of overall cumulative risk (or hazard) is presented below in the discussion of significant findings.

Provisional Peer Reviewed Toxicity Value Documentation for Key Constituents of Concern

Dinitrotoluenes: The 1998 PRG for DNT was based on a mixture of 2,4 and 2,6-dinitrotoluenes. In April 2013, the USEPA published a new provisional peer-reviewed toxicity value (PPRTV) document addressing all the known isomers of DNT (USEPA 2013b). Technical grade DNT (tgDNT) is defined in the assessment as 76 percent 2,4-DNT and 19 percent 2,6-

DNT, with the remaining 5 percent being comprised of a combination of the other four DNT isomers (2,3-, 2,5-, 3,4-, and 3,5-DNT). The weight of toxicological evidence led the USEPA to conclude that tgDNT is likely to be carcinogenic to humans and that all six DNT isomers must be considered. However, the PPRTV concludes that no provisional chronic or subchronic oral or inhalation reference doses (concentrations) for non-carcinogenic health effects can be derived due to lack of suitable peer-reviewed toxicity criteria for tgDNT. Instead, screening level toxicity criteria for non-cancer health endpoints (adverse affects to the liver) are provided in an appendix to the PPRTV documentation. These screening level toxicity criteria are generally not suitable for use in quantifying risk, although the USEPA RSLs do incorporate these appendix screening PPRTV values (Table A.8-1). Likewise, although the PPRTV documentation indicates that tgDNT is "likely to be carcinogenic to humans", the derivation of a provisional oral slope factor is not possible due to the lack of suitable peer-reviewed cancer studies. A screening level provisional oral cancer slope factor is also provided in the appendix to the PPRTV documentation and this value is also listed in Table A.8-1. The USEPA RSLs do use these values in developing a new RSL for tgDNT. This new RSL for tgDNT (3.8 mg/kg for industrial use) is very similar to the RSL for the 2,4 and 2,6-DNT mixture (2.5 mg/kg) already provided by the USEPA.

In April 2013, the USEPA also published a PPRTV document for 2,6-DNT (USEPA 2013c), which provides only a screening level provisional oral reference dose for non-carcinogenic health effects (adverse affects to the spleen). In addition, although the weight of evidence determined that 2,6-DNT is only considered to have "suggestive evidence of carcinogenic potential", a provisional oral cancer slope factor is provided in the PPRTV document. These newer provisional and screening level toxicity criteria values were used by USEPA to develop a new RSL for 2,6-DNT (Table A.8-1). Due to the uncertainty inherent in these PPRTV screening toxicity values, the U.S. Army's position is that they are unusable in quantitative risk assessment.

4,6-Dinitro-2-aminophenol (DNAP, Picramic Acid): As mentioned above, the 1998 PRG for JOAAP was developed using a surrogate compound (2,4-DNP) since toxicity criteria was not available for DNAP. Since that time, additional PPRTV documents have been developed for DNAP (picramic acid) (USEPA 2002, 2009d). The 2009 PPRTV document was not able to derive any toxicity criteria for DNAP, however, it did provide a screening level provisional oral reference dose for non-carcinogenic health effects in an appendix, based on toxicity studies conducted on 4,6-dinitro-o-cresol (DNOC), which the USEPA determined at that time to be a better surrogate for DNAP than 2,4-DNP. The toxic endpoint (cataracts) was determined to be the same for all three compounds (2,4-DNP, DNOC, and DNAP). This newer provisional and screening level oral reference dose value was used by USEPA to develop a new RSL for DNAP (Table A.8-1). Due to the uncertainty inherent in the PPRTV screening toxicity values, the U.S. Army's position is that they are unusable in quantitative risk assessment. However, the 1998 ROD RG for tetryl was set using the 1996 toxicity criteria for DNAP.

Total Petroleum Hydrocarbons: A PRG was established at JOAAP for total petroleum hydrocarbons (TPH) due to the substantially lower costs for analyzing for TPH rather than for individual petroleum constituents (OHM 1996). The PRG of 2,500 mg/kg was set using toxicity criteria for medium to heavy weight petroleum compounds, based on a Massachusetts Department of Environmental Protection (MADEP) cleanup level for soils where contact is

limited. The toxicity criteria used for this older MADEP cleanup goal was not provided in the JOAAP documentation and is not currently readily available.

In 2009, the Superfund Health Risk Technical Support Center published a Provisional Peer Revised Toxicity Value for Complex Mixtures of Aliphatic and Aromatic Hydrocarbons (USEPA 2009c). Using the provisional and screening level toxicity criteria values for medium range aliphatic hydrocarbon fraction of total petroleum hydrocarbons (as the most stringent of the non-aromatic, medium to heavy weight fraction), a risk based concentration for protection of industrial workers was derived (Tables A.8-3a and -3b). The non-cancer risk based concentration of 3,400 mg/kg (Table A.8-3a) is significantly greater than that used for the 1998 ROD remedial action goal (2,500 mg/kg). The PPRTV determined that there is only "suggestive evidence of carcinogenic potential" for medium range aliphatic compounds within the TPH and a screening level inhalation unit risk value for cancer potency via inhalation was provided. From this screening level cancer potency value for inhalation exposures, a cancer-based risk concentration of 48 mg/kg was estimated (Table A.8-3b), although the weight of evidence for carcinogenicity is not strong. In general, the U.S. Army's position on screening provisional toxicity criteria is that they are not appropriate to use in quantifying risk. The PRG of 2,500 mg/kg for TPH remains protective for non-carcinogenic health effects such as adverse affects to the liver, kidney, and blood system.

Special Case

Lead: Lead is a COC for Sites M5, M6, M13 and M16 (Table A.8-2). Risks from exposure to lead are evaluated by predicting the associated blood lead level. Blood lead levels have been accepted as the best measure of internal dose of lead. Sensitive populations include preschool-age children and fetuses and a blood lead level of between 10 and 15 micrograms per deciliter (µg/dL) was originally associated with a level at which no adverse effects would be expected. At the time of the development of the JOAAP PRGs, the only model available from the USEPA for assessing lead exposures was the Integrated Exposure Uptake Biokinetic (IEUBK) Model for assessing lead exposures to children. This model was not run specifically to determine an acceptable level of lead in soil at the JOAAP for industrial use. Rather, it was stated that, *"USEPA notes that at some sites, the IEUBK Model has indicated that PRGs of over twice the screening level [of 400 mg/kg] are acceptable and that even higher levels may be used as remediation goals based on consideration of other factors. At the JOAAP, exposure of children is likely to be substantially less frequent than could occur in a residential setting. Adults, such as industrial workers, are less sensitive to the effects of lead. Considering these factors, higher levels at the JOAAP, such as 1,000 mg/kg, would be unlikely to pose risks to industrial workers or recreational site users; and as such, a PRG of 1,000 mg/kg in soil and sediments is recommended"* (OHM 1996). Shortly after the PRGs were developed in April 1996, the USEPA's Technical Review Workgroup for Lead published a draft interim report proposing a model for assessing risks associated with non-residential adult exposures to lead in soil; the Adult Lead Model (USEPA 1996, updated in 2003). The USEPA RSL for industrial exposure of 800 mg/kg was developed using the Adult Lead Model to protect a fetus that may be carried by a pregnant female worker. It is assumed that a cleanup goal that is protective of a fetus will also afford protection for male or female adult workers. Updates were made to the Adult Lead Model in 2009 recommending adjustments to baseline lead blood levels (USEPA 2009b). Use of this updated adult lead model using USEPA recommended exposure values results in a PRG slightly

over 1,000 mg/kg (Table A.8-4), indicating that the current JOAAP PRG remains protective using the latest Adult Lead Model. In 2012, the Centers for Disease Control announced that adverse affects may be associated with even lower blood lead levels, although the USEPA has not adopted this new lead blood concentration (5 µg/dL) as a threshold for actions at Superfund sites (DOD 2012). Should this new lead blood level be adopted by the USEPA for Superfund sites in the future, the lead PRG for adult workers may need to be re-evaluated ensure that lead blood levels will remain at an acceptable level for protection of human health.

Significant Findings

The multiple toxicity criteria changes and the updates to several risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for Superfund program between 1998 and 2013, resulted in several constituents that currently have lower USEPA RSLs (used as PRGs in the JOAAP 1998 ROD) for protection of industrial workers using today's methods. These are identified with bold font in Table A.8-2. For 13 of the COCs, there were no updates to toxicity criteria and therefore the existing RGs still result in acceptable risks or non-cancer hazards.

The new cancer risks or hazard indexes for constituents of concern presented in Table A.8-2 were summed within each site. Although many of the risk-based concentrations (RGs) would be lower now, the resulting increase in risk is not enough to result in a cumulative risk (presented in Table A.8-2) that is above the USEPA's acceptable risk range for cancer or non-cancer indices at most of the sites, with the exception of sites L6, M5, M6, M13, and M16. The constituents for which the 1998 industrial RGs present unacceptable cancer risks or non-cancer hazards (i.e., are greater than what would now be considered protective using current toxicity and risk assessment methodology) include 2-nitrotoluene in M6, tetryl (or DNAP, picramic acid) in M5, cadmium and mercury in M16 (although as discussed below those may not actually have ever been considered soil COCs at that site), and 2 SVOCs (di-n-octyl phthalate, and naphthalene) in L6 and M16. The close-out reports for 2 of these sites was examined to ascertain whether or not remediation of these constituents was adequately protective using today's toxicity criteria and risk assessment methodology (MWH 2000; 2006). A summary of those evaluations are provided in the site-specific protectiveness determinations, below.

The TPH PRG is protective of non-cancer hazards, but a screening level provisional cancer slope factor for medium range aliphatic components of TPH indicates that a lower PRG may be warranted to assure full protection against all adverse health effects from exposure to TPH components. Since USACE does not use these PPRTV screening toxicity values in a quantitative risk assessment, there is no need to review residual TPH concentrations at Site L6.

In addition, the USEPA RSL for lead is currently lower than the JOAAP lead PRG, and it is possible that USEPA may be adopting recommendations from the CDC for lowering the acceptable concentration of lead in blood, which may require a re-evaluation of the lead cleanup goal. Therefore, the close-out reports for sites M5, M6, and M13 were further reviewed for residual lead soil concentrations (MWH 2000; 2006, MKM 2009b). A summary of those evaluations are provided in the site-specific protectiveness determinations, below.

Sites L6 and M16 were identified in the 1998 ROD as needing no further action for the identified industrial future land use. The close-out documentation will be evaluated for these sites to determine if the residual concentrations of COCs with lower USEPA RSLs are below the new USEPA RSLs. Current land use will also be considered in making the protectiveness determination.

Site L6 Protectiveness Determination:

For Site L6 a no further action designation was made because a removal action occurred prior to the finalization of the ROD. The early soil removal action involved the excavation and disposal of organics and PCB contaminated soil to eliminate the risks from exposure to these soil contaminants (Dames and Moore 1995). This was also done to facilitate transfer of the property to the Will County Landfill in accordance with Public Law 104-106 (US Congress 1996). The 1998 ROD indicated that the removal action eliminated health hazards for the identified future industrial use of the site and the Second Five Year Review indicated that the remaining COCs at Site L6 that posed potential human health and environmental hazards were removed to levels that met the industrial RGs set in the 1998 ROD (Aerostar 2009). The removal action at Site L6 was documented in the *Final Report, Removal Action Site L6/Group 70 Area, Joliet Army Ammunition Plant, Wilmington, Illinois* (IT 1998). Table 2-2 of that report (summary of confirmation samples collected from removal action areas) was reviewed and residual concentrations of PAHs (e.g. naphthalene as the COC with greatest change in USEPA RSL) were compared to the new USEPA RSLs, which would be protective of exposure to industrial workers to the soil. The majority of samples did not have any PAHs above laboratory reporting limits, (less than 1 mg/kg), which is generally considered to represent background concentrations of PAHs in soil. Some of the individual confirmation samples collected had concentrations higher than the established PRGs for JOAAP, as presented in Table 2-2 of the 1998 Removal Action Report. The text in Section 2.2.4 of that report explains that in those cases, further excavation of impacted soils was performed and additional confirmation samples were collected. The maximum concentration of naphthalene was 7 mg/kg, which is below the new USEPA RSL, indicating that the cleanup achieved concentrations that are protective of human health. The analytical results were reported in Appendix D of the Removal Action Report.

The site is currently part of the Will County Landfill. As such, actual exposure to potentially contaminated soil would be much less than what was assumed in developing RGs and USEPA industrial RSLs (exposure to open soil areas for 8 hours a day, 250 days a year, for 25 years). For both of these reasons (low residual concentrations of PAHs and limited human exposure), the previous removal action would still be considered protective of human health at Site L6.

Site M5 Protectiveness Determination:

The *Draft Site M5Closure Report* (MWH 2000a, the final was not available) was reviewed and residual soil concentrations of lead and tetryl were extracted from summary tables of confirmation samples and entered into the ProUCL program (EPA 2010) to determine 95th upper confidence limits on the mean (UCL95) of residual concentrations (Tables A8-5, A8-6). As seen in Table A8-5, the UCL95 concentration of lead at this site is 375 mg/kg, which is below the current USEPA industrial RSL for lead, as well as a calculated PRG soil concentration that would be protective of a fetus (Table A.8-4).

The average residual concentration of tetryl (UCL95 estimated to be 236 mg/kg, Table A8-6), while well below the 1998 ROD cleanup goal of 4,100 mg/kg, is approximately 4 times greater than the current USEPA industrial RSL of 62 mg/kg, which was set using a PPRTV Appendix screening level toxicity criterion (discussed above, Table A.8-1). The U.S. Army's position is that there is too much uncertainty surrounding these appendix screening level PPRTV criteria to use them to quantify risk. Furthermore, an examination of current conditions at Site M5 indicates that after remediation, the site was redeveloped into a rail yard (Figure 5-19). The majority of the portions of the site that were remediated are covered by railroad lines, although a couple of the remediated areas lie adjacent to a detention pond. The exposure assumptions utilized for development of PRGs for an industrial worker (exposure to open soil areas for 8 hours a day, 250 days a year, for 25 years) are no longer valid for this site. Little to no direct human contact to soils currently occurs at this site. Therefore, the cleanup remains protective for tetryl.

M6 Protectiveness Determination:

The *Final Closure Report [for] Site M6* (MWH 2006a) was reviewed and residual soil concentrations of 2-nitrotoluene and lead were extracted from summary tables of confirmation samples and entered into the ProUCL program (EPA 2010) to determine the UCL95 of residual concentrations (Tables A8-7, A8-8). As seen in Table A8-7, the UCL95 concentration of 2 nitrotoluene was estimated to be up to 0.661 mg/kg, which is well below USEPA's 2013 industrial RSL (Table A.8-2), indicating that the residual concentrations are protective of human health.

Based on recommendations made by the ProUCL program, the UCL95 concentrations of lead at Site M6 were estimated to be either 943 or 1213 mg/kg (Table A.8-8). The difficulty in determining a UCL95 for the lead concentrations may be due to the high number of results as reported below detection limits. Only 10 of the 733 soil samples had detected concentrations of lead, although the detection limit was up to 800 mg/kg. It is not known why the laboratory could not report lower concentrations of lead. Current laboratory detection limits for soil lead samples are typically around 1 mg/kg. Use of lower laboratory analytical detection limits may have revealed a lower average concentration of lead at the site. The range of estimated UCL95 concentrations are comparable to both the ROD cleanup goal as well as the industrial soil PRG developed using the latest USEPA Adult Lead Model PRG calculation (Table A.8-4), although they are slightly above the current USEPA industrial RSL. It should be noted that currently, this site is not being used (Figure 5-20). It is adjacent to the parking lot of the rail yard (M13). If the CDC acceptable blood lead levels become adopted by the USEPA in the future, the lead soil cleanup goal may need to be re-evaluated in order to remain protective of human health. At that point, it would be recommended to take some additional soil confirmation samples and have them analyzed at a laboratory that is capable of reporting lead concentrations down to 1 mg/kg in soil in order to determine whether or not there are truly elevated lead concentrations across the site. Otherwise, concentrations of lead at or below the calculated PRG of 1,120 mg/kg should be considered protective, especially since the site is not being occupied or used currently.

Site M13 Protectiveness Determination:

The remedy in place report for Site M13 (MKM 2009b) was reviewed, and residual lead concentrations were extracted. The maximum residual lead concentration at the site was 18 mg/kg (Table A8-9), which is comparable to background. Therefore, the cleanup is fully protective of human health.

Site M16 Protectiveness Determination:

The BRA for Site M16 indicates that no risk was calculated for this site because no soil samples were obtained (no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). The 1998 ROD should not have identified soil COCs for this site, as it did in Table 6-3. There is no new evidence to indicate the presence of soil COCs at the site. It is recommended that the surface water and sediment sampling results presented in Table 5.16-2 of the Phase II RI (Dames and Moore 1993) be evaluated and perhaps this site may be released for UU/UE.

1.2 Environmental Health (Ecological Assessment)

The ecological risk assessments performed for the JOAAP were summarized in the 1998 ROD and also in the 1996 PRG documentation discussed above for human health. According to the 1998 ROD, "Hazardous substances were not found to significantly impact the terrestrial components of the JOAAP ecological system. Habitat, historical biological surveys, soil toxicity, and the health of small mammals and deer were examined. Tissue samples from rodents and deer within the study areas were analyzed for heavy metals and explosives. These tissues were found to not contain metals at concentrations above those found in samples collected from the reference sites (i.e., background). Additionally, explosives were found to not accumulate in these tissues. [Note: The deer tissue study was focused on the consumptability of the meat, not on the ecosystem impacts of the contaminants, if any, in the deer.] A rodent biomarker study was conducted to compare rodents on JOAAP and off-site on the basis of bone marrow micronucleus assays, histopathology, and hematology. The variations between on-site and offsite rodents were found to be either statistically insignificant or unrelated to possible chemical exposure. Population surveys of the Upland Sandpiper conducted by the Illinois Department of Conservation over several years beginning in 1983 indicate the populations of these birds are relatively stable on JOAAP and represent some of the best biological resources in northern Illinois. This is primarily due to the extensive acreage of grazed land and prairie remnants at JOAAP that provide habitat for grassland bird species. The areas contaminated with chemicals of concern at JOAAP represent a small percentage of the 23,542-acre installation and are areas that were previously developed for industrial activities (contain buildings, roadways, parking lots, railroad tracks, etc.) and currently do not provide desirable habitat for the Upland Sandpiper. Soil toxicity tests conducted on field-collected soils at several JOAAP study sites found evidence of excess toxicity for earthworm survival and growth, plant seed germination and growth, and soil microorganisms. Some tests recorded toxicity due to metals and RDX, however, the greatest adverse effects for all tests were found in soils with TNT contamination. The spatial scale where these toxic effects are found is very small (less than 1 percent) relative to the entire JOAAP ecological system. Further details regarding earthworm, microbe, and plant

communities indicate that, *"Based on recent field screening efforts, it has been observed that the borders between thickly vegetated and barren areas are very sharply defined. Additional research has shown that indigenous plant life at JOAPP has been observed in soil with TNT levels greater than 290 mg/kg"* (OHM 1996 Appendix D).

The primary document outlining development of PRGs for specifically for the protection of ecological receptors on JOAAP lands that are slated to be transferred to the US Department of Agriculture (USDA) for incorporation into the Midewin National Tallgrass Prairie (MNTP) is:

> Joliet/Midewin Ecological Work Group (EWG), 2000. *Ecological Preliminary Remedial Goals, Joliet Army Ammunition Plant and Midewin National Tallgrass Prairie*, 2000.

The MNTP will be managed by the USDA Forest Service (FS) and the Illinois Department of Natural Resource, *"in a manner that will conserve and enhance the native populations and habitats of fish, wildlife, and plants"* (U.S. Congress 1996).

The EWG consisted of a multi-agency group of JOAAP stakeholders, including representatives from several Federal and State environmental agencies. The overall goal of development of soil PRGs by the EWG was to, *"Develop soil preliminary remedial goals that are protective of the ecological resources of the Midewin National Tallgrass Prairie"*. The EWG stressed that, *"The PRGs are the contaminant concentrations in soil that the EWG determined are protective of the ecological resources of the prairie. There exists no clear line in applicable law or regulatory guidance as to how much protection of ecological resources is required. The PRGs were selected by EWG consensus."* The EWG benefitted from the extensive surveys of the native biota species resident at the JOAAP that had begun in the 1980's and were published in 1994 by the Illinois Division of Natural Heritage. These include hundreds of species of plants, insects, and birds, as well as dozens of species of mammals, reptiles, amphibians, and aquatic biota, including several threatened, endangered, or rare species of plants, birds, reptiles, and insects. From this comprehensive survey of natural resources present at the JOAAP, there were six different groups of ecological receptors chosen for endpoints for PRG development (plants, soil invertebrates, herbivores, insectivores, carnivores, and Federal and State threatened and endangered species). The EWG utilized a comprehensive process for generation of PRGs for protection of ecological resources at the JOAAP/MNTP lands, including:

- Compilation of toxicological benchmarks for the six different groups of ecological receptors
- Compilation of uptake/bioaccumulation parameter values for site-related COCs
- Compilation of habitat, food types, behavior histories, sensitive life stages, and ecological roles for key species within the various receptor groups
- Development of algorithms combining measures of toxicity, exposure, and receptor attributes
- Evaluation of site-specific plant and earthworm toxicity tests for explosives
- Compilation of soil background concentrations for naturally occurring COCs

In summary, ecological PRGs were developed to protect the ecological resources known to be established at the site, and utilized a comprehensive literature search of ecotoxicological resources, as well as site-specific toxicity studies for the main site-related constituents of concern

(explosives) (Table A8-10). The ecological risk assessment framework utilized by the EWG (USEPA 1997, 1998) is still in place and no major updates in the ecological risk assessment process have been published since this time.

Since the development of the ecological PRGs for JOAAP, the USEPA has developed ecological soil screening levels (Eco-SSLs) for several constituents (USEPA 2003b). These Eco-SSL values can be used to identify those contaminants of potential concern in soils requiring further evaluation in a baseline ecological risk assessment, such as what was performed for the JOAAP. The Eco-SSLs are concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with soil or ingest biota that live in or on soil. The four groups of receptors (target organisms) for which Eco-SSLs were developed are plants, soil invertebrates, birds (avian species), and mammals. Note that reptiles and amphibians which would be present at the JOAAP would not be covered by the EcoSSLs. The Eco-SSLs are not designed to be used as cleanup levels and EPA emphasizes that it is inappropriate to adopt or modify these Eco-SSLs as cleanup standards. Eco-SSLs are appropriate to sites where key soil parameters fall within a certain range of chemical and physical parameters. It is expected that there are certain soils and situations to which Eco-SSLs do not apply. These situations include (but may not be limited to) wetland soils that are regularly flooded. According to the USDA's Prairie Plan's chosen alternative, (Alternative 4), approximately 30 percent of the MNTP will be managed as wet prairie/sedge meadow (USDA 2002), for which the USEPA's Eco-SSL are not appropriate screening tools.

Despite these limitations on applying the EcoSSLs to the JOAAP (EcoSSLs are not intended to be used as RGs or PRGs), the compilation of toxicity studies used to derive the EcoSSLs was reviewed to ascertain if there are newer ecotoxicity studies for a given COC and receptor group combination that may be relevant for protection of ecological receptors at the JOAAP. Table A.8-10 provides a comparison of the Eco-SSLs and the derivation of the PRGs for the 2004 ROD. Constituents for which the receptor group identified for JOAAP ecological PRG development have a significantly lower Eco-SSLs were identified and the dates and test species of the toxicity studies used to develop these Eco-SSLs were reviewed from the individual Eco-SSL documentation (USEPA 2005 through 2008a). This review indicated that only three constituents have newer ecotoxicity studies that were published after the EWG began the process of toxicity criteria compilation for the PRG development; cobalt, nickel, and PAHs (Table A8-11). Of these, the test organisms used for those latter toxicity studies were not found to be relevant for JOAPP for cobalt and nickel, indicating that the PRG development for these constituents likely utilized all appropriate available toxicity studies. For PAHs, the PRG chosen in the 2004 ROD was based on protection of human health. (In the 2004 ROD for the Soil Operable Unit Interim Sites, the majority of the PRGs were chosen based on protection of ecological receptors.) For evaluation of ecological protection, a consideration of the presence of total concentrations of all PAHs (total PAHs) is most appropriate. Many of the individual PAHs have quite high PRGs, much greater than the USEPA's Eco-SSL for PAHs. However, for benzo(a)pyrene, which is one of the most toxic PAHs, the PRG is quite low, only 2 mg/kg, which is slightly above ambient background concentrations within Illinois (IEPA 2007). Since all PAHs are expected to be co-located with benzo(a)pyrene (based on source of PAHs and very similar fate and transport of most PAHs), remediating to this concentration should remove the rest of the PAHs to approximately background concentrations. As such, further ecological risk evaluations on the background/ambient level of constituents is not necessary.

Special Cases: SRU 6 Sites That Are or Will Become Part of the MNTP

The 1998 RGs were considered final for COCs in sites that were slated for future industrial land use, as well as SRU 4 (which covered PCBs in soil) and SRU 6 (which covered landfill areas). The RG for PCBs was based on an ARAR (40 CFR 761, TSCA), and is generally considered protective for terrestrial environments.

There were six sites in SRU 6: L3, M11, and M13, which were capped; and L4, M1, and M9, which were excavated. Site M11 originally contained 3 uncontrolled dumps (south, northeast, and northwest). The south and northeast dumps were excavated and consolidated in the northwest location. A RCRA Subtitle C cap was placed on the resulting landfill. For the two landfills that were capped (L3 and M11); the cap would not provide habitat for the MNTP when they are transferred to the USDA. However, the other the two sites (L4 and M1) as well as the south and northeast portions of site M11 that were excavated and backfilled may provide habitat for the MNTP when they are transferred to the USDA. The Second Five Year Review for these sites indicates that they were cleaned up to meet RGs identified in the 1998 ROD, which were protective of human health. Since the 2004 ROD RGs were based generally on protection of the environment and were more stringent than the RGs developed for protection of human health, meeting the 1998 ROD RGs may not be protective of the environment at SRU 6 sites L4, M1, and excavated portions of M11. Therefore, the RA completion reports for these three sites were reviewed (MKM 2007, 2009a, and 2009c). Confirmatory soil samples were obtained following excavation at Site L4 and the south and northeast portions of Site M11 to ensure that residual soil concentrations met 1998 ROD RGs. The limits of excavation at Site M1 were based on visual observations; no confirmatory soil samples were obtained at the excavation boundaries. To ensure that the excavations of these landfills would be protective of future ecological use of the site, residual concentrations of soil COCs (a) remaining after excavation at sites L4 and M11, as well as (b) in bio-remediated soil used as backfill in L4 and M11, and (c) in off-site backfill soil concentrations at sites M1 and M11, were compared to the 2004 ROD ecological RGs.

L4 Protectiveness Determination:

After excavation of the landfill area in Site L4, the bioremediated soil selected for backfill was evaluated to determine whether or not it was suitable for use for that purpose. Table 4-1 of the Site L4 Remedial Action Completion Report (MKM 2007) compares the 2004 ROD ecological RGs against residual soil concentrations of COCs in the bioremediated backfill soil. All of the COCs were remediated to levels that were below the ecological RGs. In addition, there were several soil samples obtained in the limits of the excavation (sidewalls, bottoms). Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs protective of human health in Table 4-2 of the Remedial Action Completion Report (MKM 2007), most of the organic COCs were not detected, and those that were not detected (e.g., 2,4,6-TNT at 7.3 mg/kg, naphthalene at 0.26 mg/kg) were all well below the ecological RGs from the 2004 ROD. In addition, all of the metals were also below ecological RGs from the 2004 ROD. Therefore, the excavation and backfilling of the landfill area at L4 is protective of both human health and the environment.

M1 Protectiveness Determination:

After excavation of the landfill area in Site M1, the off-site soil identified for backfill was evaluated to determine whether or not it was suitable for use for that purpose. Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs protective of human health in Table 4-1 of the Remedial Action Completion Report (MKM 2009c), most of the organic COCs were not detected or detected at low levels well below the ecological RGs (such as individual PAHs each well below 0.1 mg/kg) and all of the metals would also be below ecological RGs from the 2004 ROD. Therefore, the excavation and backfilling of the landfill area at Site M1 is protective of both human health and the environment.

M11 Protectiveness Determination:

Site M11 is an SRU 6 site that will become part of the MNTP. The RA objectives and RGs for SRU 6 sites were finalized in the 1998 ROD. However, some of the COCs that were identified for SRU 6 soil were revised for other SRUs in the 2004 ROD. Since the 2004 ROD RGs were based generally on protection of the environment and were more stringent than the RGs developed for protection of human health, meeting the 1998 ROD RGs may not be protective of the environment at SRU 6 site M11.

The Remedy in Place Report for this site was reviewed (MKM 2009a). After excavation of the southern and northeastern debris areas in Site M11, both the bioremediated soil and the off-site soil selected for backfill were evaluated to determine whether or not they were suitable for use as backfill in the excavated areas. Although the COC concentrations in those soils were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels below the ecological RGs (primarily individual PAHs at up to 0.015 mg/kg each but also low levels of DNT and TNT in the bioremediated soils, up to 4.6 mg/kg) and all of the metals were detected below ecological RGs established in the 2004 ROD (Tables 3-6 and 3-7 of MKM 2009a). Finally, there were several soil samples obtained in the limits of the excavation (sidewalls, bottoms). Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels well below the RGs (average DNTs detected less than 2.2 mg/kg, TNT up to 2.4 mg/kg, individual PAHs up to 0.48 mg/kg, PCBs – Aroclors up to 0.33 mg/kg). All of the metals were detected below ecological RGs from the 2004 ROD (Table 3-8, MKM 2009a). Therefore, the excavation and backfilling of the southern and northeastern debris areas at M11 is protective of both human health and the environment.

Significant Finding

For SRUs that were covered under the 2004 ROD, the ecological PRGs were developed to protect the ecological receptors (flora and fauna) identified or expected to occur on the MNTP and utilized a comprehensive literature search of ecotoxicological resources, as well as site-specific toxicity studies for the main site-related constituents of concern (explosives). The ecological risk assessment framework utilized by the EWG (USEPA 1997, 1998) is still in place and no major updates in the ecological risk assessment process have been published since this time. A review of a more recent compilation of ecotoxicity studies completed by the USEPA for

development of EcoSSLs did not reveal any newer ecotoxicity information that should call into question the protectiveness of the ecological PRGs for the portion of the JOAAP lands identified to be turned over to the USDA to become part of the MNTP.

For SRUs that were covered under the 1998 ROD (SRU 6) but for which the future land use will be the MNTP, the remedial action completion reports were reviewed to ensure that the remediation would be protective of both human health and the environment. Remedial action completion reports for sites L4 and M1 indicate that the excavation and backfilling of the landfill areas on these sites is protective of human health and the environment.

2.0 GROUNDWATER OPERABLE UNIT

2.1 Human Health Risk-Based Remediation Goals

For the groundwater remedial units (GRUs), RGs were finalized in the 1998 ROD. For all constituents other than explosives, groundwater RGs were established using ARARs. Changes in those standards were reviewed as part of Attachment 7, ARAR Evaluation. At the time that the ROD was signed, Illinois had not established groundwater quality criteria for explosives. Therefore, the RGs for explosives were developed using risk based concentrations. The derivation of the risk-based RGs for explosives in GRUs 1 and 2 is the subject of the evaluation in this Attachment.

The document that presents the development of risk based RGs protective of human health for the GRUs associated with the JOAAP is:

- OHM Corporation, 1996. *Joliet Army Ammunition Plant, Will County, Illinois Preliminary Remediation Goals, Manufacturing (MFG) Area [and] Load-Assemble-Package (LAP) Area.* April

Table A-1 in the above document presents the groundwater exposure parameters that were used in developing the risk-based RGs. The groundwater RGs established in the 1998 ROD were developed to be protective of a park employee who drank 1 liter per day of groundwater beneath the JOAAP, for 250 days per year, for 25 years. Ingestion was the only exposure route evaluated. These exposure assumptions are still reasonable and would be protective for the GRUs.

Table A-2 of OHM 1996 presents the toxicity criteria used and development of the risk-based RGs for GRUs that were established in the 1998 ROD. As discussed above for the SOUs, EPA has updated the toxicity criteria for several of the explosives. The updated toxicity criteria and the new derivation of risk-based RGs based on any updated toxicity criteria are presented in Table A.8-12. A comparison between the 1998 ROD-based RGs, newly calculated risk-based concentrations based on new toxicity criteria, and newly established ARAR standards for explosives in groundwater (discussed in Attachment 7) is presented in Table A.8-13.

Provisional Peer Reviewed Toxicity Value Documentation For Key Constituents of Concern

As discussed in the SOU section above, toxicity criteria for DNTs and DNAP (used as a surrogate for tetryl) are only available via the PPRTV documentation. For the non-carcinogenic

endpoint for 2,6-DNT and also for DNAP, only appendix screening level toxicity criteria are available from the respective PPRTV documents. Due to the uncertainty inherent in the PPRTV appendix screening toxicity values, the U.S. Army's position is that they are unusable in quantitative risk assessment. Therefore, no new RGs are being calculated using these toxicity criteria. The new risk-based RG for 2,6-DNT is based on the carcinogenic endpoint. No new risk-based RGs are calculated for DNAP and tetryl at this time, since only an appendix screening level toxicity criterion is currently available for DNAP.

Significant Findings

As seen in Table A.8-13, new risk-based RGs for most explosives stayed the same or even increased relative to the 1998 ROD RGs, indicating that the 1998 ROD RGs would remain protective of a park worker who drinks 1 liter of JOAAP groundwater a day. The 2 exceptions are 2,6-DNT, and 2-NT.

As discussed above for the SOU, there is some uncertainty in developing a new risk-based RG for 2,6-DNT based on its carcinogenic potential, since the April 2013 PPRTV documentation indicated that 2,6-DNT is only considered to have "suggestive evidence of carcinogenic potential". Furthermore, the new cancer risk at the old RG for 2,6-DNT would still be within the USEPA's acceptable cancer risk range (of up to one in ten thousand or 1E-04). Therefore, the 1998 ROD risk-based RG for 2,6-DNT remains protective.

For 2-NT, however, the new cancer risk at the 1998 ROD RG would be 4E-03, as the risk-based RG decreased from 5,100 ppb to 1.3 ppb based on a newly derived oral cancer slope factor. This cancer risk is above the acceptable cancer risk range. The oral cancer slope factor upon which the cancer risk is based was developed in a PPRTV document published in 2008 (USEPA 2008b). The PPRTV indicates that 2-NT is likely to be carcinogenic to humans, which is the second strongest weight-of-evidence indicator that the EPA uses to describe the likelihood that a constituent causes cancer in people.

2-NT is a COC only in the GRU 2 site M6. It has been measured in other GRU 1 and 2 sites, but it is generally below detection limits (approximately 1 ppb) or at or below the new risk-based RG (1.3 ppb) in other GRU 1 and 2 sites (Tables A1-2 and A1-13). At GRU 2 site M6, 2-NT has been consistently well above both the new risk-based concentration as well as the 1998 ROD RG in 2 wells (MW212R and MW652, Table A113). It is being monitored in all wells at this site. 2-NT has been detected in low levels (between 1.1 and 3.3 ppb) in well MW654 since 2003 (Table A1-13). This is considered an "early warning" well in site M6. In samples obtained from well MW654 in April and October of 2012, the 2-NT concentrations jumped to 18 and 86 ppb. Likewise, in early warning well MW313, 2-NT was detected at 1.8 ppb in 2004, 0.63 ppb in 2009, and at 44 ppb in the October 2012 sample obtained from that well. Although these levels are well below the risk-based RG from the 1998 ROD, because the toxicity criteria has changed on which the risk-based concentration was based, these detections of 2-NT raise the question of whether or not the groundwater remedy will remain protective for this constituent in the future.

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Table A.8-1

Review of Changes in Risk Based Concentrations and Associated Toxicity Criteria from 1998 to 2013 for Protection of Human Health at Industrial Use Sites

						USEPA Regional Toxicity Criteria May 2013 (see below for key explanations)													Indication of Toxicity Changes since 1996		
Contaminant	**1998 ROD Industrial PRGs**	**1995 EPA Region 3 Industrial RBCs**	**May 2013 EPA Industrial RSLs**	**Cancer or non-cancer endpoint for 2013 RSL?**	**New Risk or HI for old RG[1]**	**SFO (mg/kg-day)$^{-1}$**	**key**	**IUR (ug/m^3)$^{-1}$**	**key**	**RfD$_o$ (mg/kg-day)**	**key**	**RfC$_i$ (mg/m^3)**	**key**	**voc**	**muta-gen**	**GIABS**	**ABS**	**C$_{sat}$ (mg/kg)**	**Criterion(a) that changed**	**Old Value**	**Old source**
Explosives (SRUs 1 and 3)																					
1,3,5-TNB	100	100	27,000	N	0.004					3.0E-02	I					1	0.02		RfDo	5.00E-05	IRIS (RfDo)
2,4,6-TNT	190	190	79	C	2.E-06	3.0E-02	I			5.0E-04	I					1	0.03		none		
DNT mixture	8.4	8.4	2.5	C		6.8E-01	I									1	0.1		none		
2,4-DNT	8.4	8.4	5.50	C	2.E-06	3.1E-01	C	8.9E-05	C	2.0E-03	I					1	0.1		no cancer value		
2,6-DNT	8.4	8.4	1.20	C	7.E-06	1.5E+00	P			3.0E-04	X					1	0.1		no cancer value, older RfDo	1.00E-03	HEAST (RfDo)
DNT, technical grade (new)	NA		3.8	C		4.5E-01	X			9.0E-04	X					1	0.1		new PPRTV appendix values		
2-NT (ortho nitrotoluene)	10,000	20,000	13	C	8.E-04	2.2E-01	P			9.0E-04	P			V		1		1.5E+03	no cancer value, older RfDo	1.00E-02	HEAST (RfDo)
HMX	10,000	10,000	49,000	N	0.2					5.0E-02	I					1	0.01		none		
RDX	52	52	24	C	2.E-06	1.1E-01	I			3.0E-03	I					1	0.02		none		
Tetryl *(DNAP or picramic acid)*	4,100	NA	62	N	66					1.0E-04	X					1	0.1		RfDo	2.00E-03	NCEA 1995 (RfDo)
Metals (SRUs 2 and 3)																					
Arsenic	3.8	3.8	1.60	C	2.E-06	1.5E+00	I	4.3E-03	I	3.0E-04	I	1.5E-05	C			1	0.03		No RfCi		
Beryllium	2	1.3	2,000	N	0.001			2.4E-03	I	2.0E-03	I	2.0E-05	I			0.007			Withdrawn SFo, older RfDo, no RfCi	0.005, 4.3	IRIS (Sfo and RfDo)
Cadmium (diet)	1,700	1,000	800	N	2			1.8E-03	I	1.0E-03	I	2.0E-05	C			0.025	0		no RfCi		
Lead	1,000	NA	800	*na*																	
Mercury	610	610	310	N	2					3.0E-04	I	3.0E-04	S			0.07			none		
Sulfur																			no tox criteria		
Pesticides, PCBs (SRU 4 PCBs in soil)																					
PCB 1254	1.00	0.74	0.74	C	1.E-06	2.0E+00	S	5.7E-04	S	2.0E-05	I					1	0.14		No IUR, older SFo	7.7	IRIS (Sfo)
PCB 1260	1.00	0.74	0.74	C	1.E-06	2.0E+00	S	5.7E-04	S							1	0.14		No IUR, older SFo	7.7	IRIS (Sfo)
Semivolatiles (BNA's) (SRU5 - Organics in Soil)																					
1,2-Dichchlorobenzene	10,000	180,000	9,800	ns						9.0E-02	I	2.0E-01	H	V		1		3.8E+02	none		
1,3-Dichchlorobenzene	10,000	180,000	NA	na															no tox criteria		
1,4-Dichchlorobenzene	240	240	12	C	2.E-05	5.4E-03	C	1.1E-05	C	7.0E-02	A	8.0E-01	I	V		1			no RfDo, no IUR, older SFo	2.40E-02	HEAST (Sfo)
2-Methylnaphthalene	10,000	NA	NA	na															no tox criteria		
1,2,4-Trichlorobenzene	10,000	20,000	99	C	1.E-04	2.9E-02	P			1.0E-02	I	2.0E-03	P	V		1		4.0E+02	No SFo, older RfCi	9.00E-03	IRIS (RfCi)
Acenaphthylene	10,000	NA	NA	na															no tox criteria		
Anthracene	10,000	610,000	170,000	C	6.E-08					3.0E-01	I			V		1	0.13		none		
Benzo(a)anthracene	8.0	7.8	2.10	C	4.E-06	7.3E-01	E	1.1E-04	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-04	EPA 1994 (IUR)
Benzo(a)pyrene	1.0	0.8	0.21	C	5.E-06	7.3E+00	I	1.1E-03	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-03	IRIS (IUR)
Benzo(g,h,i)perylene	10,000	NA	NA	na															no tox criteria		
Benzo(b)fluoranthene	8.0	7.8	2	C	4.E-06	7.3E-01	E	1.1E-04	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-04	EPA 1994 (IUR)
Benzo(k)fluoranthene	78	78	21	C	4.E-06	7.3E-02	E	1.1E-04	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-05	EPA 1994 (IUR)
Bis(2-ethylhexyl)phthalate	410	410	120	C	3.E-06	1.4E-02	I	2.4E-06	C	2.0E-02	I					1	0.1		No IUR		
Chrysene	780	780	210	C	4.E-06	7.3E-03	E	1.1E-05	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-06	EPA 1994 (IUR)
Dibenz(a,h)anthracene	0.8	0.8	0.21	C	4.E-06	7.3E+00	E	1.2E-03	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-03	EPA 1994 (IUR)
Diethyl phthalate	10,000	1,000,000	490,000	N	0.02					8.0E-01	I					1	0.1		none		
Di-n-butyl phthalate	10,000	200,000	62,000	N	0.2					1.0E-01	I					1	0.1		none		
Di-n-octyl phthalate	10,000	41,000	6,200	N	2					1.2E-02	P					1	0.1		RfDo	2.00E-02	HEAST
Fluoranthene	10,000	82,000	22,000	N	0.5					4.0E-02	I					1	0.13		none		
Fluorene	10,000	82,000	22,000	N	0.5					4.0E-02	I			V		1	0.13		none		
Hexachlorobenzene	3.6	3.6	1.10	C	3.E-06	1.6E+00	I	4.6E-04	I	8.0E-04	I					1	0.1		none		
Inden[1,2,3-cd]pyrene	7.8	7.8	2.10	C	4.E-06	7.3E-01	E	1.1E-04	C						M	1	0.13		IUR, mutagenicity consideration	1.70E-04	EPA 1994 (IUR)
Naphthalene	10,000	82,000	18	C	6.E-04			3.4E-05	C	2.0E-02	I	3.0E-03	I	V		1	0.13		no previous tox criteria		
Phenanthrene	10,000	NA	NA	na															no tox criteria		
Phenol	10,000	1,000,000	180,000	N	0.1					3.0E-01	I	2.0E-01	C			1	0.1		No RfCi, older RfDi	6.00E-01	IRIS
Pyrene	10,000	61,000	17,000	N	0.6					3.0E-02	I			V		1	0.13		none		
Organics-Special (SRU5 - Organics in Soil)																					
TPH	2,500	NA	*See Tables A.8-3a,b*					*4.50E-06*	*P*	*0.01*	*P*	*0.1*	*P*			*1*	*0.1*		*RfDo, no RfCi, no SFo*	?	MADEP

[1] Note: The 1998 ROD PRG was divided by the 2013 EPA RSL and then multiplied by the acceptable hazard index (1) or cancer risk (1E-06) used to develop the RSL.

Key (from EPA 2013): I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

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Table A.8-2
Industrial Risk Based Cleanup Goals (1998 and 2013), and COCs per Individual Industrial Sites

Contaminant	1998 ROD Industrial PRGs	May 2013 EPA Industrial RSLs	Cancer or non-cancer endpoint?	New Risk or HI for old RG	L6	L11	L16	L17	M5	M6	M7	M8	M9	M13	M16 [1]
Explosives (SRUs 1 and 3)															
1,3,5-TNB	100	27,000	N	0.004					X	X	X				
2,4,6-TNT	190	79	C	2.E-06					X	X	X				
DNT mixture	8	2.5													
2,4-DNT	8.4	5.50	C	2.E-06					X	X	X		X		
2,6-DNT	8.4	1.20	C	7.E-06					X	X	X				
2-NT (ortho nitrotoluene)	10,000	13	C	8.E-04						X					
HMX	10,000	49,000	N	0.2			X								
RDX	52	24	C	2.E-06			X			X	X				
Tetryl *(DNAP or picramic acid)*	4,100	62	N	66					X						
Metals (SRUs 2 and 3)															
Arsenic	3.8	1.60	C	2.E-06		X				X			X		X
Beryllium	2	2,000	N	0.001					X					X	X
Cadmium (diet)	1,700	800	N	2											X
Lead	1,000	800	*na*						X	X				X	X
Mercury	610	310	N	2											X
Sulfur												X			
Pesticides, PCBs (SRU 4 PCBs in soil)															
PCB 1254	1.00	0.74	C	1.E-06	X			X							pesticides
PCB 1260	1.00	0.74	C	1.E-06	X			X							pesticides
Semivolatiles (BNA's) (SRU5 - Organics in Soil)															
1,2-Dichchlorobenzene	10,000	9,800	ns												X
1,3-Dichchlorobenzene	10,000	NA	na												X
1,4-Dichchlorobenzene	240	12	C	2.E-05											X
2-Methylnaphthalene	10,000	NA	na												X
1,2,4-Trichlorobenzene [2]	10,000	99	C	1.E-04											X
Acenaphthylene	10,000	NA	na		X										X
Anthracene	10,000	170,000	C	6.E-08	X										X
Benzo(a)anthracene	8.0	2.10	C	4.E-06	X										X
Benzo(a)pyrene	1.0	0.21	C	5.E-06	X									X	X
Benzo(g,h,i)perylene	10,000	NA	na		X										X
Benzo(b)fluoranthene	8.0	2	C	4.E-06	X										X
Benzo(k)fluoranthene	78	21	C	4.E-06	X										X
Bis(2-ethylhexyl)phthalate	410	120	C	3.E-06											X
Chrysene	780	210	C	4.E-06	X										X
Dibenz(a,h)anthracene	0.8	0.21	C	4.E-06	X										X
Diethyl phthalate	10,000	490,000	N	0.02											X
Di-n-butyl phthalate	10,000	62,000	N	0.2											X
Di-n-octyl phthalate	10,000	6,200	N	2											X
Fluoranthene	10,000	22,000	N	0.5	X										X
Fluorene	10,000	22,000	N	0.5	X										X
Hexachlorobenzene	3.6	1.10	C	3.E-06											X
Inden[1,2,3-cd]pyrene	7.8	2.10	C	4.E-06	X										X
Naphthalene	10,000	18	C	6.E-04	X										X
Phenanthrene	10,000	NA	na		X										X
Phenol	10,000	180,000	N	0.1											X
Pyrene	10,000	17,000	N	0.6	X										X
Organics-Special (SRU5 - Organics in Soil)															
TPH	2,500	*See Tables A.8-3a,b*													
Total new cancer risk at old RGs per site					**7.E-04**	**2.E-06**	**2.E-06**	**3.E-06**	**1.E-05**	**8.E-04**	**1.E-05**		**4.E-06**	**5.E-06**	**7.E-04**
Total new hazard index at old RGs per site					**3**		**0.2**		**66**					**0.001**	**7**

Notes:

1 - The list of COCs in this table for M16 were obtained from the 1998 ROD. A further discussion of the "COCs" for site M16 is provided in Attachment 8 text.

2 - 1,2,4-trichlorobenzene is not a COC for any of the sites included in this five-year review (despite inclusion in the 1998 ROD)

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Table A.8-3a

Development of Risk Based Cleanup Goal for Total Petroleum Hydrocarbons, Medium Chain Aliphatics, Non-Carcinogenic Endpoint

Exposure Assessment and Equations for Risk Based Soil Concentration from EPA 2013

Variable Name	Abbreviation	units		Fraction used	
Volatilization factor, soil	VFs	m^3/kg	17605	C9-C18 aliphatics	
Oral Reference dose	RfDo	mg/kg-day	0.01	C9-C18 aliphatics	Screening Value
Inhalation Reference Concentration	RfCi	mg/m^3	0.1	C9-C18 aliphatics	Screening Value
Target Harzard Quotient	THQ	unitless	1		
Non carcinogen averaging time - Industrial Worker	ATn	days	365		
Body weight-Industrial Worker	BWc	kg	70		
Exposure Duration - Industrial Worker	EDc	years	25		
Soil ingestion rate - Industrial Worker	IRc	mg/day	100		
Exposure frequency for soil - Industrial Worker	EFc	days/year	250		
Skin surface area exposed to soil and sediment - Industrial Worker	SAc	cm^2	3300		
Adeherence Factor, Worker	AFc	mg/cm2	0.2		
Skin absorption default SVOCs	ABS	unitless	0.1		
GI absorption	Giabs	unitless	1		
Exposure Time (Inhalation) Industrial Worker	ETi	hours/day	8		
Hours per day		hours	24		
Particulate Emissions Factor	PEF	m^3/kg	1.36E+09		
Conversion		kg/mg	1.00E-06		
RSL - oral non-cancer	RSLo-nc	mg/kg	1.02E+04		
RSL- dermal	RSLd-nc	mg/kg	1.55E+04		
RSL- inhalation	RSLi-nc	mg/kg	7.71E+03		
C(mg/kg) PRG for TPH-medium chain aliphatics, non-cancer	RSL - nc	mg/kg	**3.4E+03**		

Notes:

Used toxicity assessment as per 2009 PPRTV for TPH

Used VFs from Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases Montana Department of Environmental Quality October 2003, Appendix E http://deq.mt.gov/Rem/hwc/rbca/LinksTOC.asp

Table A.8-3b

Development of Risk Based Cleanup Goal for Total Petroleum Hydrocarbons, Medium Chain Aliphatics, Cancer Risk Endpoint

Exposure Assessment and Equations for Risk Based Soil Concentration from EPA 2013

Variable Name	Abbreviation	units		Fraction used	
Volatilization factor, soil	VFs	m^3/kg	17605	C9-C18 aliphatics	
Cancer Slope Factor	SF_0	per mg/kg-day	NA	C9-C18 aliphatics	insufficient evidence
Inhalation Unit Risk	IUR	per $\mu g/m^3$	4.5E-06	C9-C18 aliphatics	Screening Value
Target cancer risk (ILCR)	TR	unitless	1.00E-06		
Non carcinogen averaging time - Industrial Worker	ATn	days	365		
Lifetime	ATc	years	70		
Body weight-Industrial Worker	BWc	kg	70		
Exposure Duration - Industrial Worker	EDc	years	25		
Soil ingestion rate - Industrial Worker	IRc	mg/day	100		
Exposure frequency for soil - Industrial Worker	EFc	days/year	250		
Skin surface area exposed to soil and sediment - Industrial Worker	SAc	cm^2	3300		
Adeherence Factor, Worker	AFc	mg/cm2	0.2		
Skin absorption default SVOCs	ABS	unitless	0.1		
GI absorption	Giabs	unitless	1		
Exposure Time (Inhalatin) Industrial Worker	ETi	hours/day	8		
Hours per day		hours	24		
Particulate Emissions Factor	PEF	m^3/kg	1.36E+09		
Conversion		kg/mg	1.00E-06		
Conversion		ug/mg	1000		
RSL - oral cancer	RSLo - C	mg/kg	NA		
RSL- dermal cancer	RSLd - C	mg/kg	NA		
RSL- inhalation cancer	RSLi - C	mg/kg	4.80E+01		
C(mg/kg) PRG for TPH-medium aliphatics, carcinogenic	RSL - C	mg/kg	**4.8E+01**		

Notes:

Used toxicity assessment as per 2009 PPRTV for TPH

Used VFs from Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases Montana Department of Environmental Quality October 2003, Appendix E http://deq.mt.gov/Rem/hwc/rbca/LinksTOC.asp

Table A.8-4

Adult Lead Model PRG Calcluation, EPA/CERCLA Current Acceptable Blood Lead Level (10 ug/dL)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365
PRG		**ppm**	**1,120**

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Table A.8-5 Summary of Lead Results from M5 Closure Report Draft April 2000, mg/kg

ProUCL Version 4.1 Output: **General UCL Statistics for Data Sets with Non-Detects**

User Selected Options

From File	WorkSheet_b.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Number of Valid Observations	179	Number of Distinct Observations	140
Number of Missing Values	678		

Raw Statistics		Log-transformed Statistics	
Minimum	161	Minimum of Log Data	5.081
Maximum	984	Maximum of Log Data	6.892
Mean	351.9	Mean of log Data	5.747
Geometric Mean	313.2	SD of log Data	0.464
Median	279		
SD	189.6		
Std. Error of Mean	14.17		
Coefficient of Variation	0.539		
Skewness	1.505		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.191	Lilliefors Test Statistic	0.112
Lilliefors Critical Value	0.0662	Lilliefors Critical Value	0.0662
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	375.4	95% H-UCL	371.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	403.7
95% Adjusted-CLT UCL (Chen-1995)	377	97.5% Chebyshev (MVUE) UCL	427.6
95% Modified-t UCL (Johnson-1978)	375.6	99% Chebyshev (MVUE) UCL	474.6

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.376	Data do not follow a Discernable Distribution (0.05)	
Theta Star	80.42		
MLE of Mean	351.9		
MLE of Standard Deviation	168.2		
nu star	1567		
Approximate Chi Square Value (.05)	1476	Nonparametric Statistics	
Adjusted Level of Significance	0.0487	95% CLT UCL	375.3
Adjusted Chi Square Value	1475	95% Jackknife UCL	375.4
		95% Standard Bootstrap UCL	374.7
Anderson-Darling Test Statistic	5.359	95% Bootstrap-t UCL	376.4
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	374.8
Kolmogorov-Smirnov Test Statistic	0.144	95% Percentile Bootstrap UCL	375.7
Kolmogorov-Smirnov 5% Critical Value	0.0693	95% BCA Bootstrap UCL	377.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	413.7
		97.5% Chebyshev(Mean, Sd) UCL	440.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	493
95% Approximate Gamma UCL (Use when n >= 40)	373.6		
95% Adjusted Gamma UCL (Use when n < 40)	373.8		

Potential UCL to Use	
Use 95% Student's-t UCL	375.4
or 95% Modified-t UCL	375.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Table A.8-6 Summary of Tetryl Results from M5 Closure Report Draft April 2000, mg/kg

ProUCL Version 4.1 Output: General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

General Statistics

Number of Valid Data	857	Number of Detected Data	336
Number of Distinct Detected Data	152	Number of Non-Detect Data	521
		Percent Non-Detects	60.79%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	4.9	Minimum Detected	1.589
Maximum Detected	4900	Maximum Detected	8.497
Mean of Detected	423.1	Mean of Detected	4.738
SD of Detected	759.1	SD of Detected	1.683
Minimum Non-Detect	2.1	Minimum Non-Detect	0.742
Maximum Non-Detect	26	Maximum Non-Detect	3.258

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	597
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	260
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	69.66%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.291	Lilliefors Test Statistic	0.0578
5% Lilliefors Critical Value	0.0483	5% Lilliefors Critical Value	0.0483
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	168.7	Mean	2.771
SD	517	SD	1.91
95% DL/2 (t) UCL	197.8	95% H-Stat (DL/2) UCL	120
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	1.905
		SD in Log Scale	2.855
		Mean in Original Scale	167.7
		SD in Original Scale	517.3
		95% t UCL	196.8
		95% Percentile Bootstrap UCL	198.5
		95% BCA Bootstrap UCL	202.1
		95% H-UCL	583

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.485	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	873		
nu star	325.7		
A-D Test Statistic	11.35	**Nonparametric Statistics**	
5% A-D Critical Value	0.825	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.825	Mean	169
5% K-S Critical Value	0.0526	SD	516.6
Data not Gamma Distributed at 5% Significance Level		SE of Mean	17.67
		95% KM (t) UCL	198.1
Assuming Gamma Distribution		95% KM (z) UCL	198.1
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	198.1
Minimum	0.000001	95% KM (bootstrap t) UCL	203.5
Maximum	4900	95% KM (BCA) UCL	202.2
Mean	165.9	95% KM (Percentile Bootstrap) UCL	198.4
Median	0.000001	95% KM (Chebyshev) UCL	246.1
SD	517.9	97.5% KM (Chebyshev) UCL	279.4
k star	0.0729	99% KM (Chebyshev) UCL	344.9
Theta star	2275		
Nu star	125	**Potential UCLs to Use**	
AppChi2	100.2	95% KM (Chebyshev) UCL	246.1
95% Gamma Approximate UCL (Use when n >= 40)	207		
95% Adjusted Gamma UCL (Use when n < 40)	207.1		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

ProUCL Version 4.1 Output: General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2NT

General Statistics

Number of Valid Data	1022	Number of Detected Data	12
Number of Distinct Detected Data	10	Number of Non-Detect Data	1010
		Percent Non-Detects	98.83%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0057	Minimum Detected	-5.167
Maximum Detected	2.7	Maximum Detected	0.993
Mean of Detected	0.947	Mean of Detected	-1.193
SD of Detected	0.836	SD of Detected	2.384
Minimum Non-Detect	0.0078	Minimum Non-Detect	-4.854
Maximum Non-Detect	53	Maximum Non-Detect	3.97

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	1,022
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.909	Shapiro Wilk Test Statistic	0.723
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.302	Mean	-1.385
SD	1.043	SD	0.345
95% DL/2 (t) UCL	0.356	95% H-Stat (DL/2) UCL	N/A

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-4.886
		SD in Log Scale	1.821
		Mean in Original Scale	0.0393
		SD in Original Scale	0.145
		95% t UCL	0.0467
		95% Percentile Bootstrap UCL	0.047
		95% BCA Bootstrap UCL	0.0486
		95% H-UCL	N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.468	Data appear Normal at 5% Significance Level	
Theta Star	2.026		
nu star	11.22		

A-D Test Statistic	1.114	Nonparametric Statistics	
5% A-D Critical Value	0.781	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.781	Mean	0.0174
5% K-S Critical Value	0.258	SD	0.134
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0044
		95% KM (t) UCL	0.0246
Assuming Gamma Distribution		95% KM (z) UCL	0.0246
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0244
Minimum	1.00E-06	95% KM (bootstrap t) UCL	0.0286
Maximum	2.7	95% KM (BCA) UCL	0.665
Mean	0.275	95% KM (Percentile Bootstrap) UCL	0.661
Median	0.0129	95% KM (Chebyshev) UCL	0.0366
SD	0.38	97.5% KM (Chebyshev) UCL	0.0449
k star	0.131	99% KM (Chebyshev) UCL	0.0612
Theta star	2.096		
Nu star	268.5	Potential UCLs to Use	
AppChi2	231.5	95% KM (t) UCL	0.0246
95% Gamma Approximate UCL (Use when n >= 40)	0.319	95% KM (Percentile Bootstrap) UCL	0.661
95% Adjusted Gamma UCL (Use when n < 40)	0.319		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

ProUCL Version 4.1 Output: General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_c.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics	733	Number of Detected Data	10
Number of Valid Data	8	Number of Non-Detect Data	723
Number of Distinct Detected Data		Percent Non-Detects	98.64%
		Log-transformed Statistics	
Raw Statistics	920	Minimum Detected	6.824
Minimum Detected	3500	Maximum Detected	8.161
Maximum Detected	1942	Mean of Detected	7.476
Mean of Detected	893.4	SD of Detected	0.461
SD of Detected	2.9	Minimum Non-Detect	1.065
Minimum Non-Detect	800	Maximum Non-Detect	6.685
Maximum Non-Detect			
		Number treated as Non-Detect	723
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Detected	10
For all methods (except KM, DL/2, and ROS Methods),		Single DL Non-Detect Percentage	98.64%
Observations < Largest ND are treated as NDs			
UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only	0.904	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Test Statistic	0.842	5% Shapiro Wilk Critical Value	0.842
5% Shapiro Wilk Critical Value		Data appear Lognormal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
		Assuming Lognormal Distribution	
Assuming Normal Distribution		DL/2 Substitution Method	
DL/2 Substitution Method	46.05	Mean	2.466
Mean	247	SD	1.069
SD	61.07	95% H-Stat (DL/2) UCL	22.7
95% DL/2 (t) UCL			
		Log ROS Method	
Maximum Likelihood Estimate(MLE) Method	2307	Mean in Log Scale	3.038
Mean	847.5	SD in Log Scale	1.448
SD	2359	Mean in Original Scale	72.21
95% MLE (t) UCL	2741	SD in Original Scale	252.5
95% MLE (Tiku) UCL		95% t UCL	87.57
		95% Percentile Bootstrap UCL	88.54
		95% BCA Bootstrap UCL	91.79
		95% H UCL	67.97
		Data Distribution Test with Detected Values Only	
Gamma Distribution Test with Detected Values Only	3.858	Data appear Normal at 5% Significance Level	
k star (bias corrected)	503.4		
Theta Star	77.15		
nu star			
	0.37	Nonparametric Statistics	
A-D Test Statistic	0.729	Kaplan-Meier (KM) Method	
5% A-D Critical Value	0.729	Mean	933.9
K-S Test Statistic	0.267	SD	154.4
5% K-S Critical Value		SE of Mean	6.013
Data appear Gamma Distributed at 5% Significance Level		95% KM (t) UCL	943.8
		95% KM (z) UCL	943.8
Assuming Gamma Distribution		95% KM (jackknife) UCL	1049
Gamma ROS Statistics using Extrapolated Data	1.00E-06	95% KM (bootstrap t) UCL	946.2
Minimum	3500	95% KM (BCA) UCL	1215
Maximum	26.49	95% KM (Percentile Bootstrap) UCL	1213
Mean	1.00E-06	95% KM (Chebyshev) UCL	960.2
Median	246.2	97.5% KM (Chebyshev) UCL	971.5
SD	0.0526	99% KM (Chebyshev) UCL	993.8
k star	503.6		
Theta star	77.12	Potential UCLs to Use	
Nu star	57.89	95% KM (t) UCL	943.8
AppChi2	35.29	95% KM (Percentile Bootstrap) UCL	1213
95% Gamma Approximate UCL (Use when n >= 40)	35.31		
95% Adjusted Gamma UCL (Use when n < 40)			

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Table A.8-9 Summary of Lead Results from M13 Closure Report Final 2009, mg/kg

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Number of Valid Data	7	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	7
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Lead was not processed!

Highest result for Lead on M13 was 18mg/kg, which is comparable to background concentrations.

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Table A.8-10
Comparison of 2004 ROD PRGs with EPA Eco-Soil Screening Values (mg/kg)

2004 ROD Appendix A Table 1: JOAAP Management Team Agreement on Cleanup Approach and Goals					Eco-SSLs: Target Organisms				Published Soil Background Values		
Constituent	**Lower Cleanup Value**	**Basis for Low Value**	**Upper Cleanup Value**	**Basis for High Value**	**Plants**	**Soil Invertebrates**	**Birds**	**Mammals**	**Eastern USA 95th %**	**Eastern USA 50th %**	**Illinois TACO Non-Metropolitan Counties**
Antimony	50	Low Adverse Effects Level for plants	757	Human health based	NA	78	NA	0.27	1.5	1	3.3
Arsenic	21	Low Adverse Effects Level for insectivores	84	2 x UTL based RI analysis	18	NA	43	46	14	5	11.3
Barium	625	No Adverse Effects Level for Plants	1950	Low Adverse Effects Level for Insectivores	NA	330	NA	2000	550	375	122
Cadmium	63	No Adverse Effects Level for Plants	220	Low Adverse Effects Level for Insectivores	32	140	0.77	0.36	0.9	0.25	0.50
Chromium	213	Low Adverse Effects Level for insectivores	213	Low Adverse Effects Level for Insectivores	NA	NA	26	34	80	45	13.0
Cobalt	240	No Adverse Effects Level for Plants	2400	Low Adverse Effects Level for Plants	13	NA	120	230	12	8	8.9
Copper	190	No Adverse Effects Level for Plants	925	Low Adverse Effects Level for Plants	70	80	28	49	35	18	12.0
Lead	500	Low Adverse Effects Level for plants	500	Low Adverse Effects Level for Plants	120	1700	11	56	40	19	20.9
Mercury	10	No Adverse Effects Level for Plants	13	Low Adverse Effects Level for Insectivores	no Eco-SSL						0.05
Nickel	210	No Adverse Effects Level for Plants	2090	Low Adverse Effects Level for Plants	38	280	210	130	30	15	13.0
Silver	16	Low Adverse Effects Level for plants	9467	Human health based	560	NA	4.2	14	1.2	0.9	0.50
Thallium	2 x UTL	Low Adverse Effects Level for Carnivores	86	Low Adverse Effects Level for Carnivores	no Eco-SSL						0.42
Zinc	720	No Adverse Effects Level for Plants	2500	Low Adverse Effects Level for Insectivores	160	120	46	79	80	45	60.2
2,4-DNT	20	Human Health Based	20	Human Health Based	no Eco-SSL						
2,6-DNT	20	Human Health Based	20	Human Health Based	no Eco-SSL						
HMX	2860	Low Adverse Effects Level for Herbivores	2860	Low Adverse Effects Level for Herbivores	no Eco-SSL						
Total PAHS - Low MW	754,291*	Human Health Based	754,291*	Human Health Based	NA	29	NA	100			3.51
Total PAHS - High MW	51,127*	Human Health Based	51,127*	Human Health Based	NA	18	NA	1.1			6.83
benzo(a)pyrene (a high MW PAH)	2	Human Health Based	2	Human Health Based							0.98

* The total PAH concentrations from Table 6-2 of the 2004 ROD were summed. Low MW PAHs are those with fewer than 4 aromatic rings, and high MW PAHs have four or more aromatic rings (EPA 2007c)
Ecotoxicity study dates for shaded constituents were reviewed from EPA Eco-SSL documentation

Table A.8-11
Review of Toxicity Studies Used to Develop USEPA Eco-Soil Screening Values

	Endpoint	latest study used to support Eco-SSL development	Test organism(s)	Relevant test species for JOAAP? (listed in Appendix C of the 2000 EWG PRG document?)
Cadmium	Plants	1996	corn, garlic	No
Cobalt	Plants	2000	alfalfa, barley, radish	No
Copper	Plants	1998	perennial ryegrass	No
Lead	Plants	1993	Berseem clover, Ryegrass	No
Nickel	Plants	2000	alfalfa, barley, brassica	No
Silver	Plants	1973	soybeans, wheat, corn, sunflower (*Helianthus annus)*	No
Zinc	Plants	1993	lettuce	No
PAHs	Soil invertebrates	2002, 2004	earthworm, potworm, springtail	*Yes (likely present but survey not documented)*
PAHs	Mammals	2004	various, including mice, rat, rabbits	Yes

Table A.8-12: Update to Table A-2 of the 1996 PRG Development for the 1998 ROD
Cancer Slope Factors, Reference Doses, and Newly Calculated Risk-Based Park Worker Groundwater RGs (ug/L)

	USEPA Regional Toxicity Criteria May 2013[1]					Equation Results[4]		New RG
Contaminant	**SFo (mg/kg-day)$^{-1}$**	**key [2]**	**RfD_o (mg/kg-day)**	**key [2]**	**Toxicity Criteria that changed since 1996 (and 1996 value) [3]**	Carcinogenic	Non-Carcinogenic	**Minimum Value**
1,3,5-TNB			3.0E-02	I	RfDo (5.0E-05)	--	3,066	3,066
1,3-DNB			1.0E-04	I	*none*	--	10	10
2,4,6-TNP[5]			2.0E-03	I	RfDo (3.0E-03)	--	204	204
2,4,6-TNT	3.0E-02	I	5.0E-04	I	*none*	9.5	51	9.5
2,4-DNT	3.1E-01	C	2.0E-03	I	SFo (6.8E-01)	0.9	204	0.9
2,6-DNT	1.5E+00	P	3.0E-04	X	SFo (6.8E-01), RfDo (1.0E-03)	0.2	--[6]	0.2
2-NT (ortho nitrotoluene)	2.2E-01	P	9.0E-04	P	no SFo, RfDo (1.0E-02)	1.3	92	1.3
DNAP			1.0E-04	X	RfDo (2.0E-03)	--	--[6]	--[6]
HMX			5.0E-02	I	*none*	--	5,110	5,110
NB			2.0E-03	I	RfDo (5.0E-04)	--	204	204
RDX	1.1E-01	I	3.0E-03	I	*none*	2.6	307	2.6
Tetryl [7]			1.0E-04	X	RfDo (1.0E-02)	--	--[6]	--[6]

[1] EPA 2013, Regional Screening Levels (RSL) Summary Table, May 2013 (table last updated); available via EPA Region web sites, http://www.epa.gov/reg3hwmd/risk/human/rbconcentration_table/Generic_Tables/index.htm

[2] Key: I = IRIS; P = Provisional Peer Reviewed Toxicity Values (PPRTV); C = Cal EPA; X = PPRTV Appendix (Screening level)

[3] Original toxicity criteria are from Table A-2 of OHM 1996 (which used EPA Region 3 RBC table toxicity criteria except for TNP and DNAP)

[4] Equation and inputs from Tables A-1 and A-2 for Park Employee who drinks 1 L of groundwater a day for 250 days per year, for 25 years (OHM 1996).

[5] Used 2,4-Dinitrophenol as surrogate

[6] No RGs can be calculated using this toxicity criterion since it is the Army's position that the PPRTV Appendix screening toxicity criteria should not be used to quantify risk.

[7] Used DNAP as surrogate

Table A.8-13: Comparison of Risk-Based RGs with October 2012 ARAR-Based RGs for JOAAP Groundwater Operable Unit

	Risk-Based RGs [1]		New Risks		ARAR Based RGs [2]	
Contaminant	**1998 ROD Risk-Based Groundwater RGs (µg/L)**	**2013 New Potential Risk-Based Concentrations for GW (µg/L)**	**Cancer or Non-Cancer endpoint for 2013?**	**New Cancer Risk or Hazard Index at 1998 RG**	**Current IEPA Class I Groundwater RGs (µg/L)**	**Current IEPA Class II Groundwater RGs (µg/L)**
1,3,5-TNB	5.1	3,066	nc	0.002	840	840
1,3-DNB	10	10	nc	1	0.7	0.7
2,4,6-TNP[4]	200	204	nc	1	NA	NA
2,4,6-TNT	9.5	9.5	nc	1	14	14
2,4-DNT	0.42	0.9	c	5.E-07	0.1	0.1
2,6-DNT	0.42	0.2	c	2.E-06	0.31	0.31
2-NT (ortho nitrotoluene)	5,100	1.3	c	4.E-03	NA	NA
DNAP [3]	200	--	nc		NA	NA
HMX	5,100	5,110	nc	1	1,400	1,400
NB	51	204	nc	0.2	14	14
RDX	2.6	2.6	c	1.E-06	84	84
Tetryl (DNAP) [3]	200	--	nc		NA	NA

[1] Please see Table A.8-12 for derivation of 2013 risk-based groundwater RGs from new toxicity criteria

[2] ARAR Based RGs are from the Illinois Groundwater Quality Standards for Class I and II Groundwater (35 1A C 620.410, .420) amended October 2012

[3] No RGs can be calculated for this constituent since it is the Army's position that the PPRTV Appendix screening toxicity criteria should not be used to quantify risk.

ATTACHMENT 9

PUBLIC NOTICES

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Photo by Fred Ruetz

QUIGLEY gets ready to throw the discus Monday at the Black Diamond Classic in Coal City.

PUBLIC NOTICE

JOLIET ARMY AMMUNITION PLANT

The US Army has begun the third five-year review for the Soil and Groundwater Operable Units at the Joliet Army Ammunition Plant, located in Will County, south of the Town of Elwood, Illinois and north of Wilmington, Illinois.

The purpose of the five-year review is to determine if the remedies implemented continue to be protective of human health and the environment. The Army is required to evaluate these remedies at least every five years until the groundwater meets unrestricted use levels.

If you have any concerns about the Joliet Army Ammunition Plant, please contact Mr. Arthur M. Holz, Commander's Representative. The report is scheduled for completion by the middle of June, 2014. When completed, a copy of the final report will be available at the information repository below.

Information Repository:

Joliet Army Ammunition Plant
Office/Information Repository
29401 South Route 53
Wilmington, IL 60481-8879

Contact Information:

Mr. Arthur M. Holz
Commander's Representative
29401 South Route 53
Wilmington, IL 60481-8879

Published in the Free Press Advocate, Wilmington, IL, May 8, 2013.

PUBLIC NOTICE

For Immediate Release:

August, 2015

Joliet Army Ammunition Plant

THE US ARMY COMPLETES THIRD FIVE-YEAR REVIEW

The US Army has completed the third five-year review of environmental remedies undertaken for the Soil and Groundwater Operable Units at the Joliet Army Ammunition Plant located in Will County, Illinois. The site is located south of the Town of Elwood, Illinois and north of Wilmington, Illinois.

The five-year review was conducted to determine whether the remedies remain protective of human health and the environment and function as intended based on the decision documents. The five-year review also determined if the remedies would continue to be protective in the future.

If you have any concerns about the Joliet Army Ammunition Plant, please contact please contact Mr. Arthur M. Holz, Commander's Representative. The report is available at the information repositories identified below.

Information Repositories:

Joliet Public Library
150 North Ottawa Road
Joliet, IL 60532

Joliet Army Ammunition Plant
Office/Information Repository
29401 South Route 53
Wilmington, IL 60481-8879

Contact Information:

(815) 740-2660
Hours: Mon.-Thurs. 9 am-9 pm
Fri. & Sat. 9 am-5 pm

Mr. Arthur M. Holz
Commander's Representative
29401 South Route 53
Wilmington, IL 60481-8879
(815) 423-2870
Hours: Mon.-Fri. 8 am-4:30 pm

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ATTACHMENT 10

MIDEWIN NATIONAL TALLGRASS PRAIRIE MANAGEMENT AREAS

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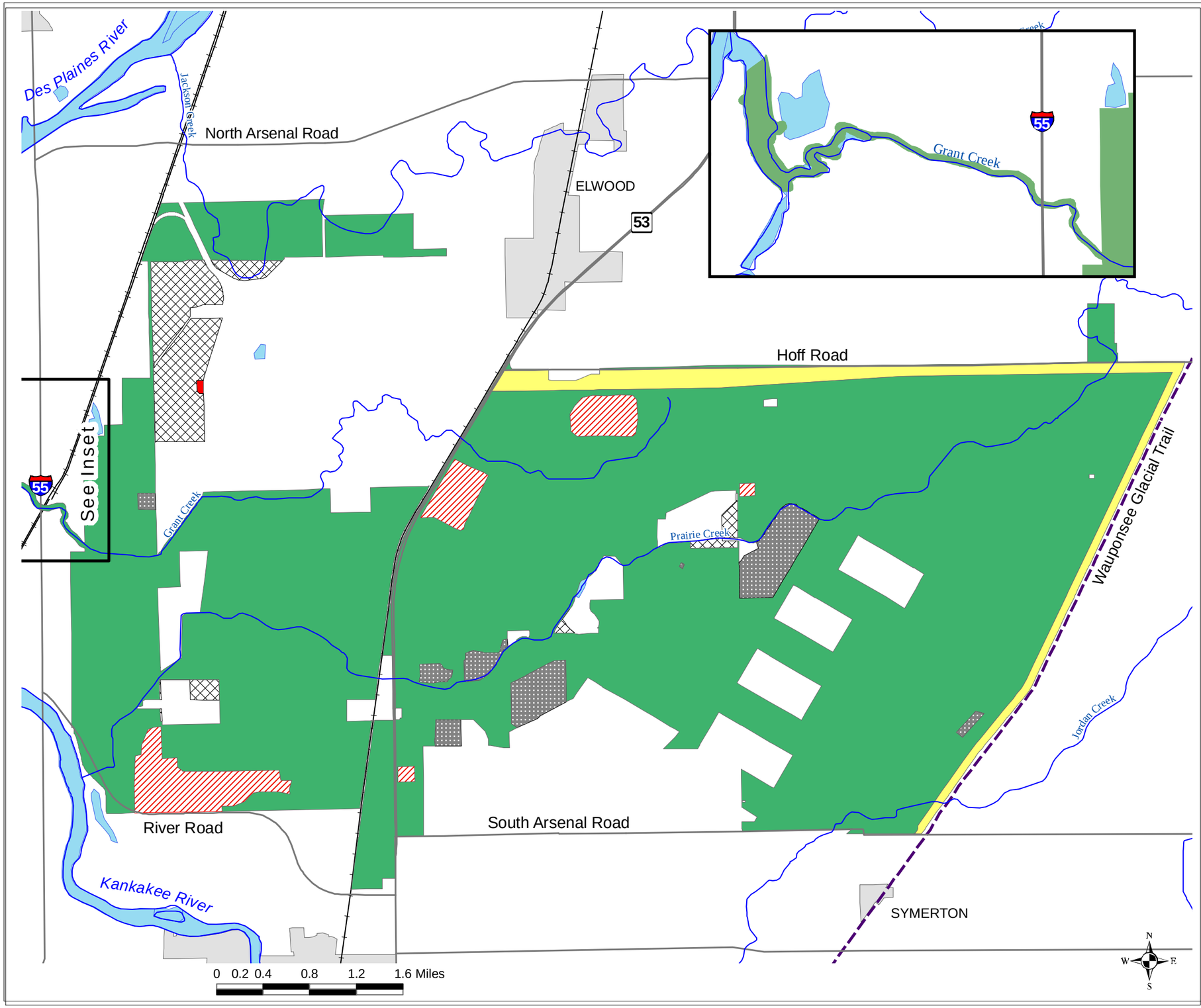
Figure 1

Midewin National Tallgrass Prairie

Management Areas
Amendment 1



LEGEND

- Public Roads

Management Area 1

- Restoration

Management Area 2

- Utility Corridor
- Administrative and Developed Rec. Sites

Management Area 3

- Groundwater Management Zone (GMZ)
- Soil Restricted Area (SRA)
- SRA/GMZ
- Wauponsee Trail
- Railroad
- Municipality

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Midewin National Tallgrass Prairie
30239 South State Route 53
Wilmington, Illinois 60481
(815) 423-6370

ATTACHMENT 11

WELL ABANDONMENT INFORMATION

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Table A11-1
Groundwater Monitoring Wells Abandoned
Joliet Army Ammunition Plant
Wilmington, Illinois

Site	Well Designation	Date[1] Installed	Well Depth[1] (ft - bgs)	Measured Well Depth (TOC)	Screen[1] Length (ft)	Formation Screened	Depth to Bedrock	Depth to Water (TOC)	Well Type	Bags[2] Sealant	Date Abandoned
L04	MW414	7/31/1991	32.7	35.4	15.0	Bedrock	3.0	2.46	4 inch PVC	4.5	8/27/10
	MW415	8/6/1991	41.0	43.3	15.0	Bedrock	13.0	10.24	4 inch PVC	5.5	8/27/10
L07	MW426	6/28/1991	19.8	22.2	10.0	Overburden	--	6.70	4 inch PVC	2.5	8/26/10
	MW427	7/3/1991	23.2	26.5	10.0	Overburden	--	5.52	4 inch PVC	2.3	8/26/10
	MW428	6/27/1991	29.5	32.9	15.0	Overburden	--	7.82	4 inch PVC	3	8/26/10
	MW429	6/26/1991	22.5	25.8	10.0	Overburden	--	5.72	4 inch PVC	2.5	8/26/10
	MW430	6/28/1991	21.8	24.6	10.0	Overburden	--	7.30	4 inch PVC	2.5	8/26/10
L08	MW432	7/10/1991	24.1	27.0	10.0	Overburden	--	6.23	4 inch PVC	2.5	8/25/10
	MW433	7/8/1991	22.0	24.0	10.0	Overburden	--	8.73	4 inch PVC	2.5	8/24/10
	MW434	7/3/1991	29.8	28.3	10.0	Overburden	--	10.83	4 inch PVC	2.5	8/26/10
	MW435	7/2/1991	22.5	25.4	10.0	Overburden	--	7.53	4 inch PVC	2.5	8/23/10
	MW436	7/8/1991	22.7	25.9	10.0	Overburden	--	6.47	4 inch PVC	2.5	8/23/10
	MW504	7/9/1991	23.2	26.8	10.0	Overburden	--	6.56	4 inch PVC	2.5	8/24/10
L09	MW301	8/3/1989	23.0	22.5	10.0	Overburden	--	8.16	2 inch SS	0.6	8/26/10
	MW302	8/1/1989	25.5	28.1	10.0	Overburden	--	6.95	2 inch SS	1	8/24/10
	MW303	7/31/1989	37.0	40.2	10.0	Overburden	--	9.02	2 inch SS	1	8/26/10
	MW306	8/9/1989	38.5	41.2	10.0	Overburden	--	5.22	2 inch SS	1	8/26/10
L10	MW3A1	6/17/1987	24.5	26.9	10.0	Overburden	--	5.04	2 inch SS	1	8/25/10
	MW3A2	6/17/1987	19.0	22.4	10.0	Overburden	--	7.48	2 inch SS	1	8/25/10
	MW3A3	6/16/1987	30.0	32.2	10.0	Overburden	--	9.00	2 inch SS	1	8/25/10
	MW442	7/29/1991	23.3	24.3	10.0	Overburden	--	3.30	4 inch PVC	2.5	8/27/10
	MW443	7/26/1991	22.7	25.1	10.0	Overburden	--	6.88	4 inch PVC	2.5	8/26/10
	MW444	7/30/1991	23.2	26.0	10.0	Overburden	--	8.76	4 inch PVC	2.5	8/25/10
	MW445	7/29/1991	22.5	25.6	10.0	Overburden	--	6.97	4 inch PVC	2.5	8/25/10
	MW446	7/25/1991	22.5	25.5	10.0	Overburden	--	5.35	4 inch PVC	2.5	8/25/10
	MW505	7/25/1991	22.7	25.4	10.0	Overburden	--	5.83	4 inch PVC	2.5	8/25/10
L15	MW453	6/24/1991	17.8	20.0	10.0	Combination	9.0	6.03	4 inch PVC	1.5	9/1/10
L16	MW454	6/25/1991	12.8	15.3	5.0	Bedrock	7.0	6.09	4 inch PVC	1.5	9/1/10
L19	MW456	6/24/1991	21.5	22.0	10.0	Overburden	22.0	9.47	4 inch PVC	2	8/27/10
L21	MW139	4/2/1981	39.0	39.2	20.0	Overburden	--	11.42	4 inch PVC	4	9/2/10
	MW459	7/17/1991	29.0	32.1	15.0	Overburden	--	7.04	4 inch PVC	3.5	9/2/10
	AEHA01[3]	NA	NA	39.0	NA	NA	NA	27.19	2 inch PVC	1.5	9/2/10
	AEHA03[3]	NA	NA	40.1	NA	NA	NA	35.48	2 inch PVC	1.25	9/3/10
	AEHA08[3]	NA	NA	31.2	NA	NA	NA	8.57	2 inch PVC	1	9/2/10
	G2[4]	NA	NA	39.3	NA	NA	NA	29.39	4 inch PVC	4.5	9/2/10
	G3[4]	NA	NA	43.2	NA	NA	NA	35.12	4 inch PVC	4.75	9/3/10
	G9[4]	NA	NA	33.3	NA	NA	NA	22.53	4 inch PVC	3	9/2/10
	Pipe(5)	NA	NA	42.8	NA	NA	NA	28.77	2 inch PVC	1.25	9/2/10
L33	MW458	7/26/1991	23.5	26.1	10.0	Overburden	--	6.30	4 inch PVC	3	8/24/10
Other Areas	MW153	2/12/1983	5.5	(6)	2.5	Overburden	5.5	(6)	2 inch PVC	0.5	9/8/10
M02	MW109	4/7/1981	44.0	11.9	open hole	Bedrock	8.0	10.55	4 inch PVC	1	9/7/10
M06	MW163	10/27/1982	6.0	(7)	3.0	Overburden	5.9	(7)	2 inch PVC	1	9/3/10
M09	MW218	4/13/1988	32.0	35.1	15.0	Overburden	--	31.65	4 inch PVC	3.5	9/8/10

Notes:
All wells abandoned were disinfected using sodium hypochlorite (bleach) prior to abandonment.
NA = Information not available
-- = Does not apply
TOC = Top of well casing
PVC = polyvinyl chloride
SS = stainless steel

Footnotes:
(1) Information obtained from monitoring well construction forms.
(2) Number of 50# bags of chipped bentonite used to seal well.
(3) PVC pipe only, no protective cover.
(4) Assumed well with protective cover is "G" series based on G1 (G101) labeled and nested with well with no protecive cover (AEHA01).
(5) Unlabeled and not on list, nested with G2 - 2 inch PVC with no protective cover.
(6) Well was filled with sand to TOC, pulled protective cover and cut well casing, topped with 1/2 bags chipped bentonite.
(7) Well was damaged (blocked at 2.2 ft below top of casing which was above ground surface) and heaved, no water level or total depth was able to be measured.

ATTACHMENT 12

SITE-WIDE DEED RESTRICTION IMPLEMENTATION REPORT

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FINAL

ANNUAL SUMMARY REPORT SITE WIDE DEED RESTRICTION IMPLEMENTATION

JOLIET ARMY AMMUNTION PLANT
WILL COUNTY, ILLINOIS

CONTRACT NO. GS-10F-0105K
DELIVERY ORDER W912QR-11-F-0222

Prepared for

U.S. Army Corps of Engineers
Louisville District
600 Martin Luther King Jr. Place
Louisville, KY 40202-2032

November 2013

URS Group, Inc.
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
Project No. 15302066

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BNSF	Burlington Northern Santa Fe Railway Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC DR POA	CenterPoint Intermodal Center Deer Run Property Owners Association
CPI LLC	CenterPoint Intermodal Limited Liability Corporation
ICs	Institutional Controls
IEPA	Illinois Environmental Protection Agency
GIS	Geographic Information System
GP	Georgia Pacific
GMZ	Groundwater Management Zone
IEPA	Illinois Environmental Protection Agency
IUOE Local 150	International Union Operating Engineers Local 150
JADA	Joliet Arsenal Development Authority
JOAAP	Joliet Army Ammunition Plant
LAP	Load-Assemble-Package
LLC	Limited Liability Corporation
LP	Limited Partnership
MFG	Manufacturing
MOA	Memorandum of Agreement
PCBs	Polychlorinated biphenyls
PIN	Parcel Identification Number
PL	Public Law
RAO	Remedial Action Objective
RG	Remedial Goal
TNT	Trinitrotoluene
URS	URS Group, Inc.
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USDA/FS	U.S. Department of Agriculture/U.S. Forest Service
USEPA	U.S. Environmental Protection Agency, Region V
USVA	U.S. Department of Veterans Affairs

SECTION ONE: INTRODUCTION

1.1 PROJECT BACKGROUND AND PURPOSE

The Joliet Army Ammunitions Plant (JOAAP) was a former United States Army (Army) munitions production facility located in Will County, Illinois that was declared excess by the Army in April 1993. The JOAAP property is divided into two main functional areas: the Manufacturing (MFG) Area west of Route 53, and the Load-Assemble-Package (LAP) Area east of Route 53. The MFG Area, covering approximately 14 square miles, is where the chemical constituents of munitions, propellants, and explosives were produced. The production facilities were generally located in the northern half of the MFG Area. In the southern half of the MFG Area, there was an extensive explosives storage facility. The LAP Area, covering approximately 22 square miles, is where munitions were loaded, assembled, and packaged for shipping. The LAP Area contained munitions filling and assembly lines, storage areas, and a demilitarization area.

Past releases and disposal practices at JOAAP resulted in soil and groundwater contamination with explosives compounds, metals, organics, polychlorinated biphenyls (PCBs), sulfur and inorganic hazardous and non-hazardous debris. The U.S. Army Environmental Command (USAEC) is managing environmental restoration activities conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The selected Remedial Goals (RGs) and Remedial Action Objectives (RAOs) for JOAAP as codified in the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas* (U.S. Army, 1998) were designed to be protective of human and ecological receptors based on the intended land use and were not intended for unlimited exposure and unrestricted use scenarios; therefore, Institutional Controls (ICs) were included as part of the remedy.

The purpose of the ICs was to ensure the protectiveness of the selected remedies at JOAAP by minimizing the potential for exposure to contamination and protecting the integrity of the remedies. ICs are comprised of various deed restrictions placed on properties prior to their transfer from the Army to federal and non-federal entities. These ICs include various restrictions on land use and prohibit the potable use of shallow groundwater.

This project was created to address U.S Environmental Protection Agency (USEPA) comments that arose from a Five-Year Review performed under CERCLA. The purpose of this project is to verify the ICs put in place through the use of deed restrictions are being implemented by federal and non-federal entities that now own the property.

1.2 PROJECT AUTHORIZATION

This project was conducted for the U.S. Army Corps of Engineers (USACE) Louisville District under Contract GS-10F-0105K, Delivery Order W912QR-11-F-0222. The work was conducted under the auspices of CERCLA and in accordance with applicable Federal, State, and local regulations and guidance.

URS Group, Incorporated (URS) prepared this report to document the procedures employed to execute the project and to present the findings.

1.3 INSTITUTIONAL CONTROL OVERVIEW

JOAAP has undergone and is continuing to undergo transfer of use to other agencies and organizations in accordance with the Illinois Land Conservation Act of 1995, Public Law (PL) 104-106, Division B, Title 2901-2932, February 10, 1996. Transfer of land is occurring incrementally as it is remediated and is deemed appropriate. ICs are implemented for all land areas that are not suitable for unlimited use or unrestricted exposure at the time of the property transfer. The ICs vary depending on impacted media and the intended land use, but are all intended to limit the exposure of human and ecological receptors to contaminated soil or groundwater in order to avoid unacceptable risks.

JOAPP property transfers have taken one of the following three forms:

1. Federal agency (Army) to Federal Agency (i.e., the property transferred to the U.S. Department of Agriculture/U.S Forest Service—USDA/FS)
2. Federal agency (Army) to the State of Illinois via the Joliet Arsenal Development Authority (JADA) for subsequent transfer to private entities
3. Federal agency (Army) to Will County, Illinois, for development of a landfill

Due to the procedure for transfer of land from one federal agency to another, formal deeds were not recorded for property that was transferred from the Army to the USDA/FS. However, Army conveyance documents (Environmental Condition of Property and Letters of Assignment) included applicable land use restrictions. These restrictions were incorporated into the USDA/FS official land management plan for the site (The Prairie Plan), and are included in revisions to The Prairie Plan.

The ICs required for property conveyed from the Army to the State of Illinois via JADA were implemented as Land Use Restrictions and Covenants, and Groundwater Restrictions and Covenants. These were recorded on the deeds of the properties. Detailed descriptions of the environmental condition of the property were also provided on the deeds. Two quit claim deeds were also conveyed from the Army to JADA. A Memorandum of Agreement (MOA) included with the deeds, or included by reference, details requirements for compliance, enforcement, and annual reporting associated with the ICs. Legal descriptions and parcel and tract maps annotated with special groundwater restriction areas were also included as exhibits to the individual deeds. The ICs required for property conveyed from the Army to Will County were implemented as Land Use Restrictions and Covenants and Groundwater Restrictions and Covenants recorded on the deed. Detailed descriptions of the environmental condition of the property were also included on the deed.

One quit claim deed was conveyed from the Army to Will County. Legal descriptions and parcel and tract maps annotated with special groundwater restriction areas were included as exhibits to the deed.

SECTION TWO: PROJECT PROCEDURES AND FINDINGS

2.1 OWNERSHIP VERIFICATION ACTIVITIES

Different ICs apply to different parcels of land, and to accurately verify the implementation of the ICs the first action taken was to verify the current owners of the parcels. To obtain this information URS accessed the Will County Recorder of Deeds to identify the property owner of record. This effort was more difficult than anticipated owing to a number of parcels that transferred ownership and the various legal steps required for properties to be transferred; mainly from the Army to JADA and then from JADA to various private entities. Another complexity was the change in Will County deed numbers when the parcels transferred ownership more than one time.

To verify the ownership information, URS prepared and mailed ownership verification letters to each identified property owner. Copies of these letters and the responses received back are included as Appendix A. When a response to the ownership verification request was not received from the property owner, it was solicited and obtained during the subsequent IC compliance verification phase discussed in the next section.

URS compiled the information into a listing of the property owners presented in Table 2-1. The data gathered was also compiled into a Geographical Information System (GIS), and unique map labels were assigned to each parcel for ease of reference. Mapping output from the GIS is presented as Figure 2-1.

The results of the ownership verification effort resulted in the following findings and/or revisions to the property ownership GIS:

- Both JADA and the Elwood Maple Hill Cemetery Association noted Parcels annotated as D33 is not owned by JADA, but rather is owned by the Cemetery Association.
- The Elwood Maple Hill Cemetery Association noted parcels D33 and D34 (Parcel Identification Number—PIN #'s 10-11-30-100-004 and 10-11-30-100-006) have been owned by the Association since the 1800's, were never part of JOAAP, and thus ICs are not applicable to these parcels. Parcel D32 (PIN # 10-11-30-100-005) was transferred from JOAAP and is now owned by the Elwood Maple Hill Cemetery Association and subject to ICs.
- The International Union of Operating Engineers Local 150 150a 150b 150c Building Corporation (IUOE Local 150) transferred 2.5 acres of land at the northwest corner of South Arsenal Road and Old Chicago Road to the Wilmington Fire Protection District. This parcel has the designation A12 on Figure 2-1.
- Fort James Operating Company was acquired by Georgia Pacific (GP) Corporation, which now holds title to parcel designated as D21.

2.2 STATEMENT OF COMPLIANCE QUESTIONNAIRES

Following confirmation of property ownership, URS sent out Statement of Compliance questionnaires to each property owner at the addresses listed in Table 2-2. The questionnaires generally contained the same questions, however, they did differ depending on the type of

property transfer (i.e., Federal to Federal; Federal to State to private; or Federal to County) and the future use of the property. The purpose of the questionnaires was to provide information for the Army to verify compliance with the deed restrictions placed on the property. Appendix B contains the Statement of Compliance responses from each owner, and Table 2-3 provides a summary of the responses obtained from the questionnaires.

Based on the responses received, it is apparent many respondents were confused about how to respond to Question 1 that asked if property owners complied with Land Use Restrictions. Many respondents checked "No" with the intent being to state the land was not being used for the various activities listed, as opposed to checking "Yes" meaning they were complying with the land use restrictions. This mistake was made by over half of the respondents who had this language in their questionnaire.

CenterPoint Intermodal Limited Liability Corporation (CPI LLC) and CenterPoint Intermodal Center Deer Run Property Owners Association (CIC DR POA) and Joliet Arsenal Development Authority (JADA) each checked "Unsure" about complying with property transfer notifications.

The IUOE Local 150 checked "Unsure" regarding the restriction of residential land use because they have a structure that is used 24 hours a day by personnel who provide security for the property.

2.3 SITE INSPECTIONS

To provide independent verification of property owners' compliance with ICs, site inspections were conducted. These site inspections were non-intrusive and consisted of visual observations only. The properties selected for site visits were based on 15% of the responders to the Statement of Compliance questionnaires and 100% of the non-responders.

The selection of property owners and parcels to inspect was biased toward properties located within Groundwater Management Zones (GMZs) and where soil remedial actions were implemented. The property owners and the parcels selected for inspection included:

- Parcel D06, owned by CPI, was selected because it comprises a majority of the former trinitrotoluene (TNT) manufacturing area where soil remediation occurred and monitoring wells used to sample groundwater are present.
- Parcels F059 and F078, owned by the USDA/FS, were selected because they encompass sites FM02 (Burning Ground), FM11 (Landfill), and FM01 (Southern Ash Pile) that are still undergoing long term monitoring by the Army.
- Parcels A10 and A11, owned by IUOE Local 150, were selected because of the uncertainty regarding compliance with the restriction on using the property for residential purposes.
- Parcel D21, owned by GP/Fort James Operating Company, was selected because at the time of the inspections the Statement of Compliance questionnaire had not been received. (Note: the Statement of Compliance was received the afternoon of June 12, 2013; however, the site inspection was still performed).

Prior to the site inspections, each property owner was contacted by phone and via mail to inform them of the planned inspections and to coordinate any required site access.

The inspections were conducted on June 12 and June 13, 2013 by:

- Meeckral Williams, USAEC
- Matthew Ridley, USACE, Louisville District
- Art Holz, ARIMD
- Scott McClelland, URS
- Amibeth Sheridan, URS

Appendix C documents the participants and observations made during the site inspection. Photographs taken to document the site conditions are also included.

In addition to the parcels planned to be inspected, additional time allowed inspections to be performed of parcel F008 owned by the USDA/FS; DM2 owned by the Army which is site L13, and consists of a capped landfill; and parcels F069, F083, F084, F085, F086 owned by the USDA/FS which surround FL02 (former Open Burning Ground site) and FL03 (former Demolition Area site) on the former LAP Area of JOAAP which are still retained by the Army.

Information provided on the Statement of Compliance questionnaires received from CPI, LLC; USDA/FS; IUOE Local 150; and GP/Fort James Operating Company was all confirmed during the site inspection, and no violations of the ICs were observed. The security building at IUOE Local 150 was found to be used to house an individual worker. The building's purpose is to enable this individual to provide 24 hour security for the facility as opposed to serving as a residential property, and as such may be considered consistent with the ICs in place for the property. The facility requires security because of the expensive equipment (i.e., cranes, bull dozers, excavators) and the presence of towers that may attract trespassers. Because the building looks like a residential property, concerns were raised regarding it's us as such, but its purpose was confirmed as being related to facility security as opposed to residential housing.

2.4 REGULATORY AGENCY COORDINATION

The U.S Environmental Protection Agency (USEPA), Region V and Illinois Environmental Protection Agency (IEPA) were involved throughout this project. This involvement included:

- Participation in the project kickoff meeting held on July 26, 2011.
- Being provided a draft version of the Statement of Compliance questionnaire for review and comment.
- Being provided a listing of the properties proposed to be inspected by the Army following receipt of the Statement of Compliance questionnaires for review and comment.
- Being provided a draft version of this document for review and comment.

Appendix D contains minutes from the kickoff meeting and copies of emails with regulatory agency comments and concurrence on the Statement of Compliance questionnaires, the properties proposed to be inspected during the site visits, and concurrence on the findings presented in this document.

SECTION THREE: SUMMARY AND RECOMMENDATIONS

This project was performed to collect data necessary to evaluate compliance with ICs put in place to protect human health as part of the selected remedies at JOAAP. Most of the property at JOAAP has been transferred from Army control. Records obtained from Will County were used to identify the current property owners of the parcels of land affected by the ICs, and these property owners provided data confirming or revising the property ownership.

One discrepancy in ownership was identified during this project. According to property records, parcels D33 and D34 (PIN #'s 10-11-30-100-004 and 10-11-30-100-006) that were assumed to have been transferred from the Army to the Elwood Maple Hill Cemetery Association were never part of JOAAP and thus ICs are not applicable to these parcels. Parcel D32 (PIN # 10-11-30-100-005) was transferred from the Army to the Elwood Maple Hill Cemetery Association and is subject to ICs.

The Will County records regarding parcel ownership were found to be mostly accurate, and the development and use of a GIS with unique identifiers for each parcel proved helpful when the Will County deed numbers changed. It is recommended that the Army retain the GIS records and update them as part of its monitoring of the implementation of ICs at JOAAP.

Statements of Compliance questionnaires were received from every property owner, and provided a useful means to obtain information regarding property owner compliance with ICs. It was noted that the wording of the questions pertaining to compliance with Land Use Restrictions posed confusion for some respondents, and it is recommended this wording be revised on future questionnaires.

The questionnaire used for the USDA/FS properties also requires revision based on comments provided by USDA/FS noting that there is not an IC that prohibits camping on its property and the ICs originated from the Environmental Condition of Property statements and the two CERCLA Records of Decision, not as deed restrictions.

Data from the questionnaires revealed confusion among some property owners regarding the notification requirements when a property is transferred, and it appears that property owners are not submitting annual reports to the Army verifying their compliance with ICs. To resolve this issue, it is recommended that the Army make annual requests for Statement of Compliance questionnaires from each property owner.

Figures

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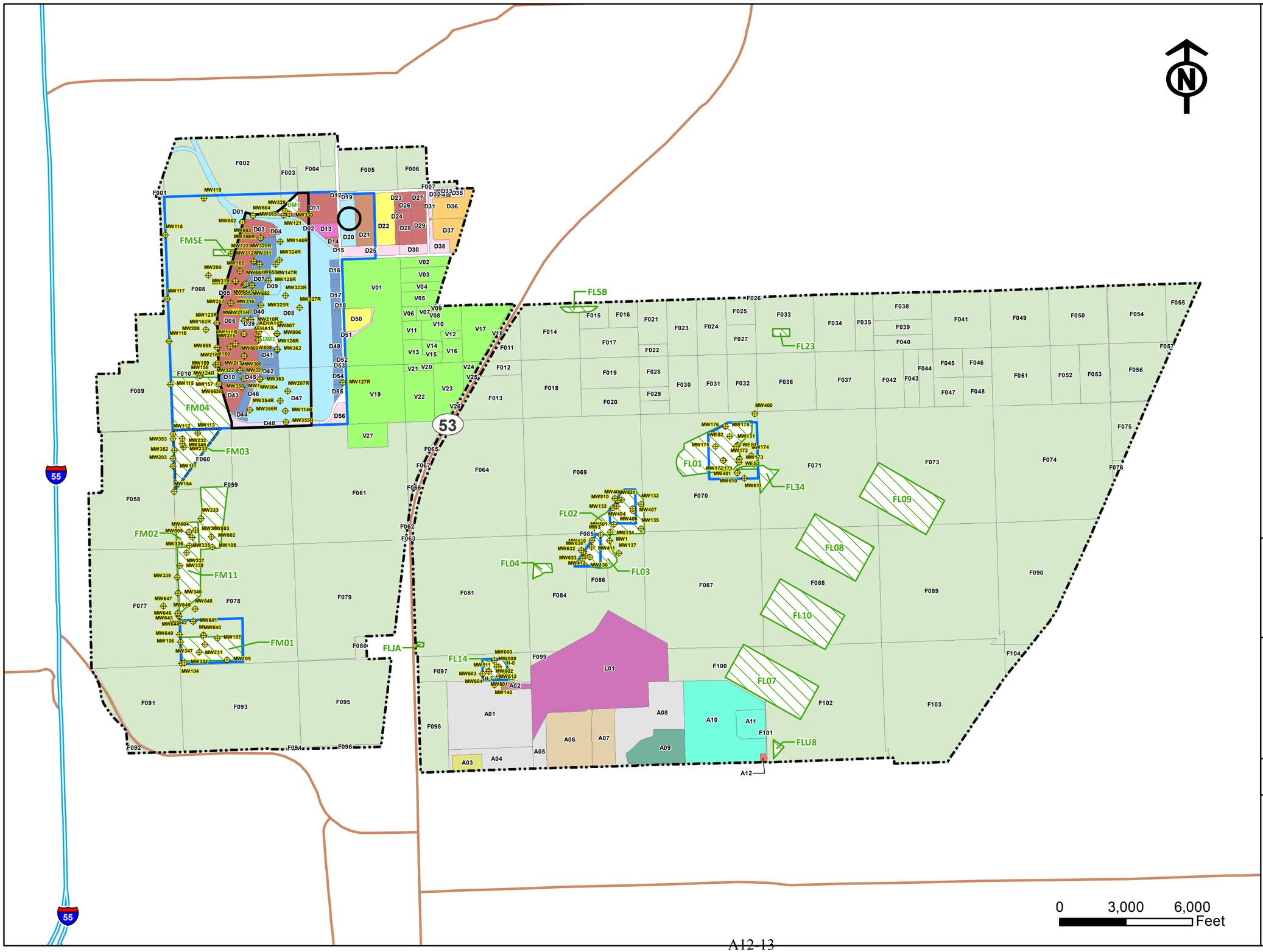

Legend

- Well Location
- Former Joliet Boundary
- Deed Restricted Parcels
- GMZ
- GMZ1

Parcels

Current Owner

- BNSF-LEASE
- BNSF
- CIC DR POA
- CPI LLC
- ELWOOD MAPLE HILL CEMETERY
- ELWOOD VILLAGE
- FJGCO LLC
- GP/FORT JAMES OPERATING CO
- IUOE LOCAL 150
- JADA
- LIBERTY PROPERTY LP
- PRAIRIE CRAFTSMAN LLC
- PROLOGIS
- US VA
- USDA/FS
- WALMART STORES EAST LP
- WILL COUNTY
- WILMINGTON FIRE DEPARTMENT
- USA - ARMY (yet to be transferred)

Note:

1) Parcel ownership is based on Will County Register data and feedback from owners and tenants. There may be discrepancies in these.

Figure 2-1
Parcel Ownership and Deed Restriction Elements – Overview

Former Joliet Army Ammunition Plant
Joliet, IL

Date: 07/24/2013

Path: G:\Projects\Former_Joliet_Army_Plant\Projects\Property_Investigation\Joliet_Base_11X17_Overview_DeededParcels_GMZ_WellLabels.mxd

URS
12420 Milestone Center Drive
Germantown, MD 20876

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Tables

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Table 2-1 - Listing of Property Owners
Former Joliet Army Ammunition Plant

Grantee *(Abberviations follow)*	Map Label	Will County Parcel Identification Number *(PIN)*	Acres (+/-)	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Groundwater Management Zone?	Monitoring Wells on Parcel?	Deed Restricted Parcel?	Date of Transfer
BNSF	D05	04-10-26-401-001-0000	10.6	R2002045744	R2010133610	Yes	6	Yes	12/10/10
BNSF	D07	04-10-26-502-001-0000	73.0	R2000086276	R2002105583	Yes	9	Yes	6/27/02
BNSF	D10	04-10-35-200-004-0020	8.0	R2000086264	R2012119388	Yes	1	Yes	10/25/12
BNSF	D16	04-10-25-502-001-0000	8.9	R2000086264	R2002105584	Yes			6/27/02
BNSF	D17	04-10-25-502-002-0000	13.1	R2000086264	R2002105584	Yes			6/27/02
BNSF	D41	04-10-35-502-003-0000	16.9	R2000086264	R2010057865	Yes	2	Yes	6/10/10
BNSF	D42	04-10-35-502-001-0000	13.8	R2000086264	R2003130582	Yes	2	Yes	6/9/03
BNSF	D44	04-10-35-502-002-0000	22.2	R2000086264	R2002227530	Yes	3	Yes	12/26/02
BNSF	D49	04-10-36-500-001-0000	21.7	R2000086264	R2010129644	Yes			12/2/10
BNSF	D53	04-10-36-500-002-0000	3.4	R2000086264	R2008019336	Yes			2/14/08
BNSF	D54	04-10-36-500-003-0000	7.8	R2000086264	R2009050466	Yes	1		4/29/09
BNSF	D55	04-10-36-300-005-0000	5.1	R2000086264	R2010129644	Yes			12/2/10
BNSF Subtotal		**12**	**204.4**				**24**		#N/A
BNSF - Leased	D01	04-10-23-101-002-0010	43.1	R2000086264	R2002105583	Yes	2	Yes	6/27/02
BNSF - Leased	D02	04-10-23-101-002-0020	14.5	R2000086264	R2002105583	Yes	2	Yes	6/27/02
BNSF - Leased	D08	04-10-36-101-001-0010	385.7	R2000086264	R2002105583	Yes	6	Yes	6/27/02
BNSF - Leased	D09	04-10-36-101-001-0010	13.2	R2000086264	R2010056239	Yes		Yes	6/7/10
BNSF - Leased	D20	04-10-25-201-010-0000	32.3	R2000086264	R2011064757	Yes		Yes	7/14/11
BNSF - Leased	D39	04-10-35-502-004-0000	10.1	R2010056234	R2010056239	Yes	4	Yes	6/7/10
BNSF - Leased	D47	04-10-36-101-001-0020	191.0	R2002045744	R2010057865	Yes	4	Yes	6/10/10
BNSF - Leased Subtotal		**7**	**689.8**				**18**		#N/A
CIC DR POA	D15	04-10-25-101-007-0000	0.1	R2000086264	R2000086271	Yes			8/11/00
CIC DR POA	D18	04-10-36-101-005-0000	0.1	R2000086264	R2010129644	Yes			12/2/10
CIC DR POA	D19	04-10-25-201-004-0000	4.2	R2000086264	R2010057862	Yes			6/10/10
CIC DR POA	D25	04-10-25-201-007-0000	27.4	R2000086264	R2010057862	Yes			6/10/10
CIC DR POA	D30	10-11-30-301-001-0000	12.9	R2000086264	R2010057862				6/10/10
CIC DR POA	D31	10-11-30-102-002-0000	6.1	R2000086264	R2010057863				6/10/10
CIC DR POA	D35	10-11-30-201-003-0000	5.3	R2000086264	R2010057863				6/10/10
CIC DR POA	D38	10-11-30-102-003-0000	21.7	R2000086264	R2010057863				6/10/10
CIC DR POA	D46	04-10-35-402-005-0000	5.9	R2000086264	R2010057863	Yes	1	Yes	6/10/10
CIC DR POA	D48	04-10-35-401-001-0000	22.0	R2002045744	R2010057863	Yes		Yes	6/10/10
CIC DR POA	D51	04-10-36-201-003-0000	6.7	R2000086264	R2010057863				6/10/10
CIC DR POA	D52	04-10-36-101-006-0000	0.1	R2000086264	R2010129644	Yes			12/2/10
CIC DR POA	D56	04-10-36-401-001-0000	15.3	R2000086264	R2010057863	Yes			6/10/10
CIC DR POA Subtotal		**13**	**127.5**				**1**		#N/A
CPI LLC	D03	04-10-26-200-002-0000	45.6	R2002045744	R2002105583	Yes		Yes	6/27/02
CPI LLC	D04	04-10-26-200-004-0000	2.4	R2000086264	R2002105583	Yes		Yes	6/27/02
CPI LLC	D06	04-10-35-200-004-0000	140.7	R2010056234	R2012119388	Yes	15	Yes	10/25/12
CPI LLC	D11	04-10-25-101-004-0000	58.1	R2000086264	R2006040134	Yes	1	Yes	3/9/06
CPI LLC	D12	04-10-25-101-005-0000	0.0	R2000086264	R2000086271	Yes			8/11/00
CPI LLC	D14	04-10-25-101-006-0000	4.7	R2000086264	R2006040134	Yes			3/9/06
CPI LLC	D23	04-10-25-201-008-0000	3.3	R2000086264	R2000086271				8/11/00
CPI LLC	D24	04-10-25-201-009-0000	6.2	R2000086264	R2000086271				8/11/00
CPI LLC	D26	10-11-30-101-004-0000	10.9	R2000086264	R2000086271				8/11/00
CPI LLC	D27	10-11-30-101-006-0000	8.9	R2000086264	R2000086271				8/11/00
CPI LLC	D28	10-11-30-101-005-0000	20.6	R2000086264	R2000086271				8/11/00
CPI LLC	D29	10-11-30-101-007-0000	27.5	R2000086264	R2000086271				8/11/00
CPI LLC	D40	04-10-35-200-003-0000	0.2	R2000086264	R2000086271	Yes		Yes	8/11/00
CPI LLC	D43	04-10-35-402-003-0000	22.5	R2000086264	R2000086271	Yes	1	Yes	8/11/00
CPI LLC	D45	04-10-35-402-001-0000	6.7	R2000086264	R2000086271	Yes		Yes	8/11/00
CPI LLC Subtotal		**15**	**358.3**				**17**		#N/A

Table 2-1 - Listing of Property Owners
Former Joliet Army Ammunition Plant

Grantee *(Abberviations follow)*	**Map Label**	**Will County Parcel Identification Number** *(PIN)*	**Acres (+/-)**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	**Groundwater Management Zone?**	**Monitoring Wells on Parcel?**	**Deed Restricted Parcel?**	**Date of Transfer**
Elwood MHC	D32	10-11-30-100-005-0000	3.8	R2000086264	R2003088615				#N/A
Elwood MHC	D33	10-11-30-100-004-0000	2.6	R68003508/9/10					#N/A
Elwood MHC	D34	10-11-30-100-006-0000	0.1	R2000086264	R2000086271				8/11/00
Elwood MHC Subtotal		**3**	**6.5**				-		#N/A
Elwood Village	D13	04-10-25-101-002-0000	15.0	R2000086264	R2002148335	Yes			9/11/02
Elwood Village Subtotal		**1**	**15.0**				-		#N/A
FJGCO LLC	A09	09-18-16-301-001-0000	77.0	R2000086264	R2011115350				12/6/11
FJGCO LLC Subtotal		**1**	**77.0**				-		#N/A
Georgia Pacific (aquired Fort James)	D21	04-10-25-201-011-0000	49.2	R2000086264	R2005210234	Yes		Yes	12/1/05
Georgia Pacific Subtotal		**1**	**49.2**				-		#N/A
IUOE Local 150	A10	09-18-16-400-002-0000	253.2	R2000086264	R2003270518				10/28/03
IUOE Local 150	A11	09-18-16-400-003-0000	39.4	R2000086264	R2005064067				4/19/05
IUOE Local 150 Subtotal		**2**	**292.6**				-		#N/A
JADA	A01	09-18-18-400-004-0000	255.6	R2005064066	R2005064066		1		4/19/05
JADA	A04	09-18-18-400-002-0000	103.0	R2004025145	R2004025145				2/13/04
JADA	A05	09-18-16-300-006-0000	25.3	R2000086264	R2000086264				8/11/00
JADA	A08	09-18-16-300-006-0000	154.6	R2000086264	R2000086264				8/11/00
JADA Subtotal		**4**	**538.5**				**1**		#N/A
Liberty Property LP	D22	04-10-25-201-012-0000	47.8	R2000086264	R2000086271				8/11/00
Liberty Property LP	D50	04-10-36-201-002-0000	27.0	R2000086264	R2000086271				8/11/00
Liberty Property LP Subtotal		**2**	**74.9**				-		#N/A
Prairie Craftsman	A03	09-18-18-300-003-0000	22.1	R2004025145	R2005213110				12/6/05
Prairie Craftsman Subtotal		**1**	**22.1**				-		#N/A
ProLogis	A06	09-18-17-300-003-0000	120.9	R2000086264	R2007081623				5/29/07
ProLogis	A07	09-18-17-400-002-0000	63.5	R2000086264	R2007081624				5/29/07
ProLogis Subtotal		**2**	**184.4**				-		#N/A
U.S. Army	DM1		10.5	To be transferred			2		#N/A
U.S. Army	DM2		21.0	To be transferred			6		#N/A
U.S. Army	FL01		120.0	To be transferred		Yes	11		#N/A
U.S. Army	FL02		45.0	To be transferred		Yes	12		#N/A
U.S. Army	FL03		50.0	To be transferred		Yes	8		#N/A
U.S. Army	FL04		12.5	To be transferred					#N/A
U.S. Army	FL07		160.2	To be transferred					#N/A
U.S. Army	FL08		129.2	To be transferred					#N/A
U.S. Army	FL09		129.2	To be transferred					#N/A
U.S. Army	FL10		139.9	To be transferred					#N/A
U.S. Army	FL14		28.1	To be transferred		Yes	10		#N/A
U.S. Army	FL23		2.0	To be transferred					#N/A
U.S. Army	FL34		3.5	To be transferred		Yes			#N/A
U.S. Army	FL5B		9.0	To be transferred					#N/A
U.S. Army	FLJA		3.1	To be transferred					#N/A
U.S. Army	FLU8		6.7	To be transferred					#N/A
U.S. Army	FM01		68.0	To be transferred		Yes	7		#N/A
U.S. Army	FM02		25.0	To be transferred			5		#N/A
U.S. Army	FM03		66.0	To be transferred		GMZ1	10		#N/A
U.S. Army	FM04		136.0	To be transferred		Yes	3		#N/A
U.S. Army	FM11		133.0	To be transferred			8		#N/A
U.S. Army	FMSE		6.0	To be transferred		Yes	1		#N/A
U.S. Army Subtotal		**0**	**1,303.8**				**83**		#N/A

Table 2-1 - Listing of Property Owners
Former Joliet Army Ammunition Plant

Grantee *(Abberviations follow)*	**Map Label**	**Will County Parcel Identification Number** *(PIN)*	**Acres (+/-)**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	**Groundwater Management Zone?**	**Monitoring Wells on Parcel?**	**Deed Restricted Parcel?**	**Date of Transfer**
USDA/FS	F001	04-10-22-100-002-0000	8.4	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F002	04-10-23-200-001-0010	286.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F003	04-10-24-300-003-0000	74.7	R2000086264	R2000086271				8/11/00
USDA/FS	F004	04-10-24-300-002-0000	81.6	R2000086264	R2004007577				1/14/04
USDA/FS	F005	04-10-24-100-003-0010	116.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F006	10-11-19-300-001-0010	59.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F007	10-11-19-300-002-0010	9.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F008	04-10-26-100-003-0010	517.7	TD-FS1-1997	TD-FS1-1997	Yes	8		3/20/97
USDA/FS	F009	04-10-34-400-001-0000	313.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F010	04-10-26-100-003-0020	144.3	TD-FS1-1997	TD-FS1-1997	Yes			3/20/97
USDA/FS	F011	10-11-31-200-001-0010	45.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F012	10-11-31-400-002-0000	26.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F013	10-11-31-400-003-0000	110.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F014	10-11-32-100-001-0000	156.4	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F015	10-11-32-200-001-0000	37.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F016	10-11-32-200-002-0000	37.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F017	10-11-32-200-003-0000	79.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F018	10-11-32-300-001-0000	160.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F019	10-11-32-400-001-0000	84.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F020	10-11-32-400-002-0000	75.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F021	10-11-33-100-001-0000	61.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F022	10-11-33-100-002-0000	16.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F023	10-11-33-100-003-0000	78.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F024	10-11-33-200-001-0000	78.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F025	10-11-33-200-002-0000	37.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F026	10-11-33-200-003-0000	0.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F027	10-11-33-200-004-0000	39.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F028	10-11-33-300-001-0000	61.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F029	10-11-33-300-002-0000	18.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F030	10-11-33-300-003-0000	80.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F031	10-11-33-400-001-0000	80.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F032	10-11-33-400-002-0000	79.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F033	10-11-34-100-001-0000	156.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F034	10-11-34-200-001-0000	108.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F035	10-11-34-200-002-0000	48.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F036	10-11-34-300-001-0000	160.4	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F037	10-11-34-400-001-0000	160.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F038	10-11-35-100-001-0000	75.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F039	10-11-35-100-002-0000	40.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F040	10-11-35-100-003-0000	40.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F041	10-11-35-200-001-0000	155.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F042	10-11-35-300-001-0000	80.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F043	10-11-35-300-002-0000	40.4	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F044	10-11-35-300-003-0000	40.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F045	10-11-35-400-001-0000	39.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F046	10-11-35-400-002-0000	39.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F047	10-11-35-400-003-0000	40.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F048	10-11-35-400-004-0000	39.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F049	10-11-36-100-001-0000	155.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F050	10-11-36-200-001-0000	156.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F051	10-11-36-300-001-0000	159.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F052	10-11-36-400-001-0000	80.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F053	10-11-36-400-002-0000	80.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F054	14-12-31-100-001-0000	157.0	TD-FS1-1997	TD-FS1-1997				3/20/97

Table 2-1 - Listing of Property Owners
Former Joliet Army Ammunition Plant

Grantee *(Abberviations follow)*	**Map Label**	**Will County Parcel Identification Number** *(PIN)*	**Acres (+/-)**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	**Groundwater Management Zone?**	**Monitoring Wells on Parcel?**	**Deed Restricted Parcel?**	**Date of Transfer**
USDA/FS	F055	14-12-31-200-001-0000	72.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F056	14-12-31-300-001-0000	144.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F057	14-12-31-400-001-0000	7.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F058	03-17-03-100-002-0000	433.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F059	03-17-02-100-001-0000	651.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F060	03-17-02-100-004-0004	162.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F061	03-17-01-100-001-0010	595.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F062	03-17-01-503-001-0000	1.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F063	03-17-01-503-002-0000	0.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F064	09-18-06-100-001-0000	609.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F065	09-18-06-503-001-0000	6.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F066	09-18-06-503-002-0000	4.5	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F067	09-18-06-503-003-0000	0.4	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F068	09-18-06-503-004-0000	0.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F069	09-18-05-100-001-0000	640.9	TD-FS1-1997	TD-FS1-1997		1		3/20/97
USDA/FS	F070	09-18-04-100-001-0000	642.1	TD-FS1-1997	TD-FS1-1997	Yes	5		3/20/97
USDA/FS	F071	09-18-03-100-001-0000	645.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F072	09-18-03-100-003-0004	-	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F073	09-18-02-100-001-0000	645.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F074	09-18-01-100-001-0000	629.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F075	13-19-06-100-001-0000	74.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F076	13-19-06-300-001-0000	7.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F077	03-17-10-100-002-0000	481.0	TD-FS1-1997	TD-FS1-1997		5		3/20/97
USDA/FS	F078	03-17-11-100-001-0000	643.6	TD-FS1-1997	TD-FS1-1997	Yes	6		3/20/97
USDA/FS	F079	03-17-12-100-001-0000	522.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F080	03-17-12-400-001-0000	11.0	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F081	09-18-07-100-001-0000	625.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F082	09-18-07-100-002-0004	-	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F083	09-18-08-100-003-0004	-	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F084	09-18-08-100-004-0000	491.9	TD-FS1-1997	TD-FS1-1997	Yes	2		3/20/97
USDA/FS	F085	09-18-08-200-001-0000	3.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F086	09-18-08-200-002-0000	56.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F087	09-18-09-100-002-0000	631.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F088	09-18-10-100-001-0000	645.8	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F089	09-18-11-100-001-0000	646.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F090	09-18-12-100-001-0000	403.4	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F091	03-17-15-200-002-0010	254.3	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F092	03-17-15-200-002-0020	174.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F093	03-17-14-100-002-0010	475.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F094	03-17-14-100-002-0020	150.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F095	03-17-13-100-002-0010	348.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F096	03-17-13-100-002-0020	109.9	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F097	09-18-18-100-004-0010	140.2	TD-FS1-1997	TD-FS1-1997	Yes			3/20/97
USDA/FS	F098	09-18-18-100-004-0020	121.1	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F099	09-18-17-100-006-0000	8.7	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F100	09-18-16-200-001-0010	169.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F101	09-18-16-200-001-0020	1.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F102	09-18-15-100-001-0000	641.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F103	09-18-14-100-001-0000	574.6	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	F104	09-18-13-100-001-0000	21.2	TD-FS1-1997	TD-FS1-1997				3/20/97
USDA/FS	FL25		8.2	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FL27		316.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FL28		211.5	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FL33		198.0	TD-FS3-2005	TD-FS3-2005				8/17/05

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Former Joliet Army Ammunition Plant

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USDA/FS	FL5A		29.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLAA		13.4	TD-FS2-2002	TD-FS2-2002				10/25/02
USDA/FS	FLU1		2.5	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU2		1.7	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU3		1.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU4		1.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU5		2.4	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU6		1.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU7		3.5	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FLU9		8.6	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FM10		10.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FM14		14.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FM6A		50.0	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FMU1		-	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS	FMU2		-	TD-FS3-2005	TD-FS3-2005				8/17/05
USDA/FS Subtotal		**104**	**20,316.6**				**27**		#N/A
VA	V01	04-10-36-400-003-0010	259.5	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V02	10-11-30-300-007-0000	24.2	R2000086264	R2000076002				#N/A
VA	V03	10-11-30-300-002-0000	31.9	R2000086264	R2000076002				#N/A
VA	V04	10-11-30-300-003-0000	16.9	R2000086264	R2000076002				#N/A
VA	V05	10-11-30-300-004-0000	25.5	R2000086264	R2000076002				#N/A
VA	V06	10-11-31-100-001-0000	9.9	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V07	10-11-31-100-002-0000	10.1	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V08	10-11-31-100-003-0000	2.1	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V09	10-11-31-100-004-0000	0.8	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V10	10-11-31-100-007-0000	46.3	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V11	10-11-31-100-005-0000	16.7	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V12	10-11-31-100-010-0000	7.7	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V13	10-11-31-100-006-0000	31.4	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V14	10-11-31-100-008-0000	11.6	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V15	10-11-31-100-009-0000	0.2	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V16	10-11-31-100-011-0000	22.7	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V17	10-11-31-200-001-0020	92.4	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V18	10-11-31-503-001-0000	7.1	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V19	04-10-36-400-003-0020	157.8	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V20	10-11-31-300-001-0000	8.9	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V21	10-11-31-300-002-0000	1.0	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V22	10-11-31-300-003-0000	69.7	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V23	10-11-31-300-004-0000	66.7	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V24	10-11-31-400-001-0000	11.0	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V25	10-11-31-503-002-0000	3.6	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V26	10-11-31-503-003-0000	3.4	TD-VA1-1996	TD-VA1-1996				12/6/96
VA	V27	03-17-01-100-001-0020	44.4	TD-VA1-1996	TD-VA1-1996				12/6/96
VA Subtotal		**27**	**983.4**				-		#N/A
WalMart	D36	10-11-30-201-004-0000	96.1	R2000086264	R2006136007				8/15/06
WalMart	D37	10-11-30-201-005-0000	76.3	R2000086264	R2006171216				10/12/06
WalMart Subtotal		**2**	**172.4**				-		#N/A
Will County	A02	09-18-18-200-001-0000	9.1	R2005064066	R2009154372				12/31/09
Will County	L01	09-18-17-100-007-0000	456.1	R2002063838	R2002063838				4/12/02
Will County Subtotal		**2**	**465.1**				-		#N/A

Table 2-1 - Listing of Property Owners
Former Joliet Army Ammunition Plant

Grantee *(Abberviations follow)*	**Map Label**	**Will County Parcel Identification Number** *(PIN)*	**Acres (+/-)**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	**Groundwater Management Zone?**	**Monitoring Wells on Parcel?**	**Deed Restricted Parcel?**	**Date of Transfer**
Wilmington FD	A12	09-18-16-300-002-0000	2.5	R2000086264	R2011036354				#N/A
Wilmington FD Subtotal		**1**	**2.5**				**-**		
Grand Subtotal		**200**	**25,883.9**				**171**		

Abbreviations	**Organization represented** (*multiple organizations may be grouped as a single entity)*
BNSF	2002A BNSF Trust
BNSF	21561 W Mississippi LLC
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF	Burlington Northern Railroad Holdings Inc.
BNSF-Leased	BN Leasing Corporation. This acronym for any parcels which BNSF retains in lease.
CIC DR POA	CIC at Deer Run Property Owners Association
CPI LLC	CenterPoint Intermodal LLC
CPI LLC	CenterPoint Properties Trust
CPI LLC	CenterPoint Realty Services Corporation
Elwood MHC	Elwood Maple Hill Cemetery Association
Elwood Village	Vilalge of Elwood, IL
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County
Wilmington FD	Wilmington Fire Department

Table 2-2: Listing of Property Owners and Points of Contact

Property Owner	Point of Contact	Address	Phone
BNSF	Amanda Marruffo Manager, Environmental Operations	BNSF Railway Company 5601 W. 26th St. Cicero, IL 60804	(708) 924-5326
CPI, LLC	Michelle Grana	CenterPoint Properties Trust 1808 Swift Drive Oak Brook, IL 60523	(630) 586-8000
CIC DR POA	Michelle Grana	CenterPoint Properties Trust 1808 Swift Drive Oak Brook, IL 60523	(630) 586-8000
Elwood MHC	John A. Tryner	Elwood Maple Hill Cemetery Association 101 Fulton Street Wilmington, IL 60481	(815) 476-9048
Village of Elwood	Massimo "Max" Bosso Director of Engineering and Public Works	Village of Elwood 401 E. Mississippi Avenue Elwood, IL 60421	(815) 423-5011
FJGCO LLC	Frank J Giordano	Illinois Transport, Inc. Mark-IT Express, LLC 20012 W. South Arsenal Road Wilmington, IL 60481	(708) 333-7510
GP/Fort James	Corporate Real Estate Department	Fort James Operating Co. c/o Georgia Pacific Corporation 133 Peachtree Street NE Atlanta, Georgia 30303	(404) 652-4000
IUOE Local 150	Melinda S. Hensel	IUOEL Local 150 Headquarters/District 1 Hall 6200 Joliet Road Countryside, Illinois, 60525	(708) 482-8800
JADA	Richard Kwasneski	Joliet Arsenal Development Authority 3180 Theodore Street #103 Joliet, IL 60435	(815) 630-2800
Liberty Property	Donald P. Schoenheider	Liberty Property Limited Partnership 500 Chesterfield Parkway Malvern, PA 19355	(610) 648-1700
Prairie Craftsman	James Keck	Prairie Craftsman, LLC 616 Mack Street Joliet, IL 60435	
Pro Logistics, Inc.	James R. Nass III	Prologis Logistics Services, Inc. 8755 West Higgins Road, Suite 700 Chicago, Illinois 60631	(847) 696-4600
US Army	Arthur M. Holz Site Manager/ Commander's Representative	Joliet Army Ammunition Plant 29401 S. Route 53 Wilmington IL 60481-8879	815-423-2870
USDA/FS	Wade Spang Prairie Supervisor	Midewin Tallgrass Prairie 30239 S. State Route 53 Wilmington, IL 60481	(815) 423-6370
VA	Marty A. Fury	Department of Veterans Affairs Abraham Lincoln National Cemetery 20953 W. Hoff Road Elwood, IL 60421	(815) 423-9958
WalMart	Attn: Real Property Manager or Executive Officer	WalMart Distribution Center 2001 S.E. 10th Street Bentonville, AR 72716-5535	(479) 204-0136
Will County Land Use Department	Dean Olson	58 E. Clinton Street Suite 500 Joliet, IL 60432	(815) 774-7891
Will County Highway Department	Bruce Gould	16841 W. Laraway Road Joliet, IL 60433	(815) 727-8476
Wilmington Fire Department	Attn: Fire Chief	Wilmington Fire Protection District P.O. Box 245 501 N. Water Street Wilmington, Illinois 60481	(815) 476-6675

Table 2-3: Summary of Statement of Compliance Questionnaire Responses

Property Owner	Compliance Responses (Yes/No/Unsure)							
	1	2	3	4	5	6	7	Comment
BNSF	Y	Y	Y	Y	Y	Y	Y	None.
CPI, LLC	N	Y	Y	Y	Y	Y	U	Mistakenly checked "No" for Item 1 due to confusion with form. Unsure regarding compliance with Notification of transfers, but notification has been provided.
CIC DR POA	N	Y	Y	Y	Y	Y	U	Mistakenly checked "No" for Item 1 due to confusion with form. Unsure regarding compliance with Notification of transfers but notification has been provided.
Elwood MHC	N	Y	Y	Y	Y	Y	Y	Mistakenly checked "No" for Item 1 due to confusion with form. Noted responses apply only to parcel D32 because parcels D33 and D34 have been continuously owned by the Cemetery and were not transferred from the Army.
Elwood Village	Y	Y	Y	Y	Y	Y	Y	Land used for water and waste water treatment as approved by USEPA.
FJGCO LLC	Y	Y	Y	Y	Y	Y	Y	None.
GP/Fort James	Y	Y	Y	Y	Y	Y	Y	Fort James Operating Company changed names to Georgia-Pacific Consumer Products LP on December 31, 2006.
IUOE Local 150	U/N	Y	Y	Y	Y	Y	Y	Unsure checked for "residential use" because campus security building staffed 24 hours per day. Other Item 1 boxes mistakenly checked as "No" for Item 1 due to confusion with form.
JADA	Y	Y	Y	Y	Y	Y	U	Unsure if notification of transfer requirements were adhered to.
Liberty Property	N	Y	Y	Y	Y	Y	Y	Mistakenly checked "No" for Item 1 due to confusion with form.
Prairie Craftsman	N	Y	Y	Y	Y	Y	Y	Mistakenly checked "No" for Item 1 due to confusion with form.
Pro Logistics, Inc.	N	Y	Y	Y	Y	Y	Y	Mistakenly checked "No" for Item 1 due to confusion with form.
US Army	Y	Y	Y	Y	Y	Y	Y	Noted 3 landfills that exist were approved in CERCLA ROD.
USDA/FS	Y	N	Y	Y	Y	--	N	USDA/FS questionnaire is different than other parcels owing to different ICs. Responses indicate USDA/FS is in compliance with ICs. USDA/FS also commented that camping should be removed from the listing of Land Use Restrictions.
VA	--	--	--	--	--	--	--	The VA property does not have the ICs applicable to other parcels because it was not contaminated.
WalMart	Y	Y	Y	Y	Y	Y	Y	None.
Will County (Landfill)	Y	Y	Y	--	Y	--	--	None. Will County questionnaire for landfill parcel is somewhat different from others due to specific conditions regarding the transfer of property and its planned use as a municipal landfill.
Will County (Highway Dept)	N	Y	Y	Y	Y	Y	Y	Mistakenly checked "No" for Item 1 due to confusion with form.
Wilmington Fire Department	N	Y	Y	Y	Y	Y	Y	Mistakenly checked "No" for Item 1 due to confusion with form.

"--" Indicates a response was either not required or not applicable

Appendix A
Ownership Verification Letters and Responses

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Julie Heyen
Jones Lang LaSalle Brokerage, Inc
Re: BNSF Land/Lease Management – Illinois
4105 North Lexington Ave., Suite 200
Arden Hills, MN 55126
(651) 415-2714

and

Don Girard
Environmental Coordinator
BNSF Railway Corporation
920 SE Quincy Street
Topeka, KS 66612
(785) 435-3193

Re: **Verification of Ownership of Property by Burlington Northern & Santa Fe Railway and related companies on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Dear Ms. Heyen and Mr. Girard:

Records at the Will County Recorder of Deeds indicate that your company, Burlington Northern & Santa Fe Railway (BNSF) and related companies, owns property as shown in Enclosure 1 that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to BNSF and related companies in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

The BNSF holdings shown in **Enclosure 1.2** include those parcels listed to its related companies. The companies (shown with their acronyms in parentheses) in the overall BNSF listings are:

- BNSF
- BN Leasing Corporation (BN Leasing)
- 2002A BNSF Trust (BNSF 2002A)
- BNSF; BN Leasing (several deeds included the grantees listed jointly)

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and

safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by BNSF and related companies
- 1.1 Ownership summary and verification for BNSF and related companies
- 1.2 Detailed list of properties owned by BNSF and related companies
- 1.3 Parcel Map (large scale, overview)
- 1.4 Parcel Map (medium scale, Deer Run Industrial Park)

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by BNSF and related companies

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: ***Burlington Northern & Santa Fe Railway (BNSF) and its related companies, including: BN Leasing Corporation (BN Leasing); Burlington Northern Railroad Holdings Inc. (BN Holding); and 2002A BNSF Trust (BNSF 2002a)***

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Enclosure 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

BNSF and its related companies of 2500 Lou Menk Drive, Fort Worth, Texas 76131-2830 and/or **1700 East Golf Road, Schaumburg, Illinois 60173** owns the 12 parcels of land, covering approximately 594.72 acres, within the Deer Run Industrial Park as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

Tenant(s), if any:

BNSF and its related companies are the current grantees on the deeds of transfer cited in Enclosure 1.2. The grantors in those deeds include CenterPoint Property Trust (CPPT) and its subsidiaries, including: CenterPoint Intermodal LLC (CPI LLC); CenterPoint Realty Services Corporation (CPRSC); and CenterPoint Elwood LLC _____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of ***Burlington Northern & Santa Fe Railway (BNSF) and its related companies as listed.*** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Burlington Northern & Santa Fe Railway and related companies
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
BN Leasing	D18	04-10-36-101-005-0000	0.05	R2000086264	R2010129644	☐	CP Ellwood LLC
BN Leasing Total		1	0.05				
BNSF 2002A	D01	04-10-23-101-002-0010	43.11	R2000086264	R2002105583	☐	CPI LLC
BNSF 2002A	D02	04-10-23-101-002-0020	14.46	R2000086264	R2002105583	☐	CPI LLC
BNSF 2002A	D04	04-10-26-200-004-0000	2.43	R2000086264	R2002105583	☐	CPI LLC
BNSF 2002A	D07	04-10-26-502-001-0000	73.01	R2000086276	R2002105583	☐	CPI LLC
BNSF 2002A	D08	04-10-36-101-001-0010	385.67	R2000086264	R2010057865	☐	BNSF
BNSF 2002A Total		5	518.68				
BNSF	D42	04-10-35-502-001-0000	13.81	R2000086264	R2003130582	☐	CPI LLC
BNSF	D44	04-10-35-502-002-0000	22.22	R2000086264	R2002227530	☐	CPI LLC
BNSF	D52	04-10-36-101-006-0000	0.05	R2000086264	R2010129644	☐	CPPT
BNSF Total		3	36.08				
BNSF; BN Leasing	D09	04-10-36-101-001-0010	13.15	R2000086264	R2010056239	☐	CPI LLC
BNSF; BN Leasing	D49	04-10-36-500-001-0000	21.7	R2000086264	R2010129644	☐	CPPT
BNSF; BN Leasing	D55	04-10-36-300-005-0000	5.06	R2000086264	R2010129644	☐	CPPT
BNSF; BN Leasing Total		3	39.91				
Grand Total		12	594.72				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Pape, Mark

From: Thompson, Carrie <Carrie.Thompson@BNSF.com>
Sent: Tuesday, January 22, 2013 3:35 PM
To: Pape, Mark
Cc: Graham, Matt P; Girard, Donald G
Subject: BNSF - Land Owner Research
Attachments: s81679_Exhibit.pdf; Enclosure 1.2 & BNSF Parcel Ownership Spreadsheet.xlsx

Thank you for talking with me this afternoon, Mark.

Attached is a map and a listing of what BNSF believes to be our ownership in the area. I appreciate your thoughts and feedback.

Carrie

Carrie (Dexter) Thompson
BNSF Railway Company
Manager
Corporate Real Estate Development
Phone: 817.352.4891
Fax: 817.352.7115

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LEGEND
TRACKAGE
LAND LINES
HAZ. UTILITIES
NON-HAZ. UTILITIES
PLAT OF SURVEY
CENTERPOINT INTERMODAL CENTER AT DEER RUN
KEY:
LEASED BY BNSF - NOT OWNED
NOT OWNED
BNSF OWNED
D01
D02
D04
D07
D08
D09
D18
D42
D44
D49
D52
D55
BNSF RAILWAY
Station Map
Centerpoint Intermodal, Il
County WILL
Line Segment 7000
Formerly AT&SF RY
400 SCALE 400
800 0 800
Chief Engineer's Office
Sheet 1 of 1
C.E. s81679
These plans are the property of The Burlington Northern & Santa Fe Railway and are not to be loaned or used, copied, printed, duplicated, photographed or reproduced in any way in whole or in part without permission from said company.
Revised: 12/11/2012

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Michelle Grana
CenterPoint Properties
1808 Swift Drive
Oak Brook, IL 60523
(630) 586-8000

Re: **Verification of Ownership of Property by CenterPoint Property Trust and its subsidiaries on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that your company, CenterPoint Property Trust, and its subsidiaries (hereafter referred to in summary as CPPT), owns property in the Deer Run Industrial Park as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to CPPT in ***Enclosure 1***, correct the information contained therein as appropriate, and confirm the ownership information by signing the cover page for **Enclosure 1**. [Note – *if all information in **Enclosure 1** is correct, simply check the "no change" box.*]
2. Return the correct ed and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience (***Enclosure 2)***.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

The CPPT holdings shown in **Enclosure 1.2** include those parcels listed to its subsidiaries. The companies (shown with their acronyms in parentheses) in the overall CPPT listings are:

- 21561 W Mississippi LLC (21561 W MISS)
- CenterPoint Intermodal LLC (CPI LLC)
- CenterPoint Properties Trust (CPPT)
- CenterPoint Realty Services Corporation (CPRSC)
- CIC at Deer Run Property Owners Association (Deer Run POA)

We are also interested in determining whether other properties in the Deer Run Industrial Park are owned by CPPT and leased to tenants (listed as grantees in the deeds of transfer documents) or fully sold to the grantees. **Enclosure 1.3** lists the grantees and associated parcels in question. These are:

- Burlington Northern & Santa Fe Railroad Company (BNSF) and its affiliates and subsidiaries: BN Leasing Corporation (BN Leasing), BNSF Trust and 2002a BNSF Trust (BNSF 2002a)
- Elwood Maple Hill Cemetery Association (Elwood MHC)
- Elwood Village (Elwood Village)
- Fort James Operating Company (Fort James)
- WalMart Stores East LP (WalMart)

Enclosure 1.4 is a map of parcels within the Former JOAAP as a whole. **Enclosure 1.5** is a map that zooms in for more detail of the parcels within the Deer Run Industrial Park. The map labels shown in **Enclosures 1.2** and **1.3** match in to those shown in **Enclosures 1.4** and **1.5**.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas* (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these use restrictions and requirements are being properly followed and implemented, the Army is commencing a review process that will involve current owners in the following steps:

1. **Ownership Confirmation:** Parcel ownership will be verified via your response to this letter
2. **Compliance Questionnaire and Certification:** A Questionnaire and Certification package will be sent to you for your completion approximately 2 months from now. The package will:
    a. Detail the use restrictions that are applicable to your property;
    b. Provide for your response concerning compliance with the use restrictions on your property; and
    c. Request your signature and certification of those responses.
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits by the U.S. Corps of Engineers or its representative, on behalf of the Army, approximately 3 months from now. The site visit will include an opportunity to ask questions about the process.

The Army anticipates following the above process on an annual basis. The Army will compile the results from the above review process, including your responses with those of other property owners, and prepare a report to the UESPA and the IEPA concerning the effectiveness of the use restrictions contained in the deeds. This process is part of a review that is required at least every five years under federal law, namely the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Should you have any questions please contact the contractor for this survey (URS Group, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by ***CPPT***
- 1.1 Ownership summary and verification for ***CPPT***
- 1.2.1 Detailed list of properties owned by ***CPPT***
- 1.2.2 Additional list of properties
- 1.3 Parcel Map: Former JOAAP as a whole
- 1.4 Parcel Map: Deer Run Industrial Park

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the Former Joliet Army Ammunition Plant (JOAAP) that are currently owned by CPPT

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1.1: Ownership summary and verification for **CPPT**

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Enclosure 1.1: Ownership summary and verification for *CenterPoint Property Trust and its Subsidiaries*

Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owners: CenterPoint Properties Trust (CPPT) and its subsidiaries, including:
21561 W Mississippi LLC (21561 W MISS);
CenterPoint Intermodal LLC (CPI LLC);
CenterPoint Realty Services Corporation (CPRSC); and
CIC at Deer Run Property Owners Association (Deer Run POA)

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Enclosures 1.2.1 and 1.2.2. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

CPPT and its subsidiaries, including: 21561 W MISS; CPI LLC; CPRSC; and Deer Run POA , all of 1808 Swift Drive, Oak Brook IL 60523 are believed to own the 35 parcels of land, covering approximately 795.23 acres, within the Deer Run Industrial Park as detailed in the following Enclosure 1.2.1 and summarized below.

Grantee (presumed owner)	Parcel Count	Acres
21561 W MISSISSIPPI LLC	1	10.86
CPI LLC	7	453.31
CPI LLC; CPRSC (jointly)	15	169.97
CPPT	2	33.76
Deer Run POA	10	127.33
TOTAL: CPPT and subsidiaries	35	795.23

The original Army deed(s) as well as the current deed(s) are indicated in Enclosure 1.2.1 These property deeds, which establish the ownership (and in certain cases, owner/tenant relationships), are recorded at the Will County Recorder's Office, 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/).

Enclosure 1.1: Ownership summary and verification for *CenterPoint Property Trust and its Subsidiaries*

Tenant(s), if any:

Other parcels in the Deer Run Industrial Park show grantees other than CPPT and its subsidiaries. These grantees may be either owners or tenants. Enclosure 1.2.2 includes a detailed listing of these grantees. The following is a summary of the grantees and parcels involved.

Grantee (owner or tenant)	Parcel Count	Acres
BN Leasing	1	0.05
BNSF 2002A	5	516.68
BNSF	3	36.08
BNSF; BN Leasing (jointly)	3	39.91
Elwood MH Cemetery	1	0.09
Elwood Village	1	8.90
Fort James	1	49.19
Liberty Property LP	2	74.85
WalMart	2	172.39
TOTAL: Grantees other than CPPT and subsidiaries	**18**	**896.14**

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

Several parcels in the Deer Run Industrial Park have not yet been transferred from the U.S. Army to the Joliet Arsenal Development Authority (JADA) or from JADA to commercial owners. These are summarized below and listed in Enclosure 1.2.2 and shown on the Enclosure 1.3 and 1.4 maps.

Owner of parcels not yet transferred	Map Label	Acres
JADA	D33	2.62
U.S. Army	D10	31.47
TOTAL: Parcels w Army or JADA		**34.09**

Statement of Authorized Representative:

I, _____, am an authorized representative of ***CenterPoint Property Trust*** and ***its subsidiaries, 21561 W Mississippi LLC (21561 W MISS); CenterPoint Intermodal LLC (CPI LLC); CenterPoint Realty Services Corporation (CPRSC); and CIC at Deer Run Property Owners Association (Deer Run POA).*** I understand that compliance with the annual certification of compliance is required and, if necessary, enforcement through the civil courts may be pursued to ensure that deed restrictions are maintained and verified.

To the best of my knowledge ***CPPT and its subsidiaries*** own the properties listed in Enclosure 1.2.1 without / with modification as shown. In addition, to the best of my knowledge the grantees listed in Enclosure 1.2.2 are owners or tenants for the properties listed without / with modification as shown

_____(signature) _____(date)

1.2.1: Detailed list of properties in Deer Run Industrial Park owned by ***CPPT and its subsidiaries, including:***

- 21561 W Mississippi LLC (21561 W MISS)
- CenterPoint Intermodal LLC (CPI LLC)
- CenterPoint Properties Trust (CPPT)
- CenterPoint Realty Services Corp (CPRSC)
- CIC at Deer Run Property Owners Association (Deer Run POA)

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Enclosure 1.2.1 - Detailed list of properties owned by CenterPoint Property Trust and its subsidiaries Based on Will County Recorder of Deed's Data Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
21561 W MISS	D26	10-11-30-101-004-0000	10.86	R2000086264	R2000086271	☐	**CPI LLC**
21561 W MISSISSIPPI LLC Total		1	10.86				
CPI LLC	D03	04-10-26-200-002-0000	45.56	R2002045744	R2002105583	☐	JADA
CPI LLC	D05	04-10-26-401-001-0000	10.62	R2002045744	R2002105583	☐	JADA
CPI LLC	D06	04-10-35-200-004-0000	148.65	R2010056234	R2010056239	☐	JADA
CPI LLC	D13	04-10-25-101-002-0000	15.04	R2000086264	R2002148335	☐	JADA
CPI LLC	D20	04-10-25-201-010-0000	32.33	R2000086264	R2011064757	☐	**CPPT**
CPI LLC	D39	04-10-35-502-004-0000	10.1	R2010056234	R2010056239	☐	**JADA**
CPI LLC	D47	04-10-36-101-001-0020	191.01	R2002045744	R2000086271	☐	**JADA**
CPI LLC Total		7	453.31				
CPI LLC; CPRSC	D11	04-10-25-101-004-0000	58.06	R2000086264	R2000086271	☐	JADA
CPI LLC; CPRSC	D12	04-10-25-101-005-0000	0.02	R2000086264	R2000086271	☐	JADA
CPI LLC; CPRSC	D14	04-10-25-101-006-0000	4.74	R2000086264	R2000086271	☐	JADA
CPI LLC; CPRSC	D15	04-10-25-101-007-0000	0.06	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D16	04-10-25-502-001-0000	8.94	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D17	04-10-25-502-002-0000	13.05	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D23	04-10-25-201-008-0000	3.33	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D28	10-11-30-101-005-0000	20.57	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D32	10-11-30-102-001-0000	3.78	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D40	04-10-35-200-003-0000	0.2	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D41	04-10-35-502-003-0000	16.93	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D43	04-10-35-402-003-0000	22.48	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D45	04-10-35-402-001-0000	6.71	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D53	04-10-36-500-002-0000	3.35	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D54	04-10-36-500-003-0000	7.75	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC Total		15	169.97				
CPPT	D24	04-10-25-201-009-0000	6.22	R2000086264	R2000086271	☐	**Benderson Trusts (Var)**
CPPT	D29	10-11-30-101-007-0000	27.54	R2000086264	R2000086271	☐	**Benderson Trusts (Var)**
CPPT Total		2	33.76				
Deer Run POA	D19	04-10-25-201-004-0000	4.2	R2000086264	R2010057862	☐	**CPI LLC**
Deer Run POA	D25	04-10-25-201-007-0000	27.4	R2000086264	R2010057862	☐	**CPI LLC**
Deer Run POA	D30	10-11-30-301-001-0000	12.87	R2000086264	R2010057862	☐	**CPI LLC**
Deer Run POA	D31	10-11-30-102-002-0000	6.06	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D35	10-11-30-201-003-0000	5.33	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D38	10-11-30-102-003-0000	21.68	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D46	04-10-35-402-005-0000	5.85	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D48	04-10-35-401-001-0000	21.97	R2002045744	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D51	04-10-36-201-003-0000	6.67	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D56	04-10-36-401-001-0000	15.3	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA Total		10	127.33				
Grand Total		35	795.23				

Abbreviations

21561 W MISS	21561 W Mississippi LLC

Enclosure 1.2.1 - Detailed list of properties owned by CenterPoint Property Trust and its subsidiaries Based on Will County Recorder of Deed's Data Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
BN Leasing	BN Leasing Corporation						
BNR Holding	Burlington Northern Railroad Holdings Inc.						
BNSF	Burlington Northern & Santa Fe Railway Company						
BNSF 2002A	2002A BNSF Trust						
CPI LLC	CenterPoint Intermodal LLC						
CPPT	CenterPoint Properties Trust						
CPRSC	CenterPoint Realty Services Corporation						
Deer Run POA	CIC at Deer Run Property Owners Association						
Elwood MHC	Elwood Maple Hill Cemetery Association						
FJGCO LLC	FJGCO LLC						
Fort James	Fort James Operating Company						
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation						
JADA	Joliet Arsenal Development Authority						
Liberty Property LP	Liberty Property Limited Partnership						
Prairie Craftsman	Prairie Craftsman LLC						
ProLogis	Prologis Logistics Services Inc.						
SF Pacific Railroad	Santa Fe Pacific Railroad Company						
U.S. Army	Department of the Army (U.S.)						
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie						
VA	Department of Veterans Affairs						
WalMart	WalMart Stores East LP						
Will County	Will County						

1.2.2: Additional list of properties:

Detailed list of properties in Deer Run Industrial Park with grantees other than **CPPT and its subsidiaries** to be used in determining whether grantees are owners or tenants of the properties. Grantees listed are:

- Burlington Northern & Santa Fe Railroad Company (BNSF) and its affiliates and subsidiaries: BN Leasing Corporation (BN Leasing), BNSF Trust and 2002a BNSF Trust (BNSF 2002a)
- Elwood Maple Hill Cemetery Association (Elwood MHC)
- Elwood Village (same)
- Fort James Operating Company (Fort James)
- WalMart Stores East LP (WalMart)

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Enclosure 1.2.2 - Detailed list of properties in Deer Run Industrial Park possibly owned by CenterPoint Property Trust and its Subsidiaries (on which CPPT is not current grantee) Based on Will County Recorder of Deed's Data Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right three) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Is Grantee Owner (O) or Tenant (T)?	Comment
BN Leasing	D18	04-10-36-101-005-0000	0.05	R2000086264	R2010129644	☐	O / T	
BN Leasing Total		1	0.05					
BNSF 2002A	D01	04-10-23-101-002-0010	43.11	R2000086264	R2002105583	☐	O / T	
BNSF 2002A	D02	04-10-23-101-002-0020	14.46	R2000086264	R2002105583	☐	O / T	
BNSF 2002A	D04	04-10-26-200-004-0000	2.43	R2000086264	R2002105583	☐	O / T	
BNSF 2002A	D07	04-10-26-502-001-0000	73.01	R2000086276	R2002105583	☐	O / T	
BNSF 2002A	D08	04-10-36-101-001-0010	385.67	R2000086264	R2010057865	☐	O / T	
BNSF 2002A Total		5	518.68					
BNSF	D42	04-10-35-502-001-0000	13.81	R2000086264	R2003130582	☐	O / T	
BNSF	D44	04-10-35-502-002-0000	22.22	R2000086264	R2002227530	☐	O / T	
BNSF	D52	04-10-36-101-006-0000	0.05	R2000086264	R2010129644	☐	O / T	
BNSF Total		3	36.08					
BNSF; BN Leasing	D09	04-10-36-101-001-0010	13.15	R2000086264	R2010056239	☐	O / T	
BNSF; BN Leasing	D49	04-10-36-500-001-0000	21.7	R2000086264	R2010129644	☐	O / T	
BNSF; BN Leasing	D55	04-10-36-300-005-0000	5.06	R2000086264	R2010129644	☐	O / T	
BNSF; BN Leasing Total		3	39.91					
Elwood MHC	D34	10-11-30-100-006-0000	0.09	R2000086264	R2000086271	☐	O / T	
Elwood Village	D27	10-11-30-101-006-0000	8.9	R2000086264	R2000086271	☐	O / T	
Elwood Village Total		1	8.9					
Fort James	D21	04-10-25-201-011-0000	49.19	R2000086264	R2005210234	☐	O / T	
Fort James Total		1	49.19					
JADA	D33	10-11-30-100-004-0000	2.62	R2000086264	R2000086271	☐		
JADA Total		1	2.62					
Liberty Property LP	D22	04-10-25-201-012-0000	47.84	R2000086264	R2000086271	☐	O / T	
Liberty Property LP	D50	04-10-36-201-002-0000	27.01	R2000086264	R2000086271	☐	O / T	
Liberty Property LP Total		2	74.85					
U.S. Army	D10	04-10-35-200-002-0000	31.47	To be transferred	To be transferred	☐		
U.S. Army Total		1	31.47					
WalMart	D36	10-11-30-201-004-0000	96.07	R2000086264	R2006136007	☐	O / T	
WalMart	D37	10-11-30-201-005-0000	76.32	R2000086264	R2006171216	☐	O / T	
WalMart Total		2	172.39					
Grand Total		21	934.23					

Abbreviations

2002A BNSF	2002A BNSF Trust
21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
Elwood Village	Elwood Village of
Fort James	Fort James Operating Company
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture
WalMart	WalMart Stores East LP

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1.3: Parcel Map: Former JOAAP as a whole

1.4: Parcel Map: Deer Run Industrial Park

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Pape, Mark

From: Purcell, Sharon <spurcell@centerpoint.com>
Sent: Tuesday, February 05, 2013 4:01 PM
To: Pape, Mark
Subject: Elwood
Attachments: Department of the Army property chart.xlsx

Mark,

Here's the list (to the best of my knowledge) of the most current parcel numbers. My overview map is really outdated, but I will drop it in the mail tomorrow.

Sharon Purcell
Tax Manager
CenterPoint Properties
1808 Swift Drive
Oak Brook, Illinois 60523-1501
Phone 630-586-8291
Fax 630-586-8010

Proportionate Share of Acreage 10-16-12

	PIN	Acres				Owner
BNSF - LEASED	04-10-23-101-002-0010,-0020 parts	32.78	4	D01+D02	57.57	BNSF - Lease
BNSF	04-10-26-502-004	10.00	#	D04	2.43	CPI LLC
BNSF	04-10-26-401-001	10.71	#	D05	10.62	BNSF (per CPI)
BNSF	04-10-35-200-004-0020	8.00	#	D06 new name D10	148.65	BNSF (per CPI)
BNSF	04-10-26-502-001	73.00	#	D07	73.01	BNSF
BNSF	04-10-36-101-001-0010, -0020	575.96	#	D08 + D47	576.68	BNSF - Lease
BNSF	04-10-25-505-001	8.95	5	D16	8.94	BNSF
BNSF	04-10-25-502-002	13.00	6	D17	13.05	BNSF
BNSF	04-10-35-502-003	17.00	#	D41	16.93	BNSF (per CPI)
BNSF	04-10-35-502-001	13.80	#	D42	13.81	BNSF
BNSF	04-10-35-502-002	22.00	#	D44	22.22	BNSF
BNSF	04-10-25-502-001	21.46	7	D49	21.7	BNSF
BNSF	04-10-36-500-002	3.30	8	D53	3.35	BNSF (per CPI)
BNSF	04-10-36-500-003	7.60	9	D54	7.75	BNSF (per CPI)
BNSF	04-10-36-300-005	4.69	#	D55	5.06	BNSF
		822.25	#			
			#			
Container Yards:			#			
CY 1 - LEASED to BNSF	04-10-25-201-010	31.96	#	D20	32.33	BNSF - Lease (per CPI)
CY 2	04-10-25-101-004, -005	57.77	#	D11+D12	58.08	CPI LLC
CenterPoint Undeveloped Land			#			
Detention at Entrance to Park:	04-10-26-200-002	42.829	#	D03	45.56	04-10-26-200-002-0000
	04-10-26-200-004	2.431	#	D04		
M13 and pt M-6	04-10-35-200-004-0010	140.65	#	D06 remainder	#N/A	See R2012119388 Recorde
Welcome Center	04-10-25-101-006	4.72	#	D14	4.74	04-10-25-101-006-0000
Outlot (Partners)	04-10-11-30-101-006	8.85	#	D27	8.9	10-11-30-101-006-0000
Sliver parcel	04-10-35-200-003	0.14	#	D40	0.2	04-10-35-200-003-0000
Lot 4 Unit 2	04-10-35-402-003	22.91	#	D43	22.48	04-10-35-402-003-0000
Lot 3 Unit 2	04-10-35-402-001	6.62	#	D45	6.71	04-10-35-402-001-0000
Phase III - future spec 9	10-11-30-401-005	69.23	#	Outside JOAAP		
Pt Block 2 Lot 3	10-11-30-202-003	10.82	#	Outside JOAAP		
Block 1, Unit 6 Lot 6	10-11-30-401-006	9.67	#	Outside JOAAP		
Block 1, Unit 6 Lot 7	10-11-30-401-007	14.21	#	Outside JOAAP		
Block 2, Lot 4	10-11-30-202-001	0.49	#	Outside JOAAP		
Phase III Future Comm	10-11-30-401-008	2.97	#	Outside JOAAP		
Phase III Future Comm	10-11-30-401-009	2.81	#	Outside JOAAP		
		429.07	#			
			#			
			#			
Georgia Pacific/ 21837 Mississippi	04-10-25-201-011	48.72	#	D21	49.19	04-10-25-201-011-0000
Liberty/21705 Mississippi	04-10-25-201-012	47.51	#	D22	47.84	Originally listed as "10-25
21505 Mississippi	04-10-25-201-008/10-11-30-101-004	14.09	#	D23+D26	14.19	#N/A
21561 CenterPoint Dr.	10-11-30-101-005/04-10-25-201-009	26.56	#	D28+D26+D24	26.79	#N/A
26416-26634 S CenterPoint Dr.	10-11-30-101-007	27.53	#	D29	27.54	10-11-30-101-007-0000
Walmart/ 26453 and 26537 CenterP	10-11-30-201-004, -005	172.02	#	D36+D37	172.39	#N/A
Liberty/27413 Baseline Rd	04-10-36-201-002	26.97	#	D50	27.01	Originally listed as "10-36
20901 Walter Strawn Drive	10-11-30-401-004	65.54	#	Outside JOAAP		
			#			
		428.94	#			
			#			
			#			
Village of Elwood:			#			
Block 2			#			
Lot 2	10-11-30-203-001	31.89	#	Outside JOAAP		
		0.20	#			
Lot 3 (part of)	10-11-30-202-004	5.89	#	Outside JOAAP		
		0.22	#			
Lot 5	10-11-30-102-001	3.83	#	D32	3.78	10-11-30-102-001-0000
		0.05	#			
Block 4			#			
Lot 3	04-10-25-101-002	15.00	#	D13	15.04	04-10-25-101-002-0000
CNT Subdivision			#			
Lot 1	10-11-29-301-001	0.32	#	Outside JOAAP		
	Total	**57.40**	#			
			#			
			#			
Current and Future Common Area:			#			
Block I			#			
Unit 6 Lot 3	10-11-30-401-003	9.29	#	Outside JOAAP		Originally listed as "11-30
Block 2			#			
Unit 5 Lot 7	10-11-30-201-003	5.41	#	D35	5.33	10-11-30-201-003-0000
Unit 5 Lot 8	10-11-30-102-002	6.08	#	D31	6.06	10-11-30-102-002-0000
Unit 5 Lot 11	10-11-30-102-003	21.56	#	D38	21.68	10-11-30-102-003-0000
Block 3			#			
Lot 10	04-10-25-201-004	4.15	#	D19	4.2	04-10-25-201-004-0000
Lot 12	10-11-30-301-001/04-10-25-201-007	41.04	#	D30+D25	40.27	#N/A
Block 4			#			
Pt lot 2	04-10-23-101-002-0010/-0020 Parts	25.22	#	D01+D02	57.57	#N/A
Lot 6	04-10-36-401-001	15.31	#	D56	15.3	04-10-36-401-001-0000
Lot 7	04-10-35-401-001	21.86	#	D48	21.97	04-10-35-401-001-0000
Block 5			#			
Lot 3	04-10-36-201-003	6.69	#	D51	6.67	04-10-36-201-003-0000
CIC at Deer One Unit Two			#			
Lot 6	04-10-35-402-005	5.62	#	D46	5.85	04-10-35-402-005-0000
			#			
			#			
	Total Common Area:	**162.23**	#			
			#			
	Total Park Area	**#REF!**	#			
			#			
	1.00		#	0.00		
			#			
			#			

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Re: **Verification of Ownership of Property Held by Elwood Maple Hill Cemetery Association on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

John Tryner:

Records at the Will County Recorder of Deeds indicate that your company, Elwood Maple Hill Cemetery Association, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Elwood Maple Hill Cemetery Association in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

Information from the Will County Recorder includes parcel identifications, grantors and grantees in its deeds of transfer that may be ambiguous or outdated. For instance, deeds of transfer can be provided for long-term leases as well as for changes of ownership. Thus we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

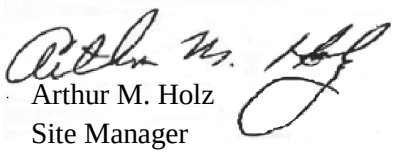
To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Elwood Maple Hill Cemetery Association
- 1.1 Ownership summary and verification for Elwood Maple Hill Cemetery Association
- 1.2 Detailed list of properties owned by Elwood Maple Hill Cemetery Association
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Elwood Maple Hill Cemetery Association

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Elwood Maple Hill Cemetery Association _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Elwood Maple Hill Cemetery Association owns the 1 parcel of land, covering approximately 0.09 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of ***Elwood Maple Hill Cemetery Association.*** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Elwood Maple Hill Cemetery Association
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
Elwood MHC	D34	10-11-30-100-006-0000	0.09	R2000086264	R2000086271	☐	**CPI LLC**
Elwood MHC Total		1	0.09				
Grand Total		1	0.09				

Abbreviations	
21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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JOHN A. TRYNER
ATTORNEY AT LAW
101 FULTON STREET
WILMINGTON, IL 60481

PH: (815) 476-9048 FAX: (815) 476-9092

January 16, 2013

Arthur M. Holz
Dept. of the Army

RE: Elwood Maple Hill Cemetery Association

Dear Mr. Holz:

This letter is in reference to your letter dated 1/14/13. I am returning enclosure 1.1, and attaching this letter as space on 1.1 does not permit a full explanation.

At this time it does not appear that your records of ownership match the records of the Cemetery Association. Using the reference numbers from your enclosure 1.4 our understanding of the Cemetery property is as follows:

1) D32 - this parcel consists of approximately 3.83 acres +/- and was platted as Lot 5 in the Centerpoint development. This parcel was conveyed to the Elwood Maple Hill Cemetery Assoc. via document no. R2003-088165, and was subject to certain restrictions which I believe are those referenced by your letter. According to Terry Weidemann of the Cemetery Association this property is not currently in use and remains vacant.

2) D33 - this parcel (or rather two parcels) are part of the original cemetery association property dating back to some time in the 1800's. Based on the information I have there are two deeds of conveyance located at the Will County Recorder of Deeds Nos. 334629 and 39953 (both dating to the 1800's) which transferred title to the original Cemetery. This parcel is currently being used as a Cemetery.

3) D34 - I am unclear on the history of this parcel. It appears there may have been some confusion in the original legal descriptions which created parcel D33, and that this has caused a gap to appear in the county assessors GIS system. I believe this property was conveyed to the cemetery via Doc. No. 334629 referenced above, but I cannot verify that without a title

commitment and survey work.

I have enclosed for your reference a copy of Doc. No. R2003-088165 which relates to the ownership of D32.

Very truly yours,

John A. Tryner
Attorney at Law

JAT/dld/enc.

Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Elwood Maple Hill Cemetery Association

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

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Elwood Maple Hill Cemetery Association owns the 1 parcel of land, covering approximately 0.09 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

see my letter dated 1/16/13 attached

Tenant(s), if any:

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

changes are required see letter attached

Statement of Authorized Representative:

I, John A. Tryner, am an authorized representative of ***Elwood Maple Hill Cemetery Association.*** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 1/16/13 (date)

1638D

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

John A. Tryner
Elwood Maple Hill Cemetery Association
101 Fulton Street
Wilmington, IL 60481

Re: **Verification of Ownership of Property Held by Elwood Maple Hill Cemetery Association on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

John Tryner:

Records at the Will County Recorder of Deeds indicate that your company, Elwood Maple Hill Cemetery Association, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Elwood Maple Hill Cemetery Association in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

Information from the Will County Recorder includes parcel identifications, grantors and grantees in its deeds of transfer that may be ambiguous or outdated. For instance, deeds of transfer can be provided for long-term leases as well as for changes of ownership. Thus we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are

binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

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    a. Details deed restrictions that are conveyed with your property
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The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

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Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

R2003088165

THIS INSTRUMENT WAS PREPARED BY:

Kevin P. Breslin
KATZ RANDALL WEINBERG & RICHMOND
333 West Wacker Drive, Suite 1800
Chicago, Illinois 60606
KRWR File No. 07056.36219

AFTER RECORDING RETURN TO:
and Send Tax bills to:

Elwood Maple Hill Cemetery Association
c/o John A. Tryner
101 Fulton Street
Wilmington, Illinois 60481

MARY ANN STUKEL 13P
Will County Recorder
Will County
R 2003088165 Page 1 of 13
CEM Date 04/16/2003 Time 12:26:10
Recording Fees: 27.00

1390656

QUITCLAIM DEED
Illinois

THIS INDENTURE is made as of the 30th day of December, 2002, by **CENTERPOINT INTERMODAL LLC**, an Illinois limited liability company, whose address is 1808 Swift Drive, Oak Brook, Illinois 60523 ("**Grantor**") to and in favor of **ELWOOD MAPLE HILL CEMETERY ASSOCIATION**, an association organized pursuant to the Illinois Cemetery Association Act, whose address is c/o John A. Tryner, 101 Fulton Street, Wilmington, Illinois 60481 ("**Grantee**").

WITNESSETH, that the Grantor, for and in consideration of the sum of Ten and No Dollars and other good and valuable consideration in hand paid by the party of the second part, the receipt and sufficiency whereof is hereby acknowledged, by these presents does GRANT, BARGAIN, SELL, REMISE, RELEASE, ALIEN, CONVEY AND QUIT-CLAIM unto Grantee, all of Grantor's right, title and interest, in and to the parcel of land situated in the County of Will and State of Illinois legally described on **Exhibit "A"** attached hereto and by this reference made a part hereof together with all and singular the improvements, hereditaments and appurtenances thereunto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof, and all the estate, right, title, interest, claim or demand whatsoever, of the Grantor, either in law or equity, of, in and to the above described premises, with the hereditaments and appurtenances; (collectively, the "**Property**"). The Property is conveyed subject to, among other matters, the Deed Restrictions summarized in the attached **Exhibit "B"**.

TO HAVE AND TO HOLD the Property as above described, with the appurtenances, unto the Grantee, its successors and assigns, forever.

CHICAGO TITLE INSURANCE CO.

106 A13-78C

IN WITNESS WHEREOF, Grantor has caused its name to be signed to these presents by its sole member and manager the day and year first above written.

CENTERPOINT INTERMODAL LLC, an Illinois limited liability company

By: **CENTERPOINT PROPERTIES TRUST**, a Maryland real estate investment trust, its sole member and manager

By: _____
Paul T. Ahern
Executive Vice President

By: _____
Michael Tortorici
Assistant Secretary

Exempt under provisions of Paragraph e, Section 4, Real Estate Transfer Tax Act.

4/10/03 _____
Date Buyer, Seller or Representative

R2003088165

STATE OF ILLINOIS)
)
COUNTY OF DuPAGE)

I, STACEY Cizek, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that Paul T. Ahern and Michael Tortorici, as Executive Vice President and Assistant Secretary, respectively, of CENTERPOINT PROPERTIES TRUST, a Maryland real estate investment trust, as the sole member and manager of CENTERPOINT INTERMODAL LLC, an Illinois limited liability company, who are personally known to me to be the same persons whose names are subscribed to the foregoing instrument as such President and Chief Operating Officer and Assistant Secretary, appeared before me this day in person and acknowledged that they signed and delivered the said instrument as their own free and voluntary act and as the free and voluntary act of said company for the uses and purposes therein set forth.

GIVEN under my hand and notarial seal this 30th day of December, 2002.

Stacey E. Cizek
Notary Public

OFFICIAL SEAL
STACEY E. CIZEK
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 9-27-2004

EXHIBIT A

LEGAL DESCRIPTION - PROPERTY

Lot 5 in Block 2 in CenterPoint Intermodal Center at Deer Run, according to the plat of subdivision thereof recorded on June 7, 2002 as document number R-2002094161 in the Office of the Recorder in Will County, Illinois.

Property known as: +/-3.83 acres on Drummmond Road east of Diagonal Road
CenterPoint Intermodal Center at Deer Run
Elwood, Illinois

Part of Permanent Index Number: 11-30-100-005-0000

EXHIBIT B

DEED RESTRICTIONS

The Property was previously conveyed by the United States of America, acting by and through the Deputy Assistant Secretary of the Army (I&H) pursuant to a delegation of authority from the Secretary of the Army (the "Army"), under and pursuant to the powers and authorities contained in the provisions of Section 2923 of the National Defense Authorization Act For Fiscal Year 1996, Public Law No. 104-106, Division B, Title XXIX, Subtitle B, Sections 2901 et seq., approved February 10, 1996 (the "Federal Act") by a Quit Claim Deed of Conveyance with Land Use Restrictions and Covenants and Groundwater Restrictions and Covenants recorded with the Will County Recorder's Office on August 11, 2000 as Document Number R200086264 (the "Initial Deed"). The Initial Deed contains several covenants, terms and conditions, some or all of which may apply to the Property.

In connection with the Initial Deed, a Memorandum of Agreement (hereinafter "MOA") dated August 2, 2000 was recorded as an exhibit to the Initial Deed. The MOA is incorporated herein by reference. The MOA sets forth additional rights and responsibilities of the parties to the MOA with respect to the Property and other real estate, further addresses the parallel activities of remediating a portion of the site in a manner consistent with law while allowing the Property to be redeveloped. All terms used herein, unless otherwise specified, shall have the meaning ascribed to them in the MOA.

1. NOTICE OF THE PRESENCE OF ASBESTOS.

a. Grantee, and its successors and assigns, future owners, heirs and executors, is hereby informed and does acknowledge that non-friable asbestos or asbestos-containing materials ("ACM") has been found on the Property, as described in the final installation-wide Enhanced Preliminary Assessment Screening dated September 1997.

b. Grantee covenants and agrees that its use and occupancy of the Property will be in compliance with all applicable laws relating to asbestos.

c. Unprotected or unregulated exposures to asbestos or ACM in product manufacturing and building construction workplaces have been associated with asbestos-related diseases. Both the Occupational Safety and Health Administration (hereinafter "OSHA") and the United States Environmental Protection Agency (hereinafter "USEPA") regulate asbestos because of the potential hazards associated with exposure to airborne asbestos fibers. Both OSHA and USEPA have determined that such exposure increases the risk of asbestos-related diseases, which include certain cancers and which can result in disability or death.

d. Grantee acknowledges that it has been notified of the opportunity to inspect the Property as to its asbestos content and condition and any hazardous or environmental conditions relating thereto. Grantee shall be deemed to have relied solely on its own judgment in assessing the overall condition of all or any portion of the Property, including, without limitation, any asbestos hazards or concerns.

e. No warranties, either expressed or implied, are given with regard to the condition of the Property, including, without limitation, whether the Property does or does not contain asbestos or ACM or is or is not safe for a particular purpose. The failure of Grantee to inspect, or to be fully informed as

to the condition of all or any portion of the Property offered, will not constitute grounds for any claim or demand against Grantor.

2. LEAD BASED PAINT WARNING AND COVENANT.

a. The Property does not contain structures or buildings suitable for residential dwellings. The Grantee, and its successors and assigns, future owners, heirs and executors, is hereby informed and does acknowledge that there are or were buildings on the property which were constructed or rehabilitated prior to 1978, are presumed to contain lead-based paint. Lead from paint, paint chips, and dust can pose health hazards if not managed properly. Lead exposure is especially harmful to young children and pregnant women. Such property may present exposure to lead from lead-based paint that may place young children at risk of developing lead poisoning. Lead poisoning in young children may produce permanent neurological damage, including learning disabilities, reduced intelligence quotient, behavioral problems and impaired memory.

b. Available information concerning known lead-based paint and/or lead-based paint hazards, the location of lead-based paint and/or lead-based paint hazards, and the condition of painted surfaces is contained in the Environmental Baseline Survey, which has been provided to the Grantee. Additionally, the Finding of Suitability to Transfer (FOST) has been provided to the Grantee.

c. A risk assessment or inspection by the Grantee, its successors and assigns, future owners, heirs and executors, for possible lead-based paint hazards is recommended prior to the transfer of the Property.

d. Grantee, its successors and assigns, future owners, heirs and executors, shall comply with all applicable federal, state, and local laws and regulations pertaining to lead-based paint and/or lead-based paint hazards as defined in 40 Code of Federal Regulations 745.223 in or on structures existing on the Property at the time of transfer.

3. NOTICE OF THE POTENTIAL FOR THE PRESENCE OF UNEXPLODED ORDNANCE (UXO) OR EXPLOSIVES. Ordnance and Explosives (OE) investigations indicate that OE is not likely on the Property. However, because this is a former military installation with a history of OE there is potential for OE to be present on the Property. In the event that Grantee, its successors and assigns, future owners, heirs, and executors, should discover what appears to be of an ordnance or explosive nature on the Property, said parties shall not attempt to remove or destroy such items. The said parties will immediately stop any excavation or other work in the area, and notify the local Police Department. As set forth in the Initial Deed, the Army has acknowledged its responsibility for OE/UXO and will take prompt action upon notification of discovery. Grantee, its successors and assigns, future owners, heirs and executors will provide access to the Army, at no expense to the United States Army ("Army"), for the purpose of removal of OE in the event Grantee, its successors and assigns, future owners, heirs and executors should discover any OE on the Property. For purposes of this Deed, OE, Ordnance and Explosives shall have the same meaning as that provided in the US Army Engineer Regulation (ER) 1110-1-8153, Ordnance and Explosive Response, 14 May 1999 or successor authority. ER 1110-1-8153 currently defines OE as Ordnance and Explosives which is anything related to munitions designed to cause damage to personnel or material through explosive force, incendiary action or toxic effects. Soils with explosive constituents are considered explosive waste if the concentration is sufficient to be reactive and present an imminent safety hazard as determined by the US Army Corps of Engineers, Ordnance and Explosives Mandatory Center of Expertise. UXO, Unexploded Ordnance, shall have the same meaning as that provided in the 40 Code of Federal Regulations (CFR) 266.201, which defines UXO as military munitions that have been primed, fused, armed or otherwise prepared for action and have been

fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installation, personnel or material and remain unexploded either by malfunction, design or any other cause.

4. CERCLA COVENANTS AND NOTICE. Pursuant to Sections 120(h)(3) of CERCLA, for the Property:

a. The Initial Deed contains a notice from the Army that: (1) hazardous substances were stored, released, and disposed on the Property so as to exceed the time period or quantity limits established by 40 CFR Part 373 for notification (for the purpose of this Deed, "hazardous substances" shall have the same meaning as section 101(14) of CERCLA); (2) available information regarding the type, quantity, and location of such substances and actions taken is set forth in Exhibit B of the Initial Deed there is no evidence indicating that hazardous substances were released on site, and the information regarding this storage and release indicates that there is no known existing threat to human health and the environment; and (3) except as indicated by the table at Exhibit B of the Initial Deed, there is no evidence indicating that hazardous substances were released on site, and the information regarding this storage and release indicates that there is no known existing threat to human health and the environment.

b. The remedial action for contaminated groundwater consists of establishing Groundwater Management Zones, deed restrictions, periodic site inspections, groundwater and surface water monitoring, and natural attenuation.

c. Consistent with the terms of the MOA, the Army has reserved a perpetual easement and right of access to the Property, which the Army may exercise in any case in which investigation, sampling, remedial action, corrective action, installing or removing groundwater monitoring wells, testing or monitoring of groundwater conditions is found to be necessary after the date of the Initial Deed in order to fulfill the Army=s environmental responsibilities under the Initial Deed; CERCLA; the June 1989 Federal Facility Agreement (hereinafter "FFA"); the October 1998 Record of Decision and any amendments thereto or any subsequent Records of Decision applicable to the Property (hereinafter "ROD'S; and any other applicable laws and regulations.

5. GRANTEE'S ACKNOWLEDGMENT OF THE ENVIRONMENTAL CONDITION OF THE PROPERTY. Grantee has reviewed the technical environmental reports including, but not limited to, the FOST for the Property, including all the improvements located thereon, prepared by the Army. Grantee has no knowledge to conclude that the technical environmental reports do not accurately describe the environmental condition of the Property. Grantee has inspected the Property and has no knowledge to conclude that the Property is not suitable for Grantee's intended use.

6. LAND USE RESTRICTIONS AND COVENANTS AND MONITORING WELL RESTRICTIONS AND COVENANTS. Pursuant to Article X. of the Initial Deed, the Property shall be subject to the following land use restrictions and covenants set forth in Article X. of the Initial Deed:

a. The land use restrictions and covenants and monitoring well use restrictions and covenants as set forth in Article X. of the Initial Deed shall run with the land and restrict the use of the above-referenced tracts pursuant to the legislative mandate set forth in the Federal Act and are necessary to ensure the protection of human health and the environment.

b. Within the boundaries of the Property, Grantee, its successors and assigns, future owners, heirs, and executors, shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by the

Army, without prior written permission from the Army in consultation with the USEPA and the Illinois Environmental Protection Agency (hereinafter "IEPA"). If written permission is granted to any landowner(s) for the installation of a replacement well, it shall be installed pursuant to applicable federal laws and regulations and the standards current at the time set forth in the Illinois Water Well Construction Code or successor codes.

c. The land use restrictions and covenants as set forth in Article X. of the Initial Deed shall be covenants running with the land and shall be binding upon the Grantee, its successors and assigns, future owners, heirs, and executors.

d. Grantee, its successors and assigns, future owners, heirs, and executors, shall include the land use restrictions and covenants as set forth in Article X. of the Initial Deed in all subsequent lease, transfer, or conveyance documents for all or any part of the above-referenced tracts. Notwithstanding this provision, failure to include the land use restrictions and covenants as set forth in Article X. of the Initial Deed in all subsequent lease, transfer, or conveyance documents shall not abrogate the status of these restrictions and covenants as binding upon Grantee, its successors and assigns, future owners, heirs, and executors.

e. Grantee, its successors and assigns, future owners, heirs, and executors, shall not knowingly or negligently undertake or allow any activity on or use of the above-referenced tracts that would violate the land use restrictions and covenants as set forth in Article X. of the Initial Deed.

f. The land use restrictions and covenants as set forth in Article X. of the Initial Deed (included herein as required by the Initial Deed) are enforceable by the Army only. The Army may enforce the terms of the Initial Deed by resort to specific performance or legal process. All remedies available to the Army under the Initial Deed are in addition to any and all remedies available to the Army at law or in equity, including CERCLA. Enforcement of the terms of the Initial Deed shall be at the discretion of the Army, and any forbearance, delay, or omission by the Army to exercise its rights under the Initial Deed in the breach of any term of the Initial Deed shall not be deemed to be a waiver by the Army of such term or any subsequent breach of the same or any other term, or of any of the rights of the Army under the Initial Deed.

g. The restrictions set forth in Section G. of Article X. of the Initial Deed shall ensure the protection of human health and the environment. Grantee, its successors and assigns, future owners (excluding the United States), heirs, and executors, shall use the above-referenced tracts for commercial and industrial parks. In addition, the above-referenced tracts shall not be used by Grantee, its successors and assigns, future owners (including the United States), heirs, and executors, for:

i. any type of residential purpose;

ii. any type of educational purpose for children in grades kindergarten through 12;

iii. any type of child or adult care purpose, provided however, this prohibition shall not exclude any child day care facility operated solely within the confines of a building structure;

iv. any type of solid or hazardous waste landfill purpose;

v. any type of commercial quarry operation; provided that the foregoing restriction shall not prohibit: (a) mass earth work and site grading activities, including borrow, fill, and

balancing, or (b) the excavation and use of gravel, sand, stone, aggregate and other on-site materials as rail bed ballast, in making concrete or asphalt, or in the construction of detention and retention facilities, rail beds, roads, or rights-of-way, or (c) other construction activities on or about the Property or in constructing roads and railroads leading or connecting to the Property to a distance of no more than ten (10) miles from the Property;

vi. any type of incineration of solid waste other than in connection with on-site manufacturing process(es); and

vii. any type of concrete batch plant or asphalt plant, unless the concrete or asphalt batch plant is operated for the purpose of servicing construction activities associated with the development of the Property or in constructing roads and railroads leading or connecting to the Property to a distance of no more than then (10) miles from the Property.

7. GROUNDWATER RESTRICTIONS AND COVENANTS FOR GROUNDWATER MANAGEMENT ZONE.

a. The Property lies within the Groundwater Management Zone established by the ROD for the approximate 23,500 acres former Joliet Army Ammunition Plant.

b. The groundwater restrictions and covenants as set forth in Article XI. of the Initial Deed shall restrict the use of the Property for the protection of human health and the environment until such time as the Property has been remediated to the standards established in the ROD as contemplated in Section F. of Article XI. of the Initial Deed. The ROD is available at the following repositories: Wilmington Library, Joliet Library, Administration building at Joliet Army Ammunition Plant, Region 5 USEPA, and FEPA Bureau of Land, Federal Facilities Unit, Springfield, Illinois.

c. Grantee, its successors and assigns, future owners, heirs, and executors, shall include the groundwater restrictions and covenants as set forth in Article XI. of the Initial Deed in all subsequent lease, transfer, or conveyance documents for all or any part of the above-referenced tract(s). Notwithstanding this provision, failure to include the groundwater restrictions and covenants as set forth in Article XI. of the Initial Deed in all subsequent lease, transfer, or conveyance documents shall not abrogate the status of these restrictions and covenants as binding upon Grantee, its successors and assigns, future owners, heirs, and executors.

d. Grantee, its successors and assigns, future owners, heirs, and executors, shall not undertake or allow any activity on or use of the above-referenced tract(s) that would violate the groundwater restrictions and covenants as set forth in Article XI. of the Initial Deed.

e. The groundwater restrictions and covenants as set forth in Article XI. of the Initial Deed (included herein as required by the Initial Deed) are enforceable by the Army only. That Army may enforce the terms of the Initial Deed by resort to specific performance or legal process. All remedies available to the Army under the Initial Deed shall be in addition to any and all remedies available to the Army at law or in equity, including CERCLA. Enforcement of the terms of the Initial Deed shall be at the discretion of the Army, and any forbearance, delay, or omission by the Army to exercise its rights under the Initial Deed in the breach of any term of the Initial Deed shall not be deemed to be a waiver by the Army of such term or any subsequent breach of the same or any other term, or of any of the rights of the Army under the Initial Deed.

f. The groundwater restrictions and covenants as set forth in Article XI. of the Initial Deed shall be covenants running with the land and shall be binding upon Grantee, its successors and assigns, future owners, heirs, and executors. If any groundwater restrictions or covenants set forth in Article XI. of the Initial Deed are released in accordance with Section F. of Article XI. of the Initial Deed, then upon demand by Grantee, or its successors or assigns, the Grantor shall execute and deliver to Grantee, or its successors or assigns, a release of the corresponding groundwater restrictions or covenants included in Article X. of this Deed. The referenced release shall not be unreasonably withheld or delayed by Grantor. The referenced release hereunder shall be subsequent to a release executed by the Secretary of the Army, United States Department of the Army, or his/her authorized designee.

g. It is the intent of Grantor and Grantee that the restrictions set forth in Section G. of Article XI. of the Initial Deed shall ensure the protection of human health and the environment. Unless the following restrictions in Section G. of Article XI. of the Initial Deed are removed or amended in accordance with Section F. of Article XI. of the Initial Deed, within the boundary of the Groundwater Management Zone, Grantee, its successors and assigns, future owners, heirs, and executors:

i. Shall not conduct any activity (e.g. any anthropogenic seismic activity, deep excavation activity, or drilling or pumping a well within the Silurian dolomite aquifer) that would increase the volume or area of the Contaminated Groundwater, damage the confining layers that underlie the Contaminated Groundwater (e.g. fracturing the Maquoketa confining layer or any other existing confining layer(s) or strata of the Maquoketa confining layer), or create pathways of exposure to human or ecological receptors from the Contaminated Groundwater to the extent prohibited by the ROD. For identification purposes, the groundwater within the glacial drift and the Silurian dolomite aquifer (collectively referred to herein as "the Contaminated Groundwater") is located above the Maquoketa confining bed.

ii. Shall not use the groundwater above the Maquoketa confining bed for potable purposes.

h. Shallow groundwater above the Maquoketa confining bed has the potential to be contaminated with hazardous substances, including, but not limited to explosives, their derivatives or volatile organic compounds. In the event shallow groundwater above the Maquoketa confining bed is encountered at any time due to the disturbance or excavation of surface or subsurface soil, Grantee, its successors and assigns, future owners, heirs, and executors, shall comply with all laws and regulations that are applicable to the safe and proper management, discharge, disposal, or treatment of all shallow groundwater encountered.

8. GROUNDWATER RESTRICTIONS AND COVENANTS FOR DEED RESTRICTED PARCELS. Pursuant to Article XII. of the Initial Deed, the Property shall be subject to the following groundwater restrictions and covenants as set forth in Article XII. of the Initial Deed:

a. The groundwater restrictions and covenants as set forth in Article XII. of the Initial Deed shall restrict the use of the Property for the protection of human health and the environment until such time as the property has been remediated to the standards established in the ROD, as provided in Section F of Article XII. of the Initial Deed.

b. Grantee, its successors and assigns, future owners, heirs, and executors, shall include the groundwater restrictions and covenants as set forth in Article XII. of the Initial Deed in all subsequent lease, transfer, or conveyance documents for all or any part of the above-referenced real estate.

Notwithstanding this provision, failure to include the groundwater restriction and covenant as set forth in Article XII. of the Initial Deed in all subsequent lease, transfer, or conveyance documents shall not abrogate the status of these restrictions and covenants as binding upon Grantee, its successors and assigns, future owners, heirs, and executors.

c. Grantee, its successors and assigns, future owners, heirs, and executors, shall not undertake or allow any activity on or use of the above-referenced real estate that would violate the groundwater restrictions and covenants as set forth in Article XII. of the Initial Deed.

d. The groundwater restrictions and covenants as set forth in Article XII. of the Initial Deed (included herein as required by the Initial Deed) are enforceable by the Army only. The Army may enforce the terms of the Initial Deed by resort to specific performance or legal process. All remedies available to the Army under the Initial Deed shall be in addition to any and all remedies available to the Army at law or in equity, including CERCLA. Enforcement of the terms of the Initial Deed by the Army shall be at the discretion of the Army, and any forbearance, delay, or omission by the Army to exercise its rights under the Initial Deed in the breach of any term of the Initial Deed shall not be deemed to be a waiver by the Army of such term or any subsequent breach of the same or any other term, or of any of the rights of the Army under the Initial Deed.

e. The groundwater restrictions and covenants as set forth in Article XII. of the Initial Deed shall be covenants running with the land and shall be binding upon Grantee, its successors and assigns, future owners, heirs, and executors. If any groundwater restrictions or covenants set forth in Article XII. of the Initial Deed are released in accordance with Section F. of Article XII. of the Initial Deed, then upon demand by Grantee, or its successors or assigns, the Grantor shall execute and deliver to Grantee, or its successors or assigns, a release of the corresponding groundwater restrictions or covenants included in Article XI. of this Deed. The referenced release shall not be unreasonably withheld or delayed by Grantor. The referenced release hereunder shall be subsequent to a release executed by the Secretary of the Army, United States Department of the Army, or his/her authorized designee.

f. The restrictions set forth in Section G. of Article XII. of the Initial Deed shall ensure the protection of human health and the environment. Unless the following restrictions in Section G. of Article XII. of the Initial Deed are removed or amended in accordance with Section F. of Article XII. of the Initial Deed, then, within the boundary of the Property, Grantee, its successors and assigns, future owners, heirs, and executors :

i. Shall not use the Contaminated Groundwater.

ii. Shall not drill, construct, pump, or use groundwater supply wells.

9. CERCLA REMEDIATION.

a. As set forth in the Initial Deed, the Army acknowledged that the Joliet Army Ammunition Plant, Will County, Illinois has been identified as a National Priorities List (hereinafter "NPL") site under CERCLA.

b. Grantee, its successors and assigns, future owners, heirs, and executors agree that should any conflict arise between the terms of the ROD, in accordance with CERCLA, as they exist at the time a conflict arises, and the provisions of this Deed, the provisions of the ROD will prevail.

c. Pursuant to the Initial Deed, Grantee agrees with the Army that all construction and development activities conducted on the Property by Grantee, its successors and assigns, future owners, heirs and executors, shall be conducted in a manner which is consistent with the ROD, or any amendment thereto. The Army, Grantor and Grantee or their respective successors and assigns may acknowledge in the MOA (with the written concurrence of the USEPA and IEPA), or subsequent amendments thereto, that certain activities described therein are not inconsistent with the ROD. Notwithstanding any other provision of this Article or Article XIII. of the Initial Deed, nothing in this Article or in Article XIII. of the Initial Deed reduces or in any way circumvents the protections provided and obligations imposed by CERCLA.

d. All subsequent conveyances of the Property or any interests therein, by Grantee, its successors and assigns, future owners, heirs, and executors, shall be expressly subject to the rights and duties of the Army to continue operation of any monitoring wells, treatment facilities, or other response activities undertaken pursuant to CERCLA, the FFA, or the ROD. Grantee, its successors and assigns, future owners, heirs, and executors, shall provide:

i. Pre-transfer Notice - 30 days written notice of any subsequent transfer of the Property (including a description of the deed/lease provisions allowing for the Army's continued remediation activities) to the Army, USEPA, and IEPA;

ii. Deed/lease - Within 14 days after the effective date of the transaction, Grantee, its successors and assigns, future owners, heirs, and executors, shall provide to the Army, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction.

e. Notwithstanding any other provision herein, nothing in this document reduces or in any way circumvents the protections provided and obligations imposed by CERCLA Section 120(h).

10. NON-DISCRIMINATION PROVISION. Pursuant to the Initial Deed, Grantee agrees with the Army that Article XIV. of the Initial Deed prohibits discrimination upon the basis of race, color, religion, sex, age, disability, or national origin in the use, occupancy, sale, or lease of the Property or any part thereof, or in its employment practices conducted thereon in violation of the provisions of Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. Section 2000d); the Age Discrimination Act of 1975 (42 U.S.C. Section 6102); and the Rehabilitation Act of 1973, as amended (29 U.S.C. Section 794). The Army shall be deemed a beneficiary of Article XIV. of the Initial Deed without regard to whether it remains the owner of any real estate or interest therein in the locality of the Property, and the Army shall have the sole right to enforce that covenant in any court of competent jurisdiction. Article XIV. of the Initial Deed shall not apply, however, to the lease or rental of a room or rooms within a family dwelling unit; nor shall it apply with respect to religion or to premises used primarily for religious purposes. A violation or breach of the non-discrimination provision of Article XIV. of the Initial Deed by Grantee, its successors and assigns, future owners, heirs, and executors, shall not result in a forfeiture or reversion of title.

11. NON-REVERTER. The title hereby conveyed is not qualified, defeasible, or subject to any special limitation, condition subsequent or executory limitation. The failure of Grantee or any successor owner or occupant of the Property (or any portion thereof) to comply with the covenants, restrictions, requirements, or other obligations set forth in this Deed shall not under any circumstances cause a forfeiture of title to the Property, a termination of any estate hereby created, or any reversion thereof, it being agreed by Grantor that neither Grantor or any other party holds or possesses any reversion, possibility of reverter, common law right of entry for condition broken, or right or power of forfeiture or termination with respect to the Property, all such possibilities, rights, or powers being hereby expressly waived by Grantor.

12. SPECIAL SERVICE AREA. The Property is subject to, among other matters, that certain Annexation Agreement by and among the Seller, its affiliated companies, the Village of Elwood ("**Village**") and the United States Department of the Army, which was recorded in Will County, Illinois on July 17, 2000 as document number R2000-76002. Pursuant to the Annexation Agreement, the Property and other land thereby annexed to the Village (collectively, "**Special Service Area**") shall be the subject of a special service area tax ("**SSA Tax**") in accordance with 35 ILCS 200/27-5 et seq. Grantee, its successors and assigns shall be obligated to: (i) consent to, not take any action in opposition to, and otherwise cooperate with Grantor and the Village with respect to the passage of all ordinances and other official actions deemed necessary or advisable by the Village and Grantor to effect the imposition of the SSA Tax and the levy thereof against Special Service Area (provided the same do not require that the assessment is based on lineal footage along a roadway),, and in that regard, Grantee shall without delay sign all petitions and consents requested by the Village and Grantor regarding the SSA Tax; and (ii) that it shall not permit or suffer any elector(s) to reside on the Property. The Village and/or Grantor may enjoin the violation of or failure to comply with the foregoing covenants and agreements by appropriate legal proceedings.

The foregoing provisions shall be deemed covenants running with the Property and shall be binding upon the Grantee, its successors and assigns.

R2002134030

Prepared By:

John A. Tryner, atty
101 Fulton St.
Wilmington, IL 60481

Mail To:

John A. Tryner, atty
101 Fulton St.
Wilmington, IL 60481

MARY ANN STUKEL 3P
Will County Recorder
Will County
R 2002134030 Page 1 of 3
PC2 Date 08/19/2002 Time 15:34:56
Recording Fees: 18.00

ASSOCIATION PETITION
ELWOOD MAPLE HILL CEMETERY ASSOCIATION

1 of 3.

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

William Offerman
Village President
Village of Elwood
401 E. Mississippi Avenue
P.O. Box 435
Elwood, IL 60421

Re: **Verification of Ownership of Property Held by Village of Elwood on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

William Offerman:

Records at the Will County Recorder of Deeds indicate that your company, Village of Elwood, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Village of Elwood in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are

binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

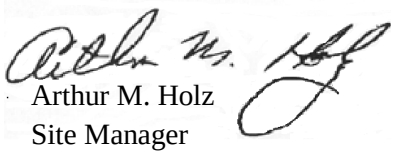
To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Village of Elwood
- 1.1 Ownership summary and verification for Village of Elwood
- 1.2 Detailed list of properties owned by Village of Elwood
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Village of Elwood

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Village of Elwood _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Village of Elwood owns the 1 parcel of land, covering approximately 8.9 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Village of Elwood.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Village of Elwood
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
Elwood Village	D27	10-11-30-101-006-0000	8.9	R2000086264	R2000086271	☐	**CPI LLC**
Elwood Village Total		1	8.9				
Grand Total		1	8.9				

Abbreviations	
21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Frank J Giordano
FJGCO, LLC
17201 State St
South Holland, IL 60473-2823

Re: **Verification of Ownership of Property Held by FJCO, LLC on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Frank Giordano:

Records at the Will County Recorder of Deeds indicate that your company, FJGCO, LLC, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to FJGCO, LLC in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by FJGCO, LLC
- 1.1 Ownership summary and verification for FJGCO, LLC
- 1.2 Detailed list of properties owned by FJGCO, LLC
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by FJGCO, LLC

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: FJGCO, LLC

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

FJGCO, LLC owns the 1 parcel of land, covering approximately 256.68 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)_____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of FJGCO, LLC. To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
FJGCO, LLC
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
FJGCO LLC	A05	09-18-16-300-005-0000	256.88	R2000086264	R2000086264	☐	JADA
FJGCO LLC Total		1	256.88				
Grand Total		1	256.88				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Fort James Operating Co.
c/o Georgi a Pacific Corporation
133 Peachtree Street NE
Atlanta, Georgia 30303
Attention: Ms. Sheron B. Belche
(404)652-4000

Re: **Verification of Ownership of Property Held by Fort James Operating Co. on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sheron Belche:

Records at the Will County Recorder of Deeds indicate that your company, Fort James Operating Co., owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Fort James Operating Co. in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements

were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Fort James Operating Co.
- 1.1 Ownership summary and verification for Fort James Operating Co.
- 1.2 Detailed list of properties owned by Fort James Operating Co.
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Fort James Operating Co.

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Fort James Operating Company** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Fort James Operating Company owns the 1 parcel of land, covering approximately 49.19 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Fort James Operating Company.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Fort James Operating Company
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
Fort James	D21	04-10-25-201-011-0000	49.19	R2000086264	R2005210234	☐	CPRSC
Fort James Total		1	49.19				
Grand Total		1	49.19				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Real Property Manager or Executive Officer
International Union of Operating Engineers
Local 150 Headquarters/District 1 Hall
6200 Joliet Road, Countryside
Illinois, 60525

Re: **Verification of Ownership of Property Held by International Union of Operating Engineers Local 150 on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that your company, International Union of Operating Engineers, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to International Union of Operating Engineers in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and

requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by International Union of Operating Engineers
- 1.1 Ownership summary and verification for International Union of Operating Engineers
- 1.2 Detailed list of properties owned by International Union of Operating Engineers
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by International Union of Operating Engineers

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **International Union of Operating Engineers Local 150** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

International Union of Operating Engineers Local 150 owns the 2 parcels of land, covering approximately 295.11 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **International Union of Operating Engineers Local 150.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
International Union of Operating Engineers Local 150
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
IUOEL	A08	09-18-16-400-002-0000	255.68	R2000086264	R2003270518	☐	JADA
IUOEL	A09	09-18-16-400-003-0000	39.43	R2005064066	R2005064067	☐	JADA
IUOEL Total		2	295.11				
Grand Total		2	295.11				

Abbreviations	
21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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INTERNATIONAL UNION OF OPERATING ENGINEERS

LOCAL UNION NO. 150, 150B, 150A, 150C, 150RA, 150D, 150G, 150M

AFFILIATED WITH THE A.F.L.-C.I.O.

6140 JOLIET ROAD
COUNTRYSIDE, IL 60525

708-579-6663
FAX 708-588-1647

DALE D. PIERSON
ELIZABETH A. LAROSE
MELINDA S. HENSEL
BRYAN P. DIEMER
CHARLES R. KISER

LEGAL DEPARTMENT

MARC R. POULOS
MELISSA L. BINETTI
STEVE A. DAVIDSON
KARA PRINCIPE

February 11, 2013

Arthur M. Holz
Site Manager
Dept. of the Army
Joliet Army Ammunition Plant
29401 S. Route 53
Wilmington, IL 60481

RE: Verification of Ownership Questionnaire

Dear Mr. Holz:

Enclosed please find the IUOE Local 150 Building Corp.'s response to the Department of the Army's ownership verification questionnaire dated January 14, 2013. If you have any questions, please do not hesitate to contact me.

Sincerely,

INTERNATIONAL UNION OF OPERATING ENGINEERS,
LOCAL 150, AFL-CIO, LEGAL DEPARTMENT

Melinda S. Hensel

MSH:mmc
Enclosure
ecc: Jim McNally

Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: International Union of Operating Engineers Local 150

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

[x] To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

International Union of Operating Engineers Local 150 owns the 2 parcels of land, covering approximately 295.11 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) On March 7, 2011, Owner forwarded an executed Special Warranty Deed to Wilmington Fire Protection District transferring 2.5 acres of land to it at the northwest corner of S. Arsenal Road and Old Chicago Road pursuant to Section 31

Tenant(s), if any:

None.

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

of the Owner's Annexation Agreement with the City of Wilmington. A copy of the Deed is attached.

Statement of Authorized Representative:

I, Melinda S. Hensel, am an authorized representative of **International Union of Operating Engineers Local 150.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

Building Corp.

Melinda S Hensel (signature) February 11, 2013 (date)

INTERNATIONAL UNION OF OPERATING ENGINEERS

LOCAL UNION NO. 150, 150B, 150A, 150C, 150RA, 150D, 150G, 150M

AFFILIATED WITH THE A.F.L.-C.I.O.

MI 724

6140 JOLIET ROAD
COUNTRYSIDE, IL 60525

708-579-6663
FAX 708-588-1647

DALE D. PIERSON
ELIZABETH A. LAROSE
MELINDA S. HENSEL
ROBERT E. ENTIN
BRYAN P. DIEMER

LEGAL DEPARTMENT

CHARLES R. KISER
MARC R. POULOS
MELISSA L. BINETTI
STEVE A. DAVIDSON
KARA PRINCIPE

March 7, 2011

COPY

Tom Gilbert
Ottosen Britz Kelly Cooper & Gilbert
9990 W. 190th Street, Suite A
Mokena, IL 60448

Re: Land Transfer Between International Union of Operating Engineers, Local 150 Building Corp. and Wilmington Fire Protection District
Our File No. MI-00750

Dear Tom:

Enclosed please find an executed Special Warranty Deed and Plat Act transferring the acreage as described in the survey dated November 12, 2010 to the Wilmington Fire Protection District and pursuant to the Local 150 Building Corp.'s annexation agreement with the City of Wilmington. Please forward the documents for recording to complete the transaction.

Sincerely,

INTERNATIONAL UNION OF OPERATING ENGINEERS,
LOCAL 150, AFL-CIO, LEGAL DEPARTMENT

Melinda S. Hensel

MSH:mmc
Enclosure
ecc: James M. Sweeney
Jim McNally
Mike Rorex

I:\MI\Wilmington Fire Dept Transfer\gilbert 3-7-11.doc

THIS INSTRUMENT PREPARED BY
AND
AFTER RECORDING RETURN TO:

Ronald B. Grais, Esq.
Jenner & Block LLP
353 North Clark Street
Chicago, Illinois 60654

Above Space for Recorder's Use Only

COPY

SPECIAL WARRANTY DEED

This **SPECIAL WARRANTY DEED**, made as of March 7, 2011 between **INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL 150, 150A, 150B, 150C, BUILDING CORPORATION**, an Illinois not-for-profit corporation, having an address of 6200 Joliet Road, Countryside, IL 60525 ("**Grantor**"), to an in favor of **WILMINGTON FIRE PROTECTION DISTRICT**, an Illinois Municipal Corporation., having an address of 501 N. Water Street, Wilmington, Illinois 60481 ("**Grantee**").

WITNESSETH, that Grantor, for and in consideration of the sum of Ten and No/100 Dollars ($10.00), and other valuable consideration in hand paid by Grantee, the receipt and sufficiency whereof is hereby acknowledged, by these presents does REMISE, RELEASE, ALIEN AND CONVEY unto Grantee, and to its successors and assigns, FOREVER, all interest in and to the real estate situated in the County of Will and State of Illinois known and described in Exhibit A attached hereto and by this reference made a part hereof, (the "**Premises**") subject to the land use restrictions and reversion described in Exhibit B attached hereto and by this reference made a part hereof.

Together with all and singular the hereditaments and appurtenances thereunto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof, and all the estate, right, title, interest, claim or demand whatsoever, of the Grantor, either in law or equity, of, in and to the Premises, with the hereditaments and appurtenances:

TO HAVE AND TO HOLD the Premises as above described, with the appurtenances, unto the Grantee, its successors and assigns forever.

COPY

And the Grantor, for itself, and its successors and assigns, does covenant, promise and agree, to and with the Grantee, its successors and assigns, that during the period that Grantor has owned title to the Property, it has not done or suffered to be done anything whereby the Premises hereby granted is, or may be, in any manner encumbered or charged, the Grantor will WARRANT AND DEFEND the Premises against all persons lawfully claiming by, through or under the Grantor, but not otherwise.

[SIGNATURE PAGE FOLLOWS]

COPY

IN WITNESS WHEREOF, Grantor has signed and sealed and delivered this instrument as of the day and year first above written.

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL 150, 150A, 150B, 150C, BUILDING CORPORATION,
an Illinois not-for-profit corporation

By: _____
Name: JAMES M. SWEENEY
Title: PRESIDENT

STATE OF ILLINOIS)
) **ss**
COUNTY OF Cook)

I, the undersigned, a Notary Public in and for the State and County provided above, do hereby certify that James M Sweeney, the President of **INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL 150, 150A, 150B, 150C, BUILDING CORPORATION**, an Illinois not-for-profit corporation, who is personally known to me to be the same person whose name is subscribed to the foregoing instrument as such President, appeared before me this day in person and acknowledged that he/she signed and delivered the said instrument as his/her own free and voluntary act and as the free and voluntary act and deed of said not-for-profit corporation pursuant to authority granted by the Board of Directors of said not-for-profit corporation, for the uses and purposes therein set forth.

GIVEN under my hand and notarial seal this 7 day of March, 2011.

Catherine B. Burns
Notary Public

OFFICIAL SEAL
CATHERINE B. BURNS
Notary Public - State of Illinois
My Commission Expires Nov 07, 2012

EXEMPT UNDER PROVISIONS OF SECTION 31-45, PARAGRAPH (E) REAL ESTATE TRANSFER TAX ACT (35 ILCS 200/31, et. seq.).

_____, **DATED:**_____
SELLER, BUYER OR REPRESENTATIVE

MAIL SUBSEQUENT TAX BILLS TO:
WILMINGTON FIRE PROTECTION DISTRICT
501 N. WATER STREET
WILMINGTON, ILLINOIS 60481

1934372

EXHIBIT A

COPY

LEGAL DESCRIPTION

THE WEST 285.00 FEET OF THE EAST 345.00 FEET OF THE NORTH 330.00 FEET OF THE SOUTH 380.00 FEETOF THE SOUTHEAST QUARTER OF SECTION 16, IN TOWNSHIP 33 NORTH, RANGE 10 EAST OF THE THIRD PRINCIPAL MERIDIAN, WILL COUNTY, ILLINOIS.

PERMANENT INDEX NUMBER: **Part of 18-16-300-002**

ADDRESS OF PROPERTY:
Vacant Land located at the northwest corner of the intersection of South Arsenal Road and Old Chicago Road

COPY

EXHIBIT B

LAND USE RESTRICTIONS

Grantee, its successors and/or assigns, future owners, heirs and executors shall use the Premises solely as a fire and emergency services station and for public purposes related thereto. Such use restrictions shall be covenants running with the Premises and shall be binding upon the Grantee, its successors and/or assigns, future owners, heirs and executors forever.

In the event that at any time subsequent to the date hereof, Grantee, its successors and/or assigns, future owners, heirs and executors shall use the Premises for any purpose other than described herein, fee title to the Premises shall immediately revert to Grantor and Grantee shall have no further right, title or interest in the Premises. In such event, Grantee shall promptly execute such documents as requested by Grantor to evidence the reversion of the Premises.

COPY

PLAT ACT AFFIDAVIT

STATE OF ILLINOIS)
) SS.
COUNTY OF WILL)

JAMES M. SWEENEY, being duly sworn on oath, states that he is the PRESIDENT of **INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL 150, 150A, 150B, 150C, BUILDING CORPORATION**, an Illinois not-for-profit corporation, having an address of 6200 Joliet Road, Countryside, IL 60525.

The attached deed is not in violation of Section 1 of the Plat Act (765 ILCS 205/1 (a)) for the one of the following reasons (circle applicable statement):

A. Said Act is not applicable as the grantors own no adjoining property to the premises described in said deed.

-OR-

B. The conveyance falls in one of the following exemptions enumerated in said Section 1.

1. The division or subdivision of land into parcels or tracts of 5 acres or more in size which does not involve any new streets or easements of access;

2. The division of lots or blocks of less than 1 acre of any recorded subdivision which not involve any new streets or easements of access;

3. The sale or exchange of parcels of land between owners of adjoining and contiguous land;

4. The conveyance of parcels of land or interest therein for use as a right of way for railroads or other public utility facilities and other pipe lines which does not involve any new streets or easements of access;

5. The conveyance of land owned by a railroad or other public utility which does not involve any new streets or easements of access;

6. The conveyance of land for highway or other public purposes or grants or conveyances relating to the dedication of land for public use or instruments relating to the vacation of land impressed with a public use;

7. Conveyances made to correct descriptions in prior conveyances;

8. The sale or exchange of parcels or tracts of land following the division into no more than 2 parts of a particular parcel or tract of land existing on July 17, 1959 and not involving any new streets or easements of access;

COPY

9. The sale of a single lot of less than 5 acres from a larger tract when a survey is made by a registered surveyor; provided, that this exemption shall not apply to the sale of any subsequent lots from the same larger tract of land, as determined by the dimensions and configuration of the larger tract on October 1, 1973, and provided also that this exemption does not invalidate any local requirements applicable to the subdivision of land.

Affiant further states that Affiant makes this affidavit for the purpose of inducing the Recorder of Deeds of Will County, Illinois to accept the attached deed for recording.

[SIGNATURE PAGE FOLLOWS]

Dated the 7 day of March, 2011.

COPY

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL 150, 150A, 150B, 150C, BUILDING CORPORATION,
an Illinois not-for-profit corporation

By: _____
Name: JAMES M. SWEENEY
Title: PRESIDENT

SUBSCRIBED AND SWORN to before me this 7 day of March, 2011.

_____
Notary Public

OFFICIAL SEAL
CATHERINE B. BURNS
Notary Public - State of Illinois
My Commission Expires Nov 07, 2012

1934372

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Joliet Arsenal Development Authority
Richard Kwasneski
3180 Theodore Street #103
Joliet, IL 60435

Re: **Verification of Ownership of Property Held by Joliet Arsenal Development Authority on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Richard Kwasneski:

Records at the Will County Recorder of Deeds indicate that your company, Joliet Arsenal Development Authority (JADA), owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to JADA in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than February 4, 2013 to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and

requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by JADA
- 1.1 Ownership summary and verification for JADA
- 1.2 Detailed list of properties owned by JADA
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by JADA

[This page intentionally left blank]

Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Joliet Arsenal Development Authority** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Joliet Arsenal Development Authority owns the 3 parcels of land, covering approximately 361.19 acres, within the *Deer Run Industrial Park* and the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Joliet Arsenal Development Authority.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Joliet Arsenal Development Authority
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
JADA	A01	09-18-18-400-004-0000	255.57	R2005064066	R2005064066	☐	
JADA	A04	09-18-18-400-002-0000	103	R2004025145	R2004025145	☐	
JADA	D33	10-11-30-100-004-0000	2.62	R2000086264	R2000086271	☐	
JADA Total		3	361.19				
Grand Total		3	361.19				

Abbreviations	
21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Joliet Arsenal Development Authority

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☒ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Joliet Arsenal Development Authority owns the 3 parcels of land, covering approximately 361.19 acres, within the *Deer Run Industrial Park* and the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) MAP LABEL D 33 IS NOT JADA PROPERTY.

Tenant(s), if any:

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

MAP LABEL A05 IS JADA PROPERTY. PART OF A05 IS OWNED BY FJGCO, LLC SINCE 11-21-11 APPROX 77 acres SHOULD BE ON FILE AT RECORDERS office.

Statement of Authorized Representative:

I, RICHARD KWASNESKI, am an authorized representative of **Joliet Arsenal Development Authority.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 8-5-13 (date)

Enclosure 1.2 - Detailed list of properties owned by
Joliet Arsenal Development Authority
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Check box if ownership information is correct.	Comment
JADA	A01	09-18-18-400-004-0000	255.57	R2005064066	R2005064066	☒	
JADA	A04	09-18-18-400-002-0000	103	R2004025145	R2004025145	☒	
JADA	D33	10-11-30-100-004-0000	2.62	R2000086264	R2000086271	☐	Not our Property
JADA Total		3	361.19				
Grand Total		3	361.19				

Abbreviations	
21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Real Property Manager or Executive Officer
Liberty Property Limited Partnership
500 Chesterfield Parkway
Malvern, PA 19355

Re: **Verification of Ownership of Property Held by Liberty Property Limited Partnership on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that your company, Liberty Property Limited Partnership, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Liberty Property Limited Partnership in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than February 4, 2013 to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and

requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or our U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Liberty Property Limited Partnership
- 1.1 Ownership summary and verification for Liberty Property Limited Partnership
- 1.2 Detailed list of properties owned by Liberty Property Limited Partnership
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Liberty Property Limited Partnership

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Liberty Property Limited Partnership _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Fo Liberty Property Limited Partnership owns the 2 parcels of land, covering approximately 74.85 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Liberty Property Limited Partnership.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Liberty Property Limited Partnership
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
Liberty Property LP	D22	04-10-25-201-012-0000	47.84	R2000086264	R2000086271	☐	**CJF1 LLC**
Liberty Property LP	D50	04-10-36-201-002-0000	27.01	R2000086264	R2000086271	☐	**CJF1 LLC**
Liberty Property LP Total		2	74.85				
Grand Total		2	74.85				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Liberty Property Limited Partnership

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☒ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Fo Liberty Property Limited Partnership owns the 2 parcels of land, covering approximately 74.85 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

Tenant(s), if any:

DSC Logistics
National Distribution Centers (DBA NFI Industries)

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

Statement of Authorized Representative:

I, Donald P. Schoenheider, am an authorized representative of **Liberty Property Limited Partnership.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 1/25/13 (date)

Enclosure 1.2 - Detailed list of properties owned by
Liberty Property Limited Partnership
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abbervlations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Check box if ownership information is correct	Comment
Liberty Property LP	D22	04-10-25-201-012-0000	47.84	R2000086264	~~R2000086271~~ (1)	☒	CJF1 LLC
Liberty Property LP	D50	04-10-36-201-002-0000	27.01	R2000086264	~~R2000086271~~ (1)	☒	CJF1 LLC
Liberty Property LP Total		2	74.85				
Grand Total		2	74.85				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
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ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

(1) Current Deed: R2011064817
Recorder in Will County 7/14/11

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Prairie Craftsman, LLC
1 Doris Ave #220
Joliet, IL 60433
and/or
225 Maple Street
Joliet, IL 60432

Re: **Verification of Ownership of Property Held by Prairie Craftsman, LLC on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that your company, Prairie Craftsman, LLC, owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Prairie Craftsman, LLC in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

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Background and Reason for Request:

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    a. Details deed restrictions that are conveyed with your property
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The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Prairie Craftsman, LLC
- 1.1 Ownership summary and verification for Prairie Craftsman, LLC
- 1.2 Detailed list of properties owned by Prairie Craftsman, LLC
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Prairie Craftsman, LLC

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Prairie Craftsman, LLC**_____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Prairie Craftsman, LLC owns the 1 parcel of land, covering approximately 22.05 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Prairie Craftsman, LLC.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Prairie Craftsman, LLC
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
Prairie Craftsman	A03	09-18-18-300-003-0000	22.05	R2004025145	R2005213110	☐	JADA
Prairie Craftsman Total		1	22.05				
Grand Total		1	22.05				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Prairie Craftsman, LLC

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☒ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Prairie Craftsman, LLC owns the 1 parcel of land, covering approximately 22.05 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

Tenant(s), if any:

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

NEW MAILING ADDRESS FOR PRAIRIE CRAFTSMAN LLC IS:
PRAIRIE CRAFTSMAN LLC
616 MACK ST.
JOLIET, IL 60435

Statement of Authorized Representative:

I, James Keck, am an authorized representative of **Prairie Craftsman, LLC.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 1/24/13 (date)

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Real Property Manager or Executive Officer
Prologis Logistics Services, Inc.
8755 West Higgins Road
Suite 700
Chicago, Illinois 60631

Re: **Verification of Ownership of Property Held by Prologis Logistics Services, Inc. on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that your company, Prologis Logistics Services, Inc. owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Prologis Logistics Services, Inc. in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and

requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

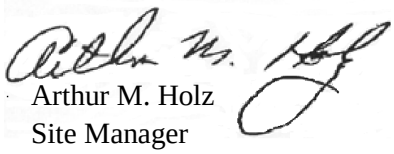
To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Prologis Logistics Services, Inc.
- 1.1 Ownership summary and verification for Prologis Logistics Services, Inc.
- 1.2 Detailed list of properties owned by Prologis Logistics Services, Inc.
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Prologis Logistics Services, Inc.

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Prologis Logistics Services, Inc.**_____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Prologis Logistics Services, Inc. owns the 2 parcels of land, covering approximately 184.35 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Prologis Logistics Services, Inc.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Prologis Logistics Services, Inc.
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
ProLogis	A06	09-18-17-300-003-0000	120.9	R2000086264	R2007081623	☐	JADA
ProLogis	A07	09-18-17-400-002-0000	63.45	R2000086264	R2007081624	☐	JADA
ProLogis Total		2	184.35				
Grand Total		2	184.35				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Prologis Logistics Services, Inc.

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☒ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Prologis Logistics Services, Inc. owns the 2 parcels of land, covering approximately 184.35 acres, within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

Tenant(s), if any:

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

Statement of Authorized Representative:

I, James R. Nass II, am an authorized representative of **Prologis Logistics Services, Inc.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 1-22-13 (date)

Enclosure 1.2 - Detailed list of properties owned by
Prologis Logistics Services, Inc
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Check box if ownership information is correct	Comment
ProLogis	A06	09-18-17-300-003-0000	120.9	R2000086264	R2007081623		JADA
ProLogis	A07	09-18-17-400-002-0000	63.45	R2000086264	R2007081624		JADA
ProLogis Total		2	184.35				
Grand Total		2	184.35				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Arthur M. Holz
Former Joliet Army Ammunition Plant
Site Manager/Commander's Representative
U.S. Army Environmental Command
26401 S. Route 53
Wilmington IL 60481-8879

Re: **Verification of Ownership of Property Held by the U.S. Army on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Letter to Self:

Records at the Will County Recorder of Deeds indicate that Department of the Army owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Department of the Army in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are

binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tenants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.

Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Department of the Army
- 1.1 Ownership summary and verification for Department of the Army
- 1.2 Detailed list of properties owned by Department of the Army
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Department of the Army

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: U.S. Army _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

U.S. Army owns the 22 parcels of land, covering approximately 1304.81 acres, within the *Deer Run Industrial Park* and the *Midewin Tallgrass Prairie* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of U.S. Army. To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by U.S. Army Based on Will County Recorder of Deed's Data Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
U.S. Army	D10	04-10-35-200-002-0000	31.47	To be transferred		☐	U.S. Army
U.S. Army	FL01	FL01	120	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL02	FL02	45	To be transferred		☐	
U.S. Army	FL03	FL03	50	To be transferred		☐	
U.S. Army	FL04	FL04	12.5	To be transferred		☐	
U.S. Army	FL07	FL07	160.2	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL08	FL08	129.18	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL09	FL09	129.18	To be transferred		☐	
U.S. Army	FL10	FL10	139.88	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL14	FL14	28.1	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL23	FL23	2	To be transferred		☐	
U.S. Army	FL34	FL34	3.5	To be transferred		☐	
U.S. Army	FL5B	FL5B	9	To be transferred		☐	
U.S. Army	FLJA	FLJA	3.1	To be transferred		☐	
U.S. Army	FLU8	FLU8	6.7	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FM01	FM01	68	To be transferred		☐	
U.S. Army	FM02	FM02	25	To be transferred		☐	
U.S. Army	FM03	FM03	66	To be transferred		☐	
U.S. Army	FM04	FM04	136	To be transferred		☐	
U.S. Army	FM11	FM11	133	To be transferred		☐	
U.S. Army	FM15	FM15	1	To be transferred		☐	
U.S. Army	FMSE	FMSE	6	To be transferred		☐	
U.S. Army Total		22	1304.81				
Grand Total		22	1304.81				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)

Enclosure 1.2 - Detailed list of properties owned by
U.S. Army
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie						
VA	Department of Veterans Affairs						
WalMart	WalMart Stores East LP						
Will County	Will County						

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Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Wade Spang, Prairie Supervisor
Midewin Tallgrass Prairie
30239 S. State Route 53
Wilmington, IL 60481
(815) 423-6370

Re: **Verification of Ownership of Property Held on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**
United States Department of Agriculture/Forest Service (USDA/FS)

Mr. Spang:

Records at the Will County Recorder of Deeds indicate that United States Department of Agriculture/Forest Service (USDA/FS), owns property in the Midewin National Tallgrass Prairie as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to USDA/FS in ***Enclosure 1***, correct the information contained therein as appropriate, and confirm the ownership information by signing the cover page for **Enclosure 1**. [Note – *if all information in **Enclosure 1** is correct, simply check the "no change" box.*]
2. Return the signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience (***Enclosure 2)***.

We have received copies of the transfer documents from your staff, Dolores Kaitschuck, for the first three transfers (1997, 2002, and 2007) and the pending transfer. These were critical in developing the maps. We are hoping that the enclosures properly capture the transfer details.

Enclosures 1.3 and **1.4** are maps of parcels within the Former JOAAP. **Enclosure 1.3** shows the Manufacturing Area, the west side of the Former JOAAP, and **Enclosure 1.4** shows the Load-Assemble-Package Area, the east side of the Former JOAAP. The map labels shown in **Enclosure 1.2** match those shown in **Enclosures 1.3** and **1.4**. The parcels have map labels with "FM**" for Manufacturing Area numbered sites, "FL**" for Load-Assemble-Package Area numbered sites, and "FMU*" or "FLU*" for parcels that did not have site designations (U = undesignated).

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S.

Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas* (ROD, U.S. Army, 1998), and the *ROD for the Soil Operable Unit Interim Sites Joliet Army Ammunition Plant, Wilmington, Will County, Illinois* (U.S. Army, 2004), which are both available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

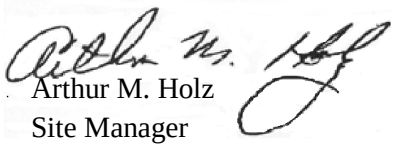
To ensure that these use restrictions and requirements are being properly followed and implemented, the Army is commencing a review process that will involve current owners in the following steps:

1. **Ownership Confirmation:** Parcel ownership will be verified via your response to this letter
2. **Compliance Questionnaire and Certification:** A Questionnaire and Certification package will be sent to you for your completion approximately 2 months from now. The package will:
    a. Detail the use restrictions that are applicable to your property;
    b. Provide for your response concerning compliance with the use restrictions on your property; and
    c. Request your signature and certification of those responses.
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits by the U.S. Corps of Engineers or its representative, on behalf of the Army, approximately three months from now. The site visit will include an opportunity to ask questions about the process.

The Army anticipates following the above process on an annual basis. The Army will compile the results from the above review process, including your responses with those of other property owners, and prepare a report to the UESPA and the IEPA concerning the effectiveness of the use restrictions contained in the deeds. This process is part of a review that is required at least every five years under federal law, namely the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Should you have any questions please contact the contractor for this survey (URS Group, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by ***USDA/FS***

- 1.1 Ownership summary and verification for ***USDA/FS***
- 1.2 Detailed list of properties owned by ***USDA/FS***
- 1.3 Parcel Map: Manufacturing Area
- 1.4 Parcel Map: Load-Assemble-Package Area Map

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the Former Joliet Army Ammunition Plant (JOAAP) that are currently owned by U.S. Forest Service

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **United States Department of Agriculture/Forest Service (USDA/FS)** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

United States Department of Agriculture/Forest Service (USDA/FS) owns the 123 parcels of land, covering approximately 20,316.6 acres, within the *Midewin National Tallgrass Prairie* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com)

Note: Enclosure 1.2 also shows the 21 remaining parcels to be transferred from the U.S. Army._____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of ***United States Department of Agriculture/Forest Service (USDA/FS).*** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
United States Department of Agriculture/Forest Service (USDA/FS)
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
USDA/FS	F001	04-10-22-100-002-0000	8.37	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F002	04-10-23-200-001-0010	286.13	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F003	04-10-24-300-003-0000	74.74	R2000086264	R2000086271	☐	
USDA/FS	F004	04-10-24-300-002-0000	81.61	R2000086264	R2004007577	☐	
USDA/FS	F005	04-10-24-100-003-0010	116.04	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F006	10-11-19-300-001-0010	59.67	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F007	10-11-19-300-002-0010	9.11	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F008	04-10-26-100-003-0010	517.73	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F009	04-10-34-400-001-0000	313.14	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F010	04-10-26-100-003-0020	144.25	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F011	10-11-31-200-001-0010	45.84	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F012	10-11-31-400-002-0000	26.93	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F013	10-11-31-400-003-0000	110.92	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F014	10-11-32-100-001-0000	156.43	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F015	10-11-32-200-001-0000	37.94	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F016	10-11-32-200-002-0000	37.47	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F017	10-11-32-200-003-0000	79.84	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F018	10-11-32-300-001-0000	160.21	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F019	10-11-32-400-001-0000	84.13	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F020	10-11-32-400-002-0000	75.85	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F021	10-11-33-100-001-0000	61.28	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F022	10-11-33-100-002-0000	16.15	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F023	10-11-33-100-003-0000	78.58	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F024	10-11-33-200-001-0000	78.09	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F025	10-11-33-200-002-0000	37.73	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F026	10-11-33-200-003-0000	0.68	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F027	10-11-33-200-004-0000	39.64	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F028	10-11-33-300-001-0000	61.25	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F029	10-11-33-300-002-0000	18.24	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F030	10-11-33-300-003-0000	80.34	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F031	10-11-33-400-001-0000	80.1	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F032	10-11-33-400-002-0000	79.5	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F033	10-11-34-100-001-0000	156.69	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F034	10-11-34-200-001-0000	108.5	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F035	10-11-34-200-002-0000	48.47	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F036	10-11-34-300-001-0000	160.4	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F037	10-11-34-400-001-0000	160.66	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F038	10-11-35-100-001-0000	75.23	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F039	10-11-35-100-002-0000	40.81	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F040	10-11-35-100-003-0000	40.51	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F041	10-11-35-200-001-0000	155.63	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F042	10-11-35-300-001-0000	80	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F043	10-11-35-300-002-0000	40.36	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F044	10-11-35-300-003-0000	40.62	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F045	10-11-35-400-001-0000	39.89	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F046	10-11-35-400-002-0000	39.46	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F047	10-11-35-400-003-0000	40	TD-FS1-1997	TD-FS1-1997	☐	

Enclosure 1.2 - Detailed list of properties owned by
United States Department of Agriculture/Forest Service (USDA/FS)
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
USDA/FS	F048	10-11-35-400-004-0000	39.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F049	10-11-36-100-001-0000	155.83	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F050	10-11-36-200-001-0000	156.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F051	10-11-36-300-001-0000	159.91	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F052	10-11-36-400-001-0000	80.03	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F053	10-11-36-400-002-0000	80.8	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F054	14-12-31-100-001-0000	157	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F055	14-12-31-200-001-0000	72.1	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F056	14-12-31-300-001-0000	144.17	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F057	14-12-31-400-001-0000	7.23	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F058	03-17-03-100-002-0000	433.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F059	03-17-02-100-001-0000	651.3	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F060	03-17-02-100-004-0004	162.49	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F061	03-17-01-100-001-0010	595.54	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F062	03-17-01-503-001-0000	1.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F063	03-17-01-503-002-0000	0.05	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F064	09-18-06-100-001-0000	608.99	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F065	09-18-06-503-001-0000	6.84	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F066	09-18-06-503-002-0000	4.49	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F067	09-18-06-503-003-0000	0.44	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F068	09-18-06-503-004-0000	0.03	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F069	09-18-05-100-001-0000	640.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F070	09-18-04-100-001-0000	642.05	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F071	09-18-03-100-001-0000	645.7	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F072	09-18-03-100-003-0004	0	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F073	09-18-02-100-001-0000	645	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F074	09-18-01-100-001-0000	629.33	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F075	13-19-06-100-001-0000	74.77	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F076	13-19-06-300-001-0000	7.78	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F077	03-17-10-100-002-0000	481.03	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F078	03-17-11-100-001-0000	643.55	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F079	03-17-12-100-001-0000	522.74	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F080	03-17-12-400-001-0000	10.97	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F081	09-18-07-100-001-0000	625.55	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F082	09-18-07-100-002-0004	0	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F083	09-18-08-100-003-0004	0	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F084	09-18-08-100-004-0000	491.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F085	09-18-08-200-001-0000	3.21	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F086	09-18-08-200-002-0000	56.8	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F087	09-18-09-100-002-0000	631.28	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F088	09-18-10-100-001-0000	645.75	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F089	09-18-11-100-001-0000	646.68	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F090	09-18-12-100-001-0000	403.36	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F091	03-17-15-200-002-0010	254.32	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F092	03-17-15-200-002-0020	174.19	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F093	03-17-14-100-002-0010	475.71	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F094	03-17-14-100-002-0020	150.57	TD-FS1-1997	TD-FS1-1997	☐	

Enclosure 1.2 - Detailed list of properties owned by
United States Department of Agriculture/Forest Service (USDA/FS)
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
USDA/FS	F095	03-17-13-100-002-0010	348.86	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F096	03-17-13-100-002-0020	109.86	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F097	09-18-18-100-004-0010	140.24	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F098	09-18-18-100-004-0020	121.11	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F099	09-18-17-100-006-0000	8.65	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F100	09-18-16-200-001-0010	169.21	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F101	09-18-16-200-001-0020	1.56	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F102	09-18-15-100-001-0000	641.55	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F103	09-18-14-100-001-0000	574.64	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F104	09-18-13-100-001-0000	21.17	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	FL25	FL25	8.2	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL27	FL27	316	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL28	FL28	211.5	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL33	FL33	198	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL5A	FL5A	29	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLAA	FLAA	13.44	TD-FS2-2002	TD-FS2-2002	☐	
USDA/FS	FLU1	FLU1	2.49	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU2	FLU2	1.74	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU3	FLU3	1.02	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU4	FLU4	1	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU5	FLU5	2.36	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU6	FLU6	0.98	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU7	FLU7	3.5	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU9	FLU9	8.57	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FM10	FM10	10	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FM14	FM14	14	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FM6A	FM6A	50	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FMU1	FMU1	0	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FMU2	FMU2	0	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS Total		123	20316.61				
Grand Total		123	20316.61				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company

Enclosure 1.2 - Detailed list of properties owned by
United States Department of Agriculture/Forest Service (USDA/FS)
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation						
JADA	Joliet Arsenal Development Authority						
Liberty Property LP	Liberty Property Limited Partnership						
Prairie Craftsman	Prairie Craftsman LLC						
ProLogis	Prologis Logistics Services Inc.						
SF Pacific Railroad	Santa Fe Pacific Railroad Company						
U.S. Army	Department of the Army (U.S.)						
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie						
VA	Department of Veterans Affairs						
WalMart	WalMart Stores East LP						
Will County	Will County						

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Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Department of Veterans Affairs
Abraham Lincoln National Cemetery
20953 W. Hoff Road
Elwood, IL 60421

Re: **Verification of Ownership of Property Held by Department of Veterans Affairs on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that Department of Veterans Affairs owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Department of Veterans Affairs in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

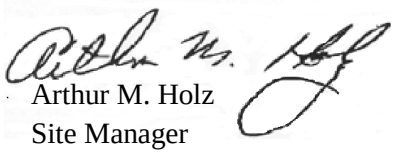
To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Department of Veterans Affairs
- 1.1 Ownership summary and verification for Department of Veterans Affairs
- 1.2 Detailed list of properties owned by Department of Veterans Affairs
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Department of Veterans Affairs

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Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Department of Veterans Affairs

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☑ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Department of Veterans Affairs owns the 27 parcels of land, covering approximately 983.37 acres, within the *Abraham Lincoln National Cemetery* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

Tenant(s), if any:

Department of Veterans Affairs
National Cemetery Administration

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

Statement of Authorized Representative:

I, Marty A. Fury, am an authorized representative of **Department of Veterans Affairs.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 01/15/13 (date)

Enclosure 2.1 - Detailed list of properties owned by
Department of Veterans Affairs
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abbreviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres *(+/-)*	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Groundwater Management Zone?	Monitoring Wells on Parcel?	Deed Restricted Parcel?	Check box if ownership information is correct	Comment
VA	V01	04-10-36-400-003-0010	259.5	TD-VA1-1996	TD-VA1-1996					
VA	V02	10-11-30-300-007-0000	24.2	R2000086264	R2000076002					
VA	V03	10-11-30-300-002-0000	31.9	R2000086264	R2000076002					
VA	V04	10-11-30-300-003-0000	16.9	R2000086264	R2000076002					
VA	V05	10-11-30-300-004-0000	25.5	R2000086264	R2000076002					
VA	V06	10-11-31-100-001-0000	9.9	TD-VA1-1996	TD-VA1-1996					
VA	V07	10-11-31-100-002-0000	10.1	TD-VA1-1996	TD-VA1-1996					
VA	V08	10-11-31-100-003-0000	2.1	TD-VA1-1996	TD-VA1-1996					
VA	V09	10-11-31-100-004-0000	0.8	TD-VA1-1996	TD-VA1-1996					
VA	V10	10-11-31-100-007-0000	46.3	TD-VA1-1996	TD-VA1-1996					
VA	V11	10-11-31-100-005-0000	16.7	TD-VA1-1996	TD-VA1-1996					
VA	V12	10-11-31-100-010-0000	7.7	TD-VA1-1996	TD-VA1-1996					
VA	V13	10-11-31-100-006-0000	31.4	TD-VA1-1996	TD-VA1-1996					
VA	V14	10-11-31-100-008-0000	11.6	TD-VA1-1996	TD-VA1-1996					
VA	V15	10-11-31-100-009-0000	0.2	TD-VA1-1996	TD-VA1-1996					
VA	V16	10-11-31-100-011-0000	22.7	TD-VA1-1996	TD-VA1-1996					
VA	V17	10-11-31-200-001-0020	92.4	TD-VA1-1996	TD-VA1-1996					
VA	V18	10-11-31-503-001-0000	7.1	TD-VA1-1996	TD-VA1-1996					
VA	V19	04-10-36-400-003-0020	157.8	TD-VA1-1996	TD-VA1-1996					
VA	V20	10-11-31-300-001-0000	8.9	TD-VA1-1996	TD-VA1-1996					
VA	V21	10-11-31-300-002-0000	1.0	TD-VA1-1996	TD-VA1-1996					
VA	V22	10-11-31-300-003-0000	69.7	TD-VA1-1996	TD-VA1-1996					
VA	V23	10-11-31-300-004-0000	66.7	TD-VA1-1996	TD-VA1-1996					
VA	V24	10-11-31-400-001-0000	11.0	TD-VA1-1996	TD-VA1-1996					
VA	V25	10-11-31-503-002-0000	3.6	TD-VA1-1996	TD-VA1-1996					
VA	V26	10-11-31-503-003-0000	3.4	TD-VA1-1996	TD-VA1-1996					
VA	V27	03-17-01-100-001-0020	44.4	TD-VA1-1996	TD-VA1-1996					
VA Subtotal		**27**	**983.4**							
Grand Subtotal		**27**	**983.4**							

Abbreviations	Organization represented *(multiple organizations may be grouped as a single entity)*
BNSF	2002A BNSF Trust
BNSF	21561 W Mississippi LLC
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF	Burlington Northern Railroad Holdings Inc.
BNSF-Leased	BN Leasing Corporation. This acronym for any parcels which BNSF retains in lease.
CIC DR POA	CIC at Deer Run Property Owners Association
CPI LLC	CenterPoint Intermodal LLC
CPI LLC	CenterPoint Properties Trust
CPI LLC	CenterPoint Realty Services Corporation
Elwood MHC	Elwood Maple Hill Cemetery Association
Elwood Village	Village of Elwood, IL
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County
Wilmington FD	Wilmington Fire Department

2 page Testimonial

Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Department of Veterans Affairs** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Department of Veterans Affairs owns the 27 parcels of land, covering approximately 983.37 acres, within the *Abraham Lincoln National Cemetery* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Department of Veterans Affairs.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Department of Veterans Affairs
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
VA	V01	04-10-36-400-003-0010	259.5	TD-VA1-1996	TD-VA1-1996	☐	
VA	V02	10-11-30-300-007-0000	24.17	R2000086264	R2000076002	☐	
VA	V03	10-11-30-300-002-0000	31.88	R2000086264	R2000076002	☐	
VA	V04	10-11-30-300-003-0000	16.91	R2000086264	R2000076002	☐	
VA	V05	10-11-30-300-004-0000	25.5	R2000086264	R2000076002	☐	
VA	V06	10-11-31-100-001-0000	9.9	TD-VA1-1996	TD-VA1-1996	☐	
VA	V07	10-11-31-100-002-0000	10.1	TD-VA1-1996	TD-VA1-1996	☐	
VA	V08	10-11-31-100-003-0000	2.1	TD-VA1-1996	TD-VA1-1996	☐	
VA	V09	10-11-31-100-004-0000	0.81	TD-VA1-1996	TD-VA1-1996	☐	
VA	V10	10-11-31-100-007-0000	46.29	TD-VA1-1996	TD-VA1-1996	☐	
VA	V11	10-11-31-100-005-0000	16.72	TD-VA1-1996	TD-VA1-1996	☐	
VA	V12	10-11-31-100-010-0000	7.65	TD-VA1-1996	TD-VA1-1996	☐	
VA	V13	10-11-31-100-006-0000	31.4	TD-VA1-1996	TD-VA1-1996	☐	
VA	V14	10-11-31-100-008-0000	11.61	TD-VA1-1996	TD-VA1-1996	☐	
VA	V15	10-11-31-100-009-0000	0.16	TD-VA1-1996	TD-VA1-1996	☐	
VA	V16	10-11-31-100-011-0000	22.71	TD-VA1-1996	TD-VA1-1996	☐	
VA	V17	10-11-31-200-001-0020	92.37	TD-VA1-1996	TD-VA1-1996	☐	
VA	V18	10-11-31-503-001-0000	7.12	TD-VA1-1996	TD-VA1-1996	☐	
VA	V19	04-10-36-400-003-0020	157.78	TD-VA1-1996	TD-VA1-1996	☐	
VA	V20	10-11-31-300-001-0000	8.9	TD-VA1-1996	TD-VA1-1996	☐	
VA	V21	10-11-31-300-002-0000	1	TD-VA1-1996	TD-VA1-1996	☐	
VA	V22	10-11-31-300-003-0000	69.65	TD-VA1-1996	TD-VA1-1996	☐	
VA	V23	10-11-31-300-004-0000	66.73	TD-VA1-1996	TD-VA1-1996	☐	
VA	V24	10-11-31-400-001-0000	10.98	TD-VA1-1996	TD-VA1-1996	☐	
VA	V25	10-11-31-503-002-0000	3.62	TD-VA1-1996	TD-VA1-1996	☐	
VA	V26	10-11-31-503-003-0000	3.39	TD-VA1-1996	TD-VA1-1996	☐	
VA	V27	03-17-01-100-001-0020	44.42	TD-VA1-1996	TD-VA1-1996	☐	
VA Total		27	983.37				
Grand Total		27	983.37				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority

Enclosure 1.2 - Detailed list of properties owned by
Department of Veterans Affairs
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
Liberty Property LP	Liberty Property Limited Partnership						
Prairie Craftsman	Prairie Craftsman LLC						
ProLogis	Prologis Logistics Services Inc.						
SF Pacific Railroad	Santa Fe Pacific Railroad Company						
U.S. Army	Department of the Army (U.S.)						
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie						
VA	Department of Veterans Affairs						
WalMart	WalMart Stores East LP						
Will County	Will County						

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DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Real Property Manager or Executive Officer
Walmart Stores East, LP
Walmart Distribution Center
26453 Center Point Drive
Elwood, IL 60421

Re: **Verification of Ownership of Property Held by Walmart Stores East, LP on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Sir/Madam:

Records at the Will County Recorder of Deeds indicate that your company, Walmart Stores East, LP, [company/organization/governmental unit], [Company name], owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Walmart Stores East, LP in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and

requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

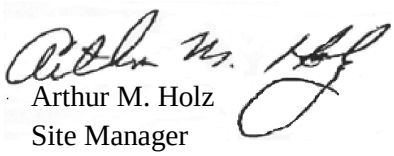
To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Walmart Stores East, LP
- 1.1 Ownership summary and verification for Walmart Stores East, LP
- 1.2 Detailed list of properties owned by Walmart Stores East, LP
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Walmart Stores East, LP

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Walmart Stores East, LP** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Walmart Stores East, LP owns the 2 parcels of land, covering approximately 172.39 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Walmart Stores East, LP.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Walmart Stores East, LP
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
WalMart	D36	10-11-30-201-004-0000	96.07	R2000086264	R2006136007	☐	**CPI LLC**
WalMart	D37	10-11-30-201-005-0000	76.32	R2000086264	R2006171216	☐	**CPI LLC**
WalMart Total		2	172.39				
Grand Total		2	172.39				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
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FJGCO LLC	FJGCO LLC
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Liberty Property LP	Liberty Property Limited Partnership
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ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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Walmart
Save money. Live better.

Realty Division

2001 S.E. 10th Street
Bentonville, AR 72716-5535
Phone 479.204.0136
Fax 479.204.9634
scott.saifi@wal-mart.com

January 22, 2013 **VIA: FED EX**

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
PH: 815-423-2870

Re: Walmart DC #7078 Joliet, IL – Verification of Ownership

Dear Mr. Holz:

I hope this letter finds you well. Enclosed, please find the signed Verification of Ownership of Property Held by Walmart Stores East, LP on the Former Joliet Army Ammunition Plant, Wilmington, Illinois. I have enclosed a copy of the most recent title report I have on file for this property (Lots 9 and 10 of Block 2) which indicates Wal-Mart Stores East, LP is the owner of record as of the effective date of the title policy, October 12, 2006; to the best of my knowledge Wal-Mart Stores East, LP has not sold the land since that date is currently the owner of record. Our Distribution Center #7078 is located there.

Please send any future correspondence on this matter directly to me and I will ensure to engage the proper folks within our organization and provide a timely response.

Should you have any questions, please feel free to contact me via e-mail at scott.saifi@wal-mart.com or via phone at 479-204-0136.

Sincerely,

Scott Saifi,
Real Estate Manager

Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Walmart Stores East, LP

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☑ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Walmart Stores East, LP owns the 2 parcels of land, covering approximately 172.39 acres, within the *Deer Run Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

Tenant(s), if any:

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

Please see copy of Title Policy dated October, 12, 2006

Statement of Authorized Representative:

I, Scott Saifi, Real Estate Manager, am an authorized representative of **Walmart Stores East, LP.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

Scott Saifi (signature) 1-22-13 (date)

Enclosure 1.2 - Detailed list of properties owned by
Walmart Stores East, LP
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abbreviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Check box if ownership information is correct	Comment
WalMart	D36	10-11-30-201-004-0000	96.07	R2000086264	R2006136007	✓	CPI LLC
WalMart	D37	10-11-30-201-005-0000	76.32	R2000086264	R2006171216	✓	CPI LLC
WalMart Total		2	172.39				
Grand Total		2	172.39				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

AMERICAN LAND TITLE ASSOCIATION
OWNER'S POLICY
(10-17-92)

CHICAGO TITLE INSURANCE COMPANY

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS FROM COVERAGE CONTAINED IN SCHEDULE B AND THE CONDITIONS AND STIPULATIONS, CHICAGO TITLE INSURANCE COMPANY, a Missouri corporation, herein called the Company, insures, as of Date of Policy shown in Schedule A, against loss or damage, not exceeding the Amount of Insurance stated in Schedule A, sustained or incurred by the insured by reason of:

1. Title to the estate or interest described in Schedule A being vested other than as stated therein;
2. Any defect in or lien or encumbrance on the title;
3. Unmarketability of the title;
4. Lack of a right of access to and from the land.

The Company will also pay the costs, attorneys' fees and expenses incurred in defense of the title, as insured, but only to the extent provided in the Conditions and Stipulations.

In Witness Whereof, CHICAGO TITLE INSURANCE COMPANY has caused this policy to be signed and sealed as of Date of Policy shown in Schedule A, the policy to become valid when countersigned by an authorized signatory.

Issued by:
CHICAGO TITLE INSURANCE COMPANY
103 N. OTTAWA STREET
JOLIET, IL 60432

CHICAGO TITLE INSURANCE COMPANY

By: _____
President

ATTEST:

_____
Secretary

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.

3. Defects, liens, encumbrances, adverse claims or other matters:

   (a) created, suffered, assumed or agreed to by the insured claimant;

   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;

   (c) resulting in no loss or damage to the insured claimant;

   (d) attaching or created subsequent to Date of Policy; or

   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.

4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:

   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or

   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:

      (a) to timely record the instrument of transfer; or

      (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

CHICAGO TITLE INSURANCE COMPANY

OWNER'S POLICY (1992)

SCHEDULE A

POLICY NO.: 1410 1442990-1 WB

DATE OF POLICY: OCTOBER 12, 2006

AMOUNT OF INSURANCE: $161,123,478.00

1. NAME OF INSURED:

   WAL-MART STORES EAST, LP, A DELAWARE LIMITED PARTNERSHIP.

2. THE ESTATE OR INTEREST IN THE LAND AND WHICH IS COVERED BY THIS POLICY IS A FEE SIMPLE, UNLESS OTHERWISE NOTED.

3. TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

   THE INSURED.

4. THE LAND HEREIN DESCRIBED IS ENCUMBERED BY THE FOLLOWING MORTGAGE OR TRUST DEED AND ASSIGNMENTS:

   NONE

AND THE MORTGAGES OR TRUST DEEDS, IF ANY, SHOWN IN SCHEDULE B HEREOF.

THIS POLICY VALID ONLY IF SCHEDULE B IS ATTACHED.

CHICAGO TITLE INSURANCE COMPANY

OWNER'S POLICY (1992)

SCHEDULE A (CONTINUED)

POLICY NO.: 1410 1442990-1 WB

5. THE LAND REFERRED TO IN THIS POLICY IS DESCRIBED AS FOLLOWS:

PARCEL 1:

LOT 9 IN BLOCK 2 IN CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5, A RESUBDIVISION OF PART OF SECTION 30, IN TOWNSHIP 34 NORTH, RANGE 10, EAST OF THE THIRD PRINCIPAL MERIDIAN, ACCORDING TO THE PLAT THEREOF RECORDED JULY 20, 2006 AS DOCUMENT NUMBER R2006-120191, IN WILL COUNTY, ILLINOIS.

PARCEL 2:

LOT 10 IN BLOCK 2 IN CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5, A RESUBDIVISION OF PART OF SECTION 30, IN TOWNSHIP 34 NORTH, RANGE 10 EAST OF THE THIRD PRINCIPAL MERIDIAN, ACCORDING TO THE PLAT THEREOF RECORDED JULY 20, 2006 AS DOCUMENT NUMBER R2006-120191, IN WILL COUNTY, ILLINOIS.

PARCEL 3:

A NON-EXCLUSIVE EASEMENT FOR THE BENEFIT OF PARCEL 2 AS CREATED BY THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED JULY 20, 2006 AS DOCUMENT NUMBER R2006-120191, FOR THE PURPOSE OF INGRESS/EGRESS OVER THAT PART OF LOT 11 IN BLOCK 2 IN SAID CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5, DEPICTED AS 80' INGRESS/EGRESS EASMENT ON SAID PLAT.

THIS POLICY VALID ONLY IF SCHEDULE B IS ATTACHED.

CHICAGO TITLE INSURANCE COMPANY

OWNER'S POLICY (1992)

SCHEDULE B

1410 1442990-1 WB

NOTWITHSTANDING THE PROVISIONS OF THE CONDITIONS AND STIPULATIONS OF THIS POLICY, ALL ENDORSEMENTS, IF ANY, ATTACHED HERETO ARE VALID DESPITE THE LACK OF SIGNATURE BY EITHER THE PRESIDENT, A VICE PRESIDENT, THE SECRETARY, AN ASSISTANT SECRETARY, OR VALIDATING OFFICER OR AUTHORIZED SIGNATORY OF THE COMPANY.

EXCEPTIONS FROM COVERAGE

THIS POLICY DOES NOT INSURE AGAINST LOSS OR DAMAGE SUSTAINED BY THE INSURED (AND THE COMPANY WILL NOT PAY COSTS, ATTORNEY'S FEES OR EXPENSES) BY REASON OF THE FOLLOWING EXCEPTIONS:

GENERAL EXCEPTIONS:

(1) RIGHTS OR CLAIMS OF PARTIES IN POSSESSION NOT SHOWN BY PUBLIC RECORDS.

(2) ENCROACHMENTS, OVERLAPS, BOUNDARY LINE DISPUTES, OR OTHER MATTERS WHICH WOULD BE DISCLOSED BY AN ACCURATE SURVEY AND INSPECTION OF THE PREMISES.

(3) EASEMENTS, OR CLAIMS OF EASEMENTS, NOT SHOWN BY THE PUBLIC RECORDS.

(4) ANY LIEN, OR RIGHT TO A LIEN, FOR SERVICES, LABOR OR MATERIAL HERETOFORE OR HEREAFTER FURNISHED, IMPOSED BY LAW AND NOT SHOWN BY THE PUBLIC RECORDS.

(5) TAXES OR SPECIAL ASSESSMENTS WHICH ARE NOT SHOWN AS EXISTING LIENS BY THE PUBLIC RECORDS.

SPECIAL EXCEPTIONS: THE MORTGAGE, IF ANY, REFERRED TO IN ITEM 4 OF SCHEDULE A.

C 6. TAXES FOR THE YEAR 2006 ARE NOT YET DUE OR PAYABLE.

NOTE: 2005 TOTAL TAXES IN THE AMOUNT OF $27,525.58, ARE PAID OF RECORD.
PERMANENT TAX NO. 11-30-201-001-0000.
(AFFECTS ALL OF LOT 9, PART OF LOT 10 AND OTHER PROPERTY)

NOTE: 2005 TOTAL TAXES IN THE AMOUNT OF $5,301.02, ARE PAID OF RECORD.
PERMANENT TAX NO. 11-30-201-002-0000.
(AFFECTS PART OF LOT 10 AND OTHER PROPERTY)

D 7. RIGHTS OF THE PARTNERS COMPOSING THE FIRM OF WAL-MART STORES EAST, LP, AND OF ALL PARTIES CLAIMING THEREUNDER.

E 8. TERMS, POWERS, PROVISIONS AND LIMITATIONS OF THE PARTNERSHIP AGREEMENT UNDER WHICH TITLE IS HELD.

F 9. THE LAND LIES WITHIN THE BOUNDARIES OF A SPECIAL SERVICE AREA AS DISCLOSED BY ORDINANCE NO. 738 (PASSED AND APPROVED OCTOBER 6, 2003) RECORDED AS DOCUMENT R2003-279807, AND IS SUBJECT TO ADDITIONAL TAXES UNDER THE TERMS OF SAID ORDINANCE AND SUBSEQUENT RELATED ORDINANCES.

AMENDED BY ORDINANCE 800 (PASSED AND APPROVED JANUARY 18, 2006) AND RECORDED JANUARY 27, 2006 AS DOCUMENT NUMBER R2006-018110 RELATING TO 2005 TAX YEAR SPECIAL TAX ROLL

EXCEPTIONS FROM COVERAGE (CONTINUED)

NOTE: THE SPECIAL TAX ROLL INDICATES $93,931 WITH RESPECT TO PIN 11-30-201-001-0000 (UNDERLYING LOT 6) AND $18,243 WITH RESPECT TO PIN 11-30-201-002-0000 (UNDERLYING LOT 1).

NOTE: PER VILLAGE OF ELWOOD LETTER DATED JULY 26, 2006, THE 2005 TAX IN THE AMOUNT OF $93,931 IS PAID IN FULL AND PER VILLAGE OF ELWOOD LETTER DATED AUGUST 2, 2006, THE 2005 TAX IN THE AMOUNT OF $18,243 IS PAID IN FULL.

G 10. THE LAND LIES WITHIN THE BOUNDARIES OF A SPECIAL SERVICE AREA AS DISCLOSED BY ORDINANCE NO. 777, AND IS SUBJECT TO ADDITIONAL TAXES UNDER THE TERMS OF SAID ORDINANCE AND SUBSEQUENT RELATED ORDINANCES, AS DISCLOSED BY ORDINANCE 778 (PASSED AND APPROVED MARCH 16, 2005) AND RECORDED MARCH 22, 2005 AS DOCUMENT NUMBER R2005-047091 RELATING TO 2004 TAX YEAR SPECIAL TAX ROLL.

NOTE: THE SPECIAL TAX ROLL INDICATES $60,616 WITH RESPECT TO PIN 11-30-201-001-0000 (UNDERLYING LOT 6) AND $11,773 WITH RESPECT TO PIN 11-30-201-002-0000 (UNDERLYING LOT 1).

NOTE: PER VILLAGE OF ELWOOD LETTER DATED JULY 26, 2006, THE 2005 TAX IN THE AMOUNT OF $60,616 IS PAID IN FULL AND PER VILLAGE OF ELWOOD LETTER DATED AUGUST 3, 2006, THE 2005 TAX IN THE AMOUNT OF $11,773 IS PAID IN FULL.

K 11. GRANT RECORDED AUGUST 8, 1974 AS DOCUMENT NO. R74-19438, MADE BY JOLIET ARMY AMMUNITION PLANT, TO COMMONWEALTH EDISON COMPANY, INC., AN EASEMENT FOR A RIGHT OF WAY FOR AN ELECTRICAL TRANSMISSION LINE OVER AND ACROSS PART OF THE LAND MORE PARTICULARLY DESCRIBED IN AFORESAID INSTRUMENT.
SUBJECT TO TERMS AND CONDITIONS THEREIN CONTAINED.

(AFFECTS THE WESTERNMOST 283.5 FEET OF LOT 9 IN BLOCK 2 - {PARCEL 1})
(AFFECTS THE WESTERNMOST 283.5 FEET OF LOT 10 IN BLOCK 2 - {PARCEL 2})

L 12. NOTE: THE FOLLOWING ITEM, WHILE APPEARING ON THIS COMMITMENT/POLICY, IS PROVIDED SOLELY FOR YOUR INFORMATION.

NOTICE RECORDED AS DOCUMENT R99-19401, MADE BY THE DEPARTMENT OF THE ARMY JOLIET ARMY AMMUNITION PLANT AND THE TERMS AND CONDITIONS CONTAINED THEREIN.

M 13. TERMS, PROVISIONS, CONDITIONS AND LIMITATIONS SET FORTH IN THE ANNEXATION AGREEMENT, A COPY OF WHICH WAS RECORDED JULY 17, 2000 AS DOCUMENT R2000-76002, AND FIRST AMENDMENT RECORDED OCTOBER 10, 2003 AS DOCUMENT NUMBER R2003-255506.

N 14. TERMS, PROVISIONS, CONDITIONS AND LIMITATIONS SET FORTH IN THE QUIT CLAIM DEED FROM THE UNITED STATES OF AMERICA TO THE JOLIET ARSENAL DEVELOPMENT AUTHORITY RECORDED AUGUST 11, 2000 AS DOCUMENT R2000-86264 RELATING TO:

1) RESERVED EASEMENTS AND RIGHT OF WAY;

CHICAGO TITLE INSURANCE COMPANY

OWNER'S POLICY (1992)

SCHEDULE B

1410 1442990-1 WB

EXCEPTIONS FROM COVERAGE
(CONTINUED)

2) "AS IS" AND "WHERE IS" CONDITION;
3) NOTICE OF PRESENCE OF ASBESTOS;
4) LEAD BASED PAINT WARNING AND COVENANT;
5) NOTICE OF THE POTENTIAL FOR THE PRESENCE OF UNEXPLODED ORDNANCE OR EXPLOSIVES
6) CERCLA COVENANTS AND NOTICE;
7) GRANTEE'S ACKNOWLEDGMENT OF THE ENVIRONMENTAL CONDITION OF THE PROPERTY;
8) LAND USE RESTRICTIONS AND COVENANTS AND MONITORING WELL RESTRICTIONS AND COVENANTS;
9) GROUNDWATER RESTRICTIONS AND COVENANTS FOR GROUNDWATER MANAGEMENT ZONE;
10) CERCLA REMEDIATION;
11) NON-DISCRIMINATION PROVISIONS;
12) ANTI-DEFICIENCY ACT STATEMENT.

NOTE: SAID INSTRUMENT CONTAINS NO PROVISION FOR A FORFEITURE OF OR REVERSION OF TITLE IN CASE OF BREACH OF CONDITION.

O 15. TERMS, PROVISIONS, CONDITIONS AND LIMITATIONS SET FORTH IN THE MEMORANDUM OF AGREEMENT ATTACHED TO THE QUIT CLAIM DEED FROM THE UNITED STATES OF AMERICA TO THE JOLIET ARSENAL DEVELOPMENT AUTHORITY RECORDED AUGUST 11, 2000 AS DOCUMENT R2000-86264 AND ASSIGNED TO CENTERPOINT INTERMODAL LLC AND CENTERPOINT REALTY SERVICES CORPORATION BY GENERAL ASSIGNMENT RECORDED AUGUST 11, 2000 AS DOCUMENT R2000-86272.

NOTE: SAID INSTRUMENT CONTAINS NO PROVISION FOR A FORFEITURE OF OR REVERSION OF TITLE IN CASE OF BREACH OF CONDITION.

P 16. TERMS, PROVISIONS, CONDITIONS AND LIMITATIONS SET FORTH IN THE DEED RECORDED AUGUST 11, 2000 AS DOCUMENT R2000-86271 FROM JADA TO CENTERPOINT INTERMODALL LLC AND CENTERPOINT REALTY SERVICES CORPORATION.

Q 17. DEED RESTRICTION/COVENANT RECORDED OCTOBER 3, 2000 AS DOCUMENT R2000-107350 MADE BY CENTERPOINT INTERMODAL LLC AND CENTERPOINT REALTY SERVICES CORPORATION, RELATING TO THE PROTECTION WETLANDS, AND THE TERMS AND CONDITIONS CONTAINED THEREIN.

R 18. DEPARTMENT OF THE ARMY PERMIT NUMBER 199900519 RECORDED OCTOBER 3, 2000 AS DOCUMENT R2000-107352, MADE BY CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS TO CENTERPOINT PROPERTIES RELATING TO THE FILLING OF WETLANDS AND THE TERMS AND CONDITIONS CONTAINED THEREIN.

S 19. EASEMENT FOR PUBLIC UTILITY & DRAINAGE, AND THE EASEMENT PROVISIONS AND GRANTEES AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN RECORDED AS DOCUMENT NUMBER R2002-94161; AND AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED AS DOCUMENT NUMBER R2006-120191, AS FOLLOWS:

AFFECTS THE NORTHERNMOST 40 FEET; AND A 55 FOOT STRIP A NORTHWEST CORNER OF

EXCEPTIONS FROM COVERAGE (CONTINUED)

LOT 9 IN BLOCK 2, (SEE PLATS FOR EXACT LOCATION) -- {AFFECTS PARCEL 1}; AND

AFFECTS 15 FOOT STRIPS NEAR THE SOUTH LINE; 20 FOOT STRIPS IN THE SOUTH PORTION; AND A 70 FOOT STRIP ALONG THE SOUTH LINE OF LOT 10 IN BLOCK 2, (SEE PLATS FOR EXACT LOCATION) -- {AFFECTS PARCEL 2}.

T 20. EASEMENT FOR LANDSCAPE, AND THE EASEMENT PROVISIONS AND GRANTEES AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN RECORDED AS DOCUMENT NUMBER R2002-94161, AND SHOWN ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED AS DOCUMENT NUMBER R2006-120191, AS FOLLOWS:

AFFECTS A 41 FOOT STRIP IN A NORTHWEST CORNER OF LOT 9 IN BLOCK 2, (SEE PLATS FOR EXACT LOCATION).

(AFFECTS PARCEL 1)

U 21. COVENANTS, CONDITIONS, RESTRICTIONS AND EASEMENTS CONTAINED IN THE DECLARATION OF PROTECTIVE COVENANTS, RESTRICTIONS AND EASEMENTS FOR CENTERPOINT INTERMODAL CENTER AT DEER RUN ELWOOD, ILLINOIS, DATED JUNE 19, 2002 MADE BY CENTERPOINT INTERMODAL LLC, AN ILLINOIS LIMITED LIABILITY COMPANY, AND CENTERPOINT REALTY SERVICES CORPORATION, AN ILLINOIS CORPORATION, RECORDED IN THE OFFICE OF THE RECORDER OF WILL COUNTY, ILLINOIS AS DOCUMENT NO. R2002-105580, AND AS AMENDED.

V 22. TERMS, PROVISIONS AND CONDITIONS CONTAINED IN THE SOLE RAIL SERVICE PROVIDER AGREEMENT MADE BY AND BETWEEN CENTERPOINT INTERMODAL LLC AND THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY, DATED JUNE 19, 2002, RECORDED IN THE OFFICE OF THE RECORDER OF WILL COUNTY, ILLINOIS AS DOCUMENT NO. R2002-105586.

Y 23. EASEMENT FOR INGRESS/EGRESS, DRAINAGE AND PUBLIC UTILITY, AND THE EASEMENT PROVISIONS AND GRANTEES AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED AS DOCUMENT NUMBER R2006-120191, AS FOLLOWS:

AFFECTS MULTIPLE STRIPS OF VARYING WIDTH IN LOTS 9 AND 10 OF BLOCK 2 (SEE PLAT FOR EXACT LOCATION).

(AFFECTS PARCELS 1 & 2)

Z 24. EASEMENT FOR PUBLIC UTILITY, AND THE EASEMENT PROVISIONS AND GRANTEES AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED AS DOCUMENT NUMBER R2006-120191, AS FOLLOWS:

AFFECTS 25 FOOT STRIP IN THE SOUTHEAST CORNER OF LOT 9 IN BLOCK 2, (SEE PLAT FOR EXACT LOCATION).

EXCEPTIONS FROM COVERAGE
(CONTINUED)

(AFFECTS PARCEL 1)

AA 25. NICOR EASEMENT, AND THE EASEMENT PROVISIONS AND GRANTEES AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED AS DOCUMENT NUMBER R2006-120191, AS FOLLOWS:

AFFECTS THE SOUTHEASTERLY 10 FEET OF LOT 9 IN BLOCK 2 -- {AFFECTS PARCEL 1}; AND

AFFECTS 10 FOOT STRIP NEAR THE NORTH LINE; AND THE EASETRNMOST 10 FEET OF LOT 10 IN BLOCK 2, (SEE PLAT FOR EXACT LOCATION) -- {AFFECTS PARCEL 2}.

AQ 26. COMED EASEMENT, AND THE EASEMENT PROVISIONS AND GRANTEES AS SET FORTH ON THE PLAT OF CENTERPOINT INTERMODAL CENTER AT DEER RUN UNIT 5 RECORDED AS DOCUMENT NUMBER R2006-120191, AS FOLLOWS:

AFFECTS 25 FOOT STRIP IN THE NORTHEAST CORNER OF LOT 10 IN BLOCK 2, (SEE PLAT FOR EXACT LOCATION).

(AFFECTS PARCEL 2)

AK. 27. (A) TERMS, PROVISIONS, AND CONDITIONS RELATING TO THE EASEMENT DESCRIBED AS PARCEL 3 CONTAINED IN THE INSTRUMENT CREATING SAID EASEMENT.

(B) RIGHTS OF THE ADJOINING OWNER OR OWNERS TO THE CONCURRENT USE OF SAID EASEMENT.

AR 28. RIGHT OF FIRST REFUSAL TO PURCHASE THE PROPERTY IN FAVOR OF CENTERPOINT INTERMODAL LLC, AN ILLINOIS, LIMITED LIABILITY COMPANY, AS DISCLOSED BY MEMORANDUM OF RIGHT OF FIRST REFUSAL TO PURCHASE RECORDED OCTOBER 12, 2006 AS DOCUMENT NUMBER R2006-171215, AND RIGHTS OF ALL THOSE CLAIMING THEREUNDER.

CHICAGO TITLE INSURANCE COMPANY

POLICY SIGNATURE PAGE

POLICY NO.: 1410 1442990-1 WB

THIS POLICY SHALL NOT BE VALID OR BINDING UNTIL SIGNED BY AN AUTHORIZED SIGNATORY.

CHICAGO TITLE INSURANCE COMPANY

BY _____
AUTHORIZED SIGNATORY

POLSIGPG

KAM 11/02/06 14:49:51

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

POLICY MODIFICATION ENDORSEMENT 4

GENERAL EXCEPTION NUMBER(S) **1 THRU 5** OF SCHEDULE B OF THIS POLICY ARE HEREBY DELETED.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

END:PG KAM

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

OWNER'S COMPREHENSIVE ENDORSEMENT 1B

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN BY REASON OF:

1. ANY INACCURACIES IN THE FOLLOWING ASSURANCES:
(A) THAT, UNLESS OTHERWISE EXPRESSLY SET FORTH OR INDICATED TO THE CONTRARY IN SCHEDULE B: (1) THERE ARE NO PRESENT VIOLATIONS ON SAID LAND OF ANY ENFORCEABLE COVENANTS, CONDITIONS OR RESTRICTIONS OR PLAT BUILDING LINES; (2) ANY INSTRUMENT REFERRED TO IN SCHEDULE B AS SPECIFICALLY CONTAINING "COVENANTS AND RESTRICTIONS" AFFECTING SAID LAND DOES NOT, IN ADDITION, ESTABLISH AN EASEMENT THEREON OR PROVIDE FOR EITHER A LIEN FOR LIQUIDATED DAMAGES, A LEVY OF A PRIVATE CHARGE OR ASSESSMENT, AN OPTION TO PURCHASE, OR THE PRIOR APPROVAL OF A FUTURE PURCHASER OR OCCUPANT; (3) THERE ARE NO ENCROACHMENTS OF EXISTING IMPROVEMENTS LOCATED ON SAID LAND ONTO ADJOINING LAND, NOR ANY ENCROACHMENTS ONTO SAID LAND OF EXISTING IMPROVEMENTS LOCATED ON ADJOINING LAND; (4) THERE ARE NO ENCROACHMENTS OF EXISTING IMPROVEMENTS LOCATED ON SAID LAND ONTO THAT PORTION OF SAID LAND SUBJECT TO ANY EASEMENT SHOWN IN SCHEDULE B;
(B) A PRESENT OR FUTURE VIOLATION ON THE LAND OF SAID COVENANTS OR RESTRICTIONS OR PLAT BUILDING LINES, IF ANY, WILL NOT GIVE RISE TO A RIGHT OF THE RE-ENTRY OR RESULT IN A FORFEITURE OR REVERSION OF THE TITLE;

2. THE ENTRY OF ANY COURT ORDER OR JUDGMENT WHICH CONSTITUTES A FINAL DETERMINATION AND DENIES THE RIGHT TO MAINTAIN ANY EXISTING IMPROVEMENTS ON SAID LAND BECAUSE OF ANY VIOLATION TO ANY COVENANTS, CONDITIONS OR RESTRICTIONS OR PLAT BUILDING LINES OR BECAUSE OF ANY ENCROACHMENT THEREOF OVER ONTO THE ADJOINING LAND;

3. THE EXERCISE OR ATTEMPT TO EXERCISE ANY RIGHT OF RE-ENTRY OR FORFEITURE OR REVERSION OR OTHER RIGHT OF TERMINATION OF TITLE BASED ON A VIOLATION OF ANY OF SAID COVENANTS OR RESTRICTIONS OR PLAT BUILDING LINES.
WHENEVER IN THIS ENDORSEMENT ANY OR ALL THE WORDS "COVENANTS, CONDITIONS OR RESTRICTIONS" APPEAR, THEY SHALL NOT BE DEEMED TO REFER TO OR INCLUDE THE TERMS, COVENANTS, CONDITIONS OR LIMITATIONS CONTAINED IN ANY LEASE, INSTRUMENT CREATING AN EASEMENT OR DECLARATION OF CONDOMINIUM REFERRED TO IN SCHEDULE A.

NOTWITHSTANDING PARAGRAPH 2 ABOVE, NO ASSURANCE IS PROVIDED REGARDING ENCROACHMENT OF FENCES, BOUNDARY WALLS, SIDEWALKS, DRIVEWAYS, OR OTHER PAVED AREAS ON THE LAND.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

LOCATION ENDORSEMENT 5 - SURVEY (MODIFIED)

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN IN THE EVENT THAT:

PARCEL 1 OF THE PLAT OF SURVEY MADE BY GEOTECH INC., JOB # 17384 (WALMART BUILDING #1 ELWOOD, ILLINOIS), DATED 07/21/06 AND LAST REVISED AUGUST 9, 2006, DOES NOT ACCURATELY DEPICT THE LOCATIONS OF THE EXTERIOR BOUNDARIES OF PARCEL 1 OF THE LAND DESCRIBED IN SCHEDULE A, DOES NOT SHOW THE PROPER DIMENSIONS OF SAID BOUNDARIES, AND DOES NOT CORRECTLY REFLECT THE ABSENCE AS OF THE DATE OF SAID SURVEY OF ANY ENCROACHMENTS OR EASEMENTS NOT OTHERWISE EXPRESSLY SET FORTH IN SCHEDULE B; AND

THE PLAT OF SURVEY MADE BY GEOTECH INC., JOB # 17384 (WALMART BUILDING #2 ELWOOD, ILLINOIS), DATED SEPTEMBER 29, 2006 DOES NOT ACCURATELY DEPICT THE LOCATIONS OF THE EXTERIOR BOUNDARIES OF PARCELS 2 AND 3 OF THE LAND DESCRIBED IN SCHEDULE A, DOES NOT SHOW THE PROPER DIMENSIONS OF SAID BOUNDARIES, AND DOES NOT CORRECTLY REFLECT THE ABSENCE AS OF THE DATE OF SAID SURVEY OF ANY ENCROACHMENTS OR EASEMENTS NOT OTHERWISE EXPRESSLY SET FORTH IN SCHEDULE B.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

ENDIPG KAM

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

LOCATION ENDORSEMENT 6 - CONTIGUITY TO STREET (MODIFIED)

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN IN THE EVENT THAT, AT DATE OF POLICY:

PARCEL 1 OF THE LAND DESCRIBED IN SCHEDULE A IS NOT CONTIGUOUS TO AND DOES NOT HAVE ACCESS TO PHYSICALLY OPEN, PUBLICLY DEDICATED STREETS KNOWN AS CENTERPOINT DRIVE, MISSISSIPPI AVENUE & DEER RUN DRIVE; AND

PARCEL 2 OF THE LAND DESCRIBED IN SCHEDULE A IS NOT CONTIGUOUS TO AND DOES NOT HAVE ACCESS TO PHYSICALLY OPEN, PUBLICLY DEDICATED STREETS KNOWN AS CENTERPOINT DRIVE & DEER RUN DRIVE.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

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ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

"CREDITORS RIGHTS" ENDORSEMENT - OWNER'S POLICY

NOTWITHSTANDING SECTIONS 3(A), 3(D) AND 4 OF THE EXCLUSIONS FROM COVERAGE, THE COMPANY INSURES THE INSURED AGAINST LOSS OR DAMAGE THE INSURED SHALL SUSTAIN BY REASON OF THE VOIDABILITY, IN WHOLE OR IN PART, OF THE TITLE TO THE ESTATE OR INTEREST SHOWN IN SCHEDULE A BECAUSE OF THE OCCURRENCE ON OR BEFORE THE DATE OF POLICY OF A FRAUDULENT TRANSFER OR A PREFERENCE, IN EITHER CASE UNDER FEDERAL BANKRUPTCY, STATE INSOLVENCY OR SIMILAR CREDITORS' RIGHTS LAWS.

THE COVERAGE PROVIDED BY THIS ENDORSEMENT SHALL INCLUDE THE PAYMENT OF COSTS, ATTORNEYS' FEES AND EXPENSES NECESSARY TO DEFEND THE INSURED AGAINST THOSE COUNTS OF ANY LITIGATION SEEKING COURT ORDERS WHICH WILL RESULT IN LOSS OR DAMAGE AGAINST WHICH THIS ENDORSEMENT PROVIDES INSURANCE, AND NO OTHERS, TO THE EXTENT PROVIDED IN THE CONDITIONS AND STIPULATIONS WHICH IS NOT INCONSISTENT WITH THIS PARAGRAPH.

AS USED IN THIS ENDORSEMENT, THE PHRASE "FRAUDULENT TRANSFER" MEANS A FRAUDULENT TRANSFER OR CONVEYANCE OTHER THAN ONE WHICH THE INSURED, AT THE TIME IT ACQUIRED AN ESTATE OR INTEREST IN THE LAND, KNEW WAS ACTUALLY INTENDED TO HINDER, DELAY OR DEFRAUD ANY CREDITOR.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

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ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

ARBITRATION ENDORSEMENT
SPECIAL POLICY MODIFICATION ENDORSEMENT

SECTION 13 ENTITLED ARBITRATION OF THE CONDITIONS AND STIPULATIONS OF SAID POLICY IS HEREBY MODIFIED SO AS TO REMOVE COMPANY'S RIGHT TO DEMAND ARBITRATION.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY OR COMMITMENT AND IS SUBJECT TO ALL THE TERMS AND PROVISIONS THEREOF AND ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY OR COMMITMENT AND PRIOR ENDORSEMENTS, IF ANY, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY OR COMMITMENT AND PRIOR ENDORSEMENTS OR INCREASE THE FACE AMOUNT THEREOF.

END1PG KAM

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

ALTA ENDORSEMENT FORM 3.1

1. THE COMPANY INSURES THE INSURED AGAINST LOSS OR DAMAGE SUSTAINED IN THE EVENT THAT, AT DATE OF POLICY:

   (A) ACCORDING TO APPLICABLE ZONING ORDINANCES AND AMENDMENTS THERETO, THE LAND IS NOT CLASSIFIED ZONE I-4, LARGE SCALE INDUSTRIAL PLANNED DEVELOPMENT DISTRICT.

   (B) THE FOLLOWING USE OR USES ARE NOT ALLOWED UNDER THAT CLASSIFICATION:

   INTERMODAL, RAIL AND TRUCK FACILITIES, INCLUDING SWITCHING YARDS, FREIGHT YARDS, MAINTENANCE FACILITIES, BUILDINGS CUSTOMARILY ACCESSORY TO A RAILROAD YARD; OUTDOOR AND INDOOR STORAGE OF MOTOR VEHICLES, FREIGHT, AND MATERIALS; AND

   WAREHOUSE, STORAGE, AND DISTRIBUTION FACILITIES.

   AND THERE SHALL BE NO LIABILITY UNDER THIS PARAGRAPH 1(B) IF THE USE OR USES ARE NOT ALLOWED AS A RESULT OF ANY LACK OF COMPLIANCE WITH ANY CONDITIONS, RESTRICTIONS, OR REQUIREMENTS CONTAINED IN THE ZONING ORDINANCES AND AMENDMENTS THERETO MENTIONED ABOVE, INCLUDING BUT NOT LIMITED TO THE FAILURE TO SECURE NECESSARY CONSENTS OR AUTHORIZATIONS AS A PREREQUISITE TO THE USE OR USES.

2. THE COMPANY FURTHER INSURES THE INSURED AGAINST LOSS OR DAMAGE ARISING FROM A FINAL DECREE OF A COURT OF COMPETENT JURISDICTION:

   (A) PROHIBITING THE USE OF THE LAND, WITH ANY STRUCTURE PRESENTLY LOCATED THEREON, AS INSURED IN PARAGRAPH 1(B); OR

   (B) REQUIRING THE REMOVAL OR ALTERATION OF THE STRUCTURE ON THE BASIS THAT, AT DATE OF POLICY, THE ORDINANCES AND AMENDMENTS THERETO HAVE BEEN VIOLATED WITH RESPECT TO ANY OF THE FOLLOWING MATTERS:
   (i) AREA, WIDTH OR DEPTH OF THE LAND AS A BUILDING SITE FOR THE STRUCTURE;
   (ii) FLOOR SPACE AREA OF THE STRUCTURE;
   (iii) SETBACK OF THE STRUCTURE FROM THE PROPERTY LINES OF THE LAND;
   (iv) HEIGHT OF THE STRUCTURE;

(CONTINUED)

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

(v) NUMBER OF PARKING SPACES; OR
(vi) NUMBER OF LOADING SPACES.

THERE SHALL BE NO LIABILITY UNDER THIS ENDORSEMENT BASED ON:

(A) THE INVALIDITY OF THE ORDINANCES AND AMENDMENTS THERETO MENTIONED ABOVE UNTIL AFTER A FINAL DECREE OF A COURT OF COMPETENT JURISDICTION ADJUDICATING THE INVALIDITY, THE EFFECT OF WHICH IS TO PROHIBIT THE USE OR USES.

(B) THE REFUSAL OF ANY PERSON TO PURCHASE, LEASE OR LEND MONEY ON THE ESTATE OR INTEREST COVERED BY THIS POLICY.

THIS ENDORSEMENT IS ISSUED AS PART OF THE POLICY. EXCEPT AS IT EXPRESSLY STATES, IT DOES NOT (i) MODIFY ANY OF THE TERMS AND PROVISIONS OF THE POLICY, (ii) MODIFY ANY PRIOR ENDORSEMENT, (iii) EXTEND THE DATE OF POLICY, OR (iv) INCREASE THE AMOUNT OF INSURANCE. TO THE EXTENT A PROVISION OF THE POLICY OR A PREVIOUS ENDORSEMENT IS INCONSISTENT WITH AN EXPRESS PROVISION OF THIS ENDORSEMENT, THIS ENDORSEMENT CONTROLS. OTHERWISE, THIS ENDORSEMENT IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS OF THE POLICY AND OF ANY PRIOR ENDORSEMENTS.

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

PLAT ACT ENDORSEMENT

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN BY REASON OF ANY INACCURACY IN THE FOLLOWING ASSURANCE:

THE LAND DESCRIBED IN SCHEDULE A MAY BE SOLD OR CONVEYED AS A SEPARATE PARCEL WITHOUT FURTHER SUBDIVISION AND A CONVEYANCE OF THE LAND DESCRIBED IN SCHEDULE A AS A SINGLE PARCEL IS NOT IN VIOLATION OF THE PLAT ACT, 765 ILCS 205/1 ET SEQ.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

LOCATION ENDORSEMENT 7 - EASEMENT CONTIGUOUS TO STREET (MODIFIED)

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN IN THE EVENT THAT, AT DATE OF POLICY:

THE EASEMENT DESCRIBED AS PARCEL 3 IN SCHEDULE A IS NOT CONTIGUOUS TO AND DOES NOT HAVE ACCESS TO A PHYSICALLY OPEN, PUBLICLY DEDICATED STREET KNOWN AS WALTER STRAWN DRIVE.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

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ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

LOCATION ENDORSEMENT 4 - CONTIGUITY

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN IN THE EVENT THAT:

PARCEL 1 AND PARCEL 2, DESCRIBED IN SCHEDULE A, ARE NOT CONTIGUOUS TO EACH OTHER AND, TAKEN AS A TRACT, DO NOT CONSTITUTE ONE PARCEL OF LAND; AND

PARCEL 2 AND PARCEL 3, DESCRIBED IN SCHEDULE A, ARE NOT CONTIGUOUS TO EACH OTHER AND, TAKEN AS A TRACT, DO NOT CONSTITUTE ONE PARCEL OF LAND.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

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ENDORSEMENT

ATTACHED TO AND FORMING A PART OF POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

SUCCESSOR AND ASSIGNS ENDORSEMENT

NOTWITHSTANDING THE DEFINITION OF "INSURED" CONTAINED IN PARAGRAPH 1 OF THE CONDITIONS AND STIPULATIONS OF THIS POLICY, LIABILITY OF THE COMPANY TO THE INSURED UNDER THIS POLICY SHALL NOT BE DENIED TO:

1. SUCCESSOR(S) TO THE NAMED INSURED BY CHANGE OF NAME.

2. SUCCESSOR(S) TO THE NAMED INSURED BY DISSOLUTION, MERGER, CONSOLIDATION OR REORGANIZATION, PROVIDED THAT SUCH TRANSFER IS WITHOUT VALUABLE CONSIDERATION.

3. ANY CORPORATE GRANTEE OF THE NAMED INSURED UNDER A DEED CONVEYING THE LAND DESCRIBED HEREIN:

A. THE STOCK OF WHICH IS WHOLLY-OWNED BY THE NAMED INSURED;

B. WHICH WHOLLY OWNS THE NAMED INSURED;

C. WHICH IS WHOLLY-OWNED BY ANY AFFILIATED COMPANY OF THE NAMED INSURED, PROVIDED THE STOCK OF SUCH AFFILIATED COMPANY AND THE STOCK OF THE NAMED INSURED ARE BOTH WHOLLY-OWNED BY A PARENT CORPORATION AND FURTHER PROVIDED THAT SUCH CONVEYANCE IS WITHOUT VALUABLE CONSIDERATION.

4. TO THE EXTENT OF THEIR INTEREST, ANY CURRENT PARTNER OR PARTNERS IN THE NAMED INSURED AND ANY SUCCESSOR ENTITY IN WHICH THE NAMED INSURED OR ANY CURRENT PARTNER OR PARTNERS IS A PARTNER, PARTICIPANT, JOINT VENTURER OR STOCKHOLDER;

5. TO THE EXTENT OF THEIR INTEREST, THE STOCKHOLDERS OF A CORPORATION WHICH IS A PARTNER OR PARTNERS IN THE NAMED INSURED, IN THE EVENT THAT SUCH CORPORATE PARTNERS DISTRIBUTE THAT LAND DESCRIBED HEREIN TO SUCH STOCKHOLDERS.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

(CONTINUED)

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

ELIMINATION OF THE OWNER'S POLICY CO-INSURANCE PROVISION ONLY ENDORSEMENT

SECTION 7, ONLY REGARDING CO-INSURANCE IN THE CONDITIONS AND STIPULATIONS OF THIS POLICY, IS HEREBY DELETED.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF POLICY NUMBER 1410 1442990-1 WB

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

P.I.N. ENDORSEMENT 2A

THE COMPANY HEREBY INSURES THE INSURED AGAINST LOSS OR DAMAGE WHICH THE INSURED SHALL SUSTAIN IN THE EVENT THAT, AT DATE OF POLICY:

(1) THE LAND DESCRIBED IN SCHEDULE A, TAKEN AS A TRACT WITH OTHER LAND NOT INSURED HEREIN, DOES NOT CONSTITUTE 2 PARCELS FOR REAL ESTATE TAX PURPOSES; AND

(2) THE LAND DESCRIBED IN SCHEDULE A, TOGETHER WITH OTHER LAND NOT INSURED HEREIN, IS NOT ASSESSED FOR REAL ESTATE TAX PURPOSES UNDER THE FOLLOWING PERMANENT INDEX NUMBERS:

11-30-201-001-0000 & 11-30-201-002-0000.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

CONDITIONS AND STIPULATIONS

1. DEFINITION OF TERMS

The following terms when used in this policy mean:

(a) "insured": the insured named in Schedule A, and, subject to any rights or defenses the Company would have had against the named insured, those who succeed to the interest of the named insured by operation of law as distinguished from purchase including, but not limited to, heirs, distributees, devisees, survivors, personal representatives, next of kin, or corporate or fiduciary successors.

(b) "insured claimant": an insured claiming loss or damage.

(c) "knowledge" or "known": actual knowledge, not constructive knowledge or notice which may be imputed to an insured by reason of the public records as defined in this policy or any other records which impart constructive notice of matters affecting the land.

(d) "land": the land described or referred to in Schedule A, and improvements affixed thereto which by law constitute real property. The term "land" does not include any property beyond the lines of the area described or referred to in Schedule A, nor any right, title, interest, estate or easement in abutting streets, roads, avenues, alleys, lanes, ways or waterways, but nothing herein shall modify or limit the extent to which a right of access to and from the land is insured by this policy.

(e) "mortgage": mortgage, deed of trust, trust deed, or other security instrument.

(f) "public records": records established under state statutes at Date of Policy for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without knowledge. With respect to Section 1(a)(iv) of the Exclusions From Coverage, "public records" shall also include environmental protection liens filed in the records of the clerk of the United States district court for the district in which the land is located.

(g) "unmarketability of the title": an alleged or apparent matter affecting the title to the land, not excluded or excepted from coverage, which would entitle a purchaser of the estate or interest described in Schedule A to be released from the obligation to purchase by virtue of a contractual condition requiring the delivery of marketable title.

2. CONTINUATION OF INSURANCE AFTER CONVEYANCE OF TITLE

The coverage of this policy shall continue in force as of Date of Policy in favor of an insured only so long as the insured retains an estate or interest in the land, or holds an indebtedness secured by a purchase money mortgage given by a purchaser from the insured, or only so long as the insured shall have liability by reason of covenants of warranty made by the insured in any transfer or conveyance of the estate or interest. This policy shall not continue in force in favor of any purchaser from the insured of either (i) an estate or interest in the land, or (ii) an indebtedness secured by a purchase money mortgage given to the insured.

3. NOTICE OF CLAIM TO BE GIVEN BY INSURED CLAIMANT

The insured shall notify the Company promptly in writing (i) in case of any litigation as set forth in Section 4(a) below, (ii) in case knowledge shall come to an insured hereunder of any claim of title or interest which is adverse to the title to the estate or interest, as insured, and which might cause loss or damage for which the Company may be liable by virtue of this policy, or (iii) if title to the estate or interest, as insured, is rejected as unmarketable. If prompt notice shall not be given to the Company, then as to the insured all liability of the Company shall terminate with regard to the matter or matters for which prompt notice is required; provided, however, that failure to notify the Company shall in no case prejudice the rights of any insured under this policy unless the Company shall be prejudiced by the failure and then only to the extent of the prejudice.

4. DEFENSE AND PROSECUTION OF ACTIONS; DUTY OF INSURED CLAIMANT TO COOPERATE

(a) Upon written request by the insured and subject to the options contained in Section 6 of these Conditions and Stipulations, the Company, at its own cost and without unreasonable delay, shall provide for the defense of an insured in litigation in which any third party asserts a claim adverse to the title or interest as insured, but only as to those stated causes of action alleging a defect, lien or encumbrance or other matter insured against by this policy. The Company shall have the right to select counsel of its choice (subject to the right of the insured to object for reasonable cause) to represent the insured as to those stated causes of action and shall not be liable for and will not pay the fees of any other counsel. The Company will not pay any fees, costs or expenses incurred by the insured in the defense of those causes of action which allege matters not insured against by this policy.

(b) The Company shall have the right, at its own cost, to institute and prosecute any action or proceeding or to do any other act which in its opinion may be necessary or desirable to establish the title to the estate or interest, as insured, or to prevent or reduce loss or damage to the insured. The Company may take any appropriate action under the terms of this policy, whether or not it shall be liable hereunder, and shall not thereby concede liability or waive any provision of this policy. If the Company shall exercise its rights under this paragraph, it shall do so diligently.

(c) Whenever the Company shall have brought an action or interposed a defense as required or permitted by the provisions of this policy, the Company may pursue any litigation to final determination by a court of competent jurisdiction and expressly reserves the right, in its sole discretion, to appeal from any adverse judgment or order.

(d) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding, the insured shall secure to the Company the right to so prosecute or provide defense in the action or proceeding, and all appeals therein, and permit the Company to use, at its option, the name of the insured for this purpose. Whenever requested by the Company, the insured, at the Company's expense, shall give the Company all reasonable aid (i) in any action or proceeding, securing evidence, obtaining witnesses, prosecuting or defending the action or proceeding, or effecting settlement, and (ii) in any other lawful act which in the opinion of the Company may be necessary or desirable to establish the title to the estate or interest as insured. If the Company is prejudiced by the failure of the insured to furnish the required cooperation, the Company's obligations to the insured under the policy shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, with regard to the matter or matters requiring such cooperation.

5. PROOF OF LOSS OR DAMAGE

In addition to and after the notices required under Section 3 of these Conditions and Stipulations have been provided the Company, a proof of loss or damage signed and sworn to by the insured claimant shall be furnished to the Company within 90 days after the insured claimant shall ascertain the facts giving rise to the loss or damage. The proof of loss or damage shall describe the defect in, or lien or encumbrance on the title, or other matter insured against by this policy which constitutes the basis of loss or damage and shall state, to the extent possible, the basis of calculating the amount of the loss or damage. If the Company is prejudiced by the failure of the insured claimant to provide the required proof of loss or damage, the Company's obligations to the insured under the policy shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, with regard to the matter or matters requiring such proof of loss or damage.

In addition, the insured claimant may reasonably be required to submit to examination under oath by any authorized representative of the Company and shall produce for examination, inspection and copying, at such reasonable times and places as may be designated by any authorized representative of the Company, all records, books, ledgers, checks, correspondence and memoranda, whether bearing a date before or after Date of Policy, which reasonably pertain to the loss or damage. Further, if requested by any authorized representative of the Company, the insured claimant shall grant its permission, in writing, for any authorized representative of the Company to examine, inspect and copy all records, books, ledgers, checks, correspondence and memoranda in the custody or control of a third party, which reasonably pertain to the loss or damage. All information designated as confidential by the insured claimant provided to the Company pursuant to this Section shall not be disclosed to others unless, in the reasonable judgment of the Company, it is necessary in the administration of the claim. Failure of the insured claimant to submit for examination under oath, produce other reasonably requested information or grant permission to secure reasonably necessary information from third parties as required in this paragraph shall terminate any liability of the Company under this policy as to that claim.

6. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS; TERMINATION OF LIABILITY

In case of a claim under this policy, the Company shall have the following additional options:

(a) To Pay or Tender Payment of the Amount of Insurance.

To pay or tender payment of the amount of insurance under this policy together with any costs, attorneys' fees and expenses incurred by the insured claimant, which were authorized by the Company, up to the time of payment or tender of payment and which the Company is obligated to pay.

Upon the exercise by the Company of this option, all liability and obligations to the insured under this policy, other than to make the payment required, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, and the policy shall be surrendered to the Company for cancellation.

(b) To Pay or Otherwise Settle With Parties Other than the Insured or With the Insured Claimant.

(i) to pay or otherwise settle with other parties for or in the name of an insured claimant any claim insured against under this policy, together with any costs, attorneys' fees and expenses incurred by the insured claimant which were authorized by the Company up to the time of payment and which the Company is obligated to pay; or

(ii) to pay or otherwise settle with the insured claimant the loss or damage provided for under this policy, together with any costs, attorneys' fees and expenses incurred by the insured claimant which were authorized by the Company up to the time of payment and which the Company is obligated to pay.

Upon the exercise by the Company of either of the options provided for in paragraphs (b)(i) or (ii), the Company's obligations to the insured under this policy for the claimed loss or damage, other than the payments required to be made, shall terminate, including any liability or obligation to defend, prosecute or continue any litigation.

7. DETERMINATION, EXTENT OF LIABILITY AND COINSURANCE

This policy is a contract of indemnity against actual monetary loss or damage sustained or incurred by the insured claimant who has suffered loss or damage by reason of matters insured against by this policy and only to the extent herein described.

(a) The liability of the Company under this policy shall not exceed the least of:

(i) the Amount of Insurance stated in Schedule A; or,

(ii) the difference between the value of the insured estate or interest as insured and the value of the insured estate or interest subject to the defect, lien or encumbrance insured against by this policy.

(b) In the event the Amount of Insurance stated in Schedule A at the Date of Policy is less than 80 percent of the value of the insured estate or interest or the full consideration paid for the land, whichever is less, or if subsequent to the Date of Policy an improvement is erected on the land which increases the value of the insured estate or interest by at least 20 percent over the Amount of Insurance stated in Schedule A, then this Policy is subject to the following:

(i) where no subsequent improvement has been made, as to any partial loss, the Company shall only pay the loss pro rata in the proportion that the amount of insurance at Date of Policy bears to the total value of the insured estate or interest at Date of Policy; or

(ii) where a subsequent improvement has been made, as to any partial loss, the Company shall only pay the loss pro rata in the proportion that 120 percent of the Amount of Insurance stated in Schedule A bears to the sum of the Amount of Insurance stated in Schedule A and the amount expended for the improvement.

The provisions of this paragraph shall not apply to costs, attorneys' fees and expenses for which the Company is liable under this policy, and shall only apply to that portion of any loss which exceeds, in the aggregate, 10 percent of the Amount of Insurance stated in Schedule A.

(c) The Company will pay only those costs, attorneys' fees and expenses incurred in accordance with Section 4 of these Conditions and Stipulations.

8. APPORTIONMENT

If the land described in Schedule A consists of two or more parcels which are not used as a single site, and a loss is established affecting one or more of the parcels but not all, the loss shall be computed and settled on a pro rata basis as if the amount of insurance under this policy was divided pro rata as to the value on Date of Policy of each separate parcel to the whole, exclusive of any improvements made subsequent to Date of Policy, unless a liability or value has otherwise been agreed upon as to each parcel by the Company and the insured at the time of the issuance of this policy and shown by an express statement or by an endorsement attached to this policy.

9. LIMITATION OF LIABILITY

(a) If the Company establishes the title, or removes the alleged defect, lien or encumbrance, or cures the lack of a right of access to or from the land, or cures the claim of unmarketability of title, all as insured, in a reasonably diligent manner by any method, including litigation and the completion of any appeals therefrom, it shall have fully performed its obligations with respect to that matter and shall not be liable for any loss or damage caused thereby.

(b) In the event of any litigation, including litigation by the Company or with the Company's consent, the Company shall have no liability for loss or damage until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals therefrom, adverse to the title as insured.

(c) The Company shall not be liable for loss or damage to any insured for liability voluntarily assumed by the insured in settling any claim or suit without the prior written consent of the Company.

10. REDUCTION OF INSURANCE; REDUCTION OR TERMINATION OF LIABILITY

All payments under this policy, except payments made for costs, attorneys' fees and expenses, shall reduce the amount of the insurance pro tanto.

11. LIABILITY NONCUMULATIVE

It is expressly understood that the amount of insurance under this policy shall be reduced by any amount the Company may pay under any policy insuring a mortgage to which exception is taken in Schedule B or to which the insured has agreed, assumed, or taken subject, or which is hereafter executed by an insured and which is a charge or lien on the estate or interest described or referred to in Schedule A, and the amount so paid shall be deemed a payment under this policy to the insured owner.

12. PAYMENT OF LOSS

(a) No payment shall be made without producing this policy for endorsement of the payment unless the policy has been lost or destroyed, in which case proof of loss or destruction shall be furnished to the satisfaction of the Company.

(b) When liability and the extent of loss or damage has been definitely fixed in accordance with these Conditions and Stipulations, the loss or damage shall be payable within 30 days thereafter.

13. SUBROGATION UPON PAYMENT OR SETTLEMENT

(a) The Company's Right of Subrogation.

Whenever the Company shall have settled and paid a claim under this policy, all right of subrogation shall vest in the Company unaffected by any act of the insured claimant.

The Company shall be subrogated to and be entitled to all rights and remedies which the insured claimant would have had against any person or property in respect to the claim had this policy not been issued. If requested by the Company, the insured claimant shall transfer to the Company all rights and remedies against any person or property necessary in order to perfect this right of subrogation. The insured claimant shall permit the Company to sue, compromise or settle in the name of the insured claimant and to use the name of the insured claimant in any transaction or litigation involving these rights or remedies.

If a payment on account of a claim does not fully cover the loss of the insured claimant, the Company shall be subrogated to these rights and remedies in the proportion which the Company's payment bears to the whole amount of the loss.

If loss should result from any act of the insured claimant, as stated above, that act shall not void this policy, but the Company, in that event, shall be required to pay only that part of any losses insured against by this policy which shall exceed the amount, if any, lost to the Company by reason of the impairment by the insured claimant of the Company's right of subrogation.

(b) The Company's Rights Against Non-insured Obligors.

The Company's right of subrogation against non-insured obligors shall exist and shall include, without limitation, the rights of the insured to indemnities, guaranties, other policies of insurance or bonds, notwithstanding any terms or conditions contained in those instruments which provide for subrogation rights by reason of this policy.

14. ARBITRATION

Unless prohibited by applicable law, either the Company or the insured may demand arbitration pursuant to the Title Insurance Arbitration Rules of the American Arbitration Association. Arbitrable matters may include, but are not limited to, any controversy or claim between the Company and the insured arising out of or relating to this policy, any service of the Company in connection with its issuance or the breach of a policy provision or other obligation. All arbitrable matters when the Amount of Insurance is $1,000,000 or less shall be arbitrated at the option of either the Company or the insured. All arbitrable matters when the Amount of Insurance is in excess of $1,000,000 shall be arbitrated only when agreed to by both the Company and the insured. Arbitration pursuant to this policy and under the Rules in effect on the date the demand for arbitration is made or, at the option of the insured, the Rules in effect at Date of Policy shall be binding upon the parties. The award may include attorneys' fees only if the laws of the state in which the land is located permit a court to award attorneys' fees to a prevailing party. Judgment upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

The law of the situs of the land shall apply to an arbitration under the Title Insurance Arbitration Rules.

A copy of the Rules may be obtained from the Company upon request.

15. LIABILITY LIMITED TO THIS POLICY; POLICY ENTIRE CONTRACT

(a) This policy together with all endorsements, if any, attached hereto by the Company is the entire policy and contract between the insured and the Company. In interpreting any provision of this policy, this policy shall be construed as a whole.

(b) Any claim of loss or damage, whether or not based on negligence, and which arises out of the status of the title to the estate or interest covered hereby or by any action asserting such claim, shall be restricted to this policy.

(c) No amendment of or endorsement to this policy can be made except by a writing endorsed hereon or attached hereto signed by either the President, a Vice President, the Secretary, an Assistant Secretary, or validating officer or authorized signatory of the Company.

16. SEVERABILITY

In the event any provision of the policy is held invalid or unenforceable under applicable law, the policy shall be deemed not to include that provision and all other provisions shall remain in full force and effect.

17. NOTICES, WHERE SENT

All notices required to be given the Company and any statement in writing required to be furnished the Company shall include the number of this policy and shall be addressed to the Company at the issuing office or to:

Chicago Title Insurance Company
National Claims Administration
P.O. Box 45023
Jacksonville, Florida 32232-5023

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON, IL 60481-8879

REPLY TO
ATTENTION OF: Arthur Holz

January 14, 2013

Will County
Lawrence M. Walsh
Will County Executive
County of Will
302 N. Chicago Street
Joliet, Illinois 60432

Re: **Verification of Ownership of Property Held by Will County on the Former Joliet Army Ammunition Plant, Wilmington, Illinois**

Lawrence Walsh:

Records at the Will County Recorder of Deeds indicate that Will County owns property as shown in ***Enclosure 1*** that formerly was part of the Joliet Army Ammunition Plant (JOAAP).

For reasons described below, we request that you:

1. Review the parcel ownership attributed to Will County in ***Enclosure 1***, correct the information contained therein, and confirm these changes by signing the cover page for Enclosure 1. [Note – *if all information in Enclosure 1 is correct, simply check the "no change" box and return that page with your signed statement.*].
2. Return the corrected and signed summary sheet (***Enclosure 1.1)*** no later than ***February 4, 2013*** to URS Group, Attn: GEARS Division – Joliet AAP Project, 12420 Milestone Center Drive, Suite 150, Germantown, MD 20876. A self-addressed, stamped return envelope has been included for your convenience.

As some information might be ambiguous or outdated, we are requesting that you verify the information we have received from Will County.

Background and Reason for Request:

The U.S. Army (Army) owned and operated the JOAAP between the early 1940's and 2000. During that time it released contaminants into the soil and groundwater that could pose risks to human health and safety and to the environment. The Army has worked to clean up the JOAAP and to minimize those risks by conducting remedial actions in accordance with standards and procedures agreed to with the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). These standards and procedures are specified in the Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas (ROD, U.S. Army, 1998), which is available upon request for your review.

Even with the remedial actions taken, certain land and groundwater use restrictions and requirements were necessary to prevent exposure to the remaining contamination. These restrictions and requirements were included in the initial deeds by the Army conveying ownership of the JOAAP property and are

binding on all subsequent owners or tenants of the JOAAP property. These use restrictions and requirements continue to be necessary in order to ensure the protection of human health and the environment by the prevention of exposure to the remaining contamination.

The USEPA and the IEPA have requested that the Army verify that the use restrictions and requirements set forth in the deeds are being complied with by all present owners (and tenants).

Compliance Verification Process

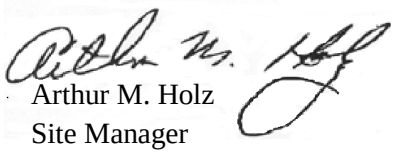
To ensure that these requirements and use restrictions are being properly implemented, the Army is commencing a review process that will involve current owners in the following steps annually:

1. **Ownership Confirmation:** Parcel ownership is verified via your response to this letter
2. **Questionnaire and Statement of Compliance:** This Questionnaire and Statement of Compliance package will be sent to you for your completion approximately 2 months from now. The package:
    a. Details deed restrictions that are conveyed with your property
    b. Requires a signed statement of compliance
    c. Allows for response and explanation of compliance activities for deed restrictions on the property
3. **Site Visit by Army representatives:** A subset of property owners will be selected for site visits approximately 3 months from now. The visit will include an in-briefing and opportunity to ask questions on the process, a site walk-through and inspection.

The Army will compile the results from this process, including your responses with those of other property owners, to prepare an Annual Report to UESPA and IEPA. While there might be one or more tentants for your parcel(s), ownership and compliance verification is the responsibility of the owner.

Should you have any questions please contact the contractor for this survey (URS Corporation, Mark Pape, 301-820-3265), the Corps of Engineers/Louisville District (Matthew Riley, 502-315-6342), or U.S. Army Joliet Army Ammunitions Plant Site Manager (Arthur Holz, 815-423-2870).

Thank you in advance for your timely response.



Arthur M. Holz
Site Manager

Enclosure 1: Land Parcels at JOAAP that are currently owned by Will County
- 1.1 Ownership summary and verification for Will County
- 1.2 Detailed list of properties owned by Will County
- 1.3 Parcel Maps

Enclosure 2: Pre-Addressed and Stamped Return Envelope

Cc: Matthew Riley, Corps of Engineers/Louisville District
Laura Peters, U.S. Army Environmental Command, Fort Sam Houston, TX
Mark Pape, URS, Germantown, MD

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Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Will County

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: **Will County** _____

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☐ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Will County owns the 2 parcels of land, covering approximately 465.14 acres, including the Will County Landfill and a parcel within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/) _____

_____

_____

Tenant(s), if any:

_____

_____

_____

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

_____

_____

_____

_____

_____

Statement of Authorized Representative:

I, _____, am an authorized representative of **Will County.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

_____(signature) _____(date)

Enclosure 1.2 - Detailed list of properties owned by
Will County
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
WILL COUNTY	A02	09-18-18-200-001-0000	9.06	R2005064066	R2009154372	☐	
WILL COUNTY	L01	09-18-17-100-007-0000	456.08	R2002063838	R2002063838	☐	
WILL COUNTY Total		2	465.14				
Grand Total		2	465.14				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County

Enclosure 2:

Pre-Addressed and Stamped Return Envelope

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WILL COUNTY LAND USE DEPARTMENT
58 E. Clinton Street, Suite 500 • Joliet, Illinois 60432
815/774-3321 • Fax 815/727-8638

February 14, 2013

URS Group, Mark Pape
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive
Suite 150
Germantown, MD 20876

SENT VIA US MAIL & ELECTRONIC MAIL TRANSMISSION

Re: Verification of Ownership of Property Held by Will County
On the Former Joliet Army Ammunition Plant, Wilmington, Illinois

Dear Mr. Pape:

Per your request, I am enclosing information confirming Will County, Illinois' ownership of two land parcels located in the former Joliet Army Ammunition Plant (JOAAP) obtained from the United States Army (Army) either directly or indirectly through deed transfers. The attached Enclosure Forms 1.1 & 1.2, along with confirmation from Will County's GIS mapping system and verbal confirmation from the Will County Highway Department confirmed that the parcel #'s indicated by the Army on the aforementioned enclosure forms are accurate. The Deed #s however, are not numbers I could locate. I will assume that the Army's Deed #'s are correct.

Please contact me @ (815) 774-7891 for any questions or to arrange a site visit regarding the Will County Landfill (a.k.a. Prairie View Landfill or RDF) parcel. For the Will County Highway Department parcel, please contact Bruce Gould or Jeff Ronaldson @ (815) 727-8476. This parcel is located just to the west of the Will County Landfill.

Sincerely,

Dean Olson
Resource Recovery & Energy Director

CC: Will County Executive's Office
Will County Highway Department

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Enclosure 1:

Land Parcels at the former Joliet Army Ammunition Plant (JOAAP) that are currently owned by Will County

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Enclosure 1.1: Verification of Ownership of Properties Located within the Former Joliet Army Ammunition Plant Boundaries, Wilmington, IL

Owner: Will County

Please review the information below and make changes to the Parcel(s) description and ID(s) as needed. *If changes are needed, they can be entered either on this page or on the attached Table 1.1. If no change is needed, indicate this by checking the box below.*

Please sign the verification statement at the bottom of this page and return this form with any other documents.

☒ To the best of my knowledge, the following parcel information is accurate.

Land Parcel(s) General Description:

Will County owns the 2 parcels of land, covering approximately 465.14 acres, including the Will County Landfill and a parcel within the *Arsenal Road Industrial Park* as detailed in the following Enclosure 1.2. The property deeds which establish the ownership are recorded at the Will County Recorder's Office 58 East Clinton Street, Joliet, IL 60432 or at website, http://recorder.willcountydata.com/fr1/)

Tenant(s), if any:

Waste Management and Waste Management Renewable Energy both are operating a landfill and a gas to electricity plant on the landfill parcel.

Note: Both owner and tenant are responsible for compliance with deed restrictions.

Additional Notes:

Statement of Authorized Representative:

I, Dean Olson, am an authorized representative of **Will County.** To the best of my knowledge, the statements of ownership contained herein are accurate and complete.

(signature) 2/14/13 (date)

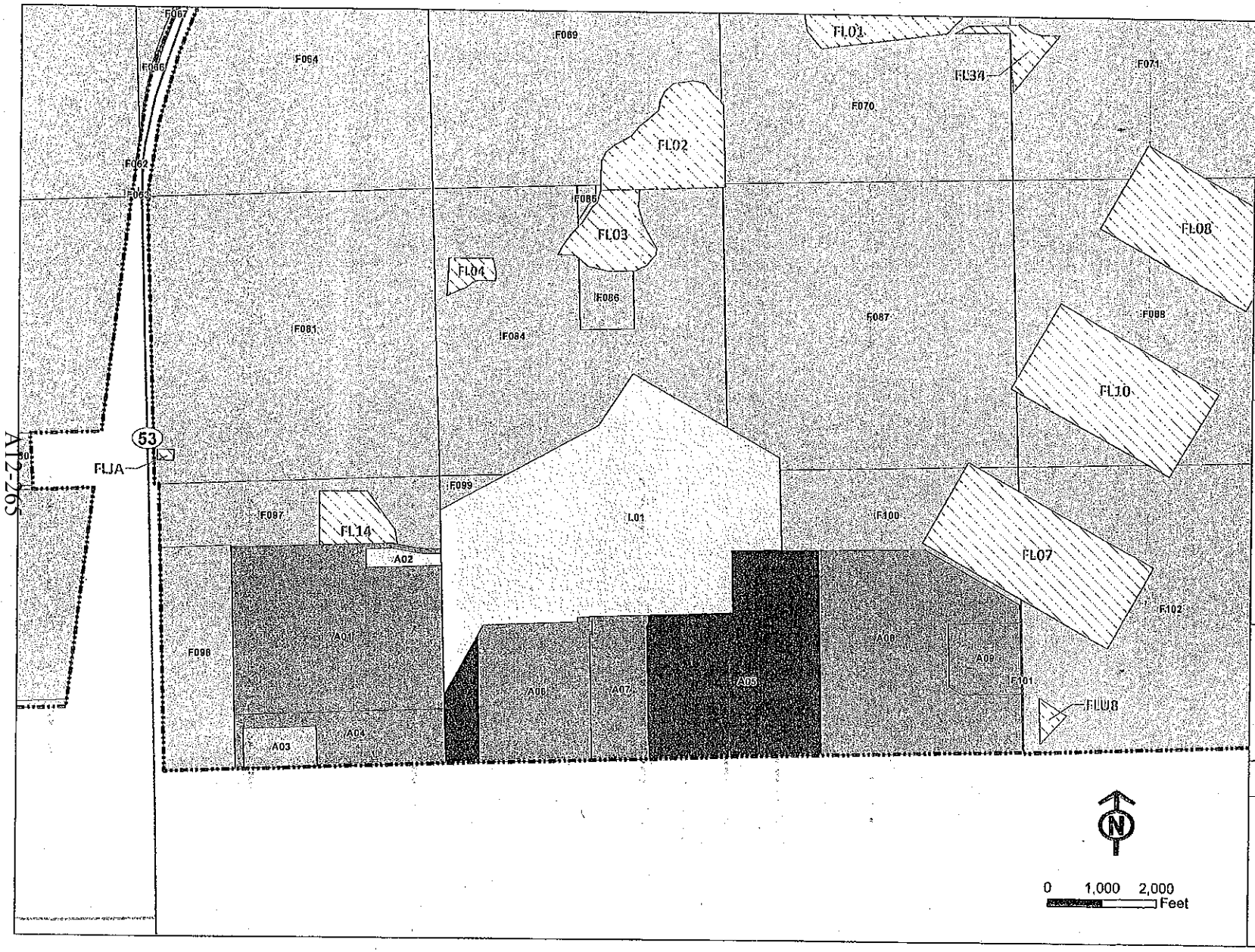
Enclosure 1.2 - Detailed list of properties owned by
Will County
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	Check box if ownership information is correct	Comment
WILL COUNTY	A02	09-18-18-200-001-0000	9.06	R2005064066	R2009154372	☒	PIN# is accurate
WILL COUNTY	L01	09-18-17-100-007-0000	456.08	R2002063838	R2002063838	☒	PIN # is accurate
WILL COUNTY Total		2	465.14				U.S. Army has Deed #
Grand Total		2	465.14				

Abbreviations

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
SF Pacific Railroad	Santa Fe Pacific Railroad Company
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County



Legend

Former Joliet Boundary

Parcels

Current Owner

- PRAIRIE CRAFTSMAN LLC
- PROLOGIS LOGISTICS SERVICES INC
- IUOEL
- FORT JAMES OPERATING CO
- JADA
- USDA/FS
- WILL COUNTY
- USA - ARMY (yet to be transferred)

Notes:

1) Property ownership and transfers from U.S. Army shown are preliminary and require verification.

2) Parcel ownership is based on Will County Recorder's Office data.

3) Two parcels, A05 and D09, include geographically distinct subparcels.

Enclosure 1.4:

Draft Parcel Ownership - Arsenal Road Industrial Park and Will County Landfill

Former Joliet Army Ammunition Plant Joliet, IL

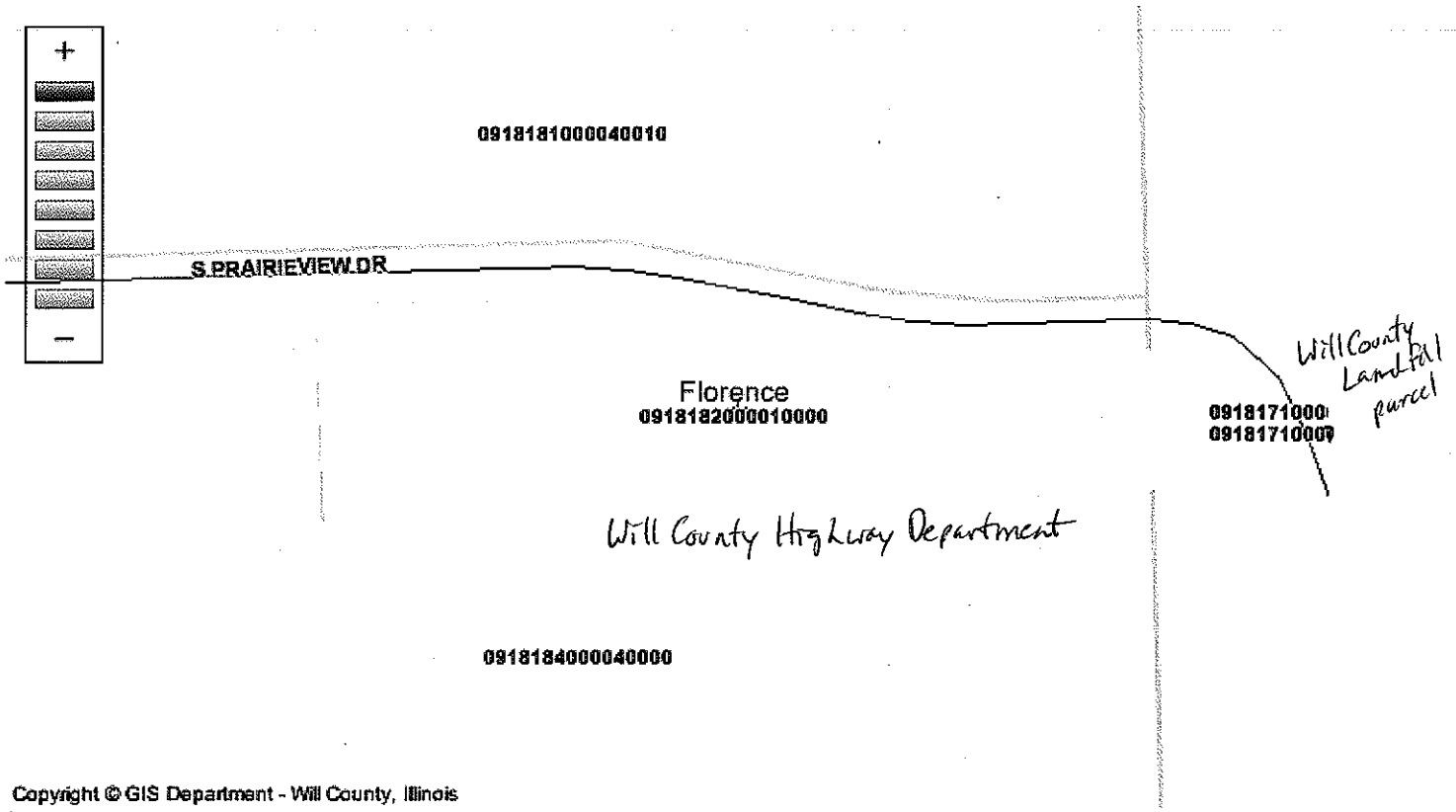
Date: 1/2/2013

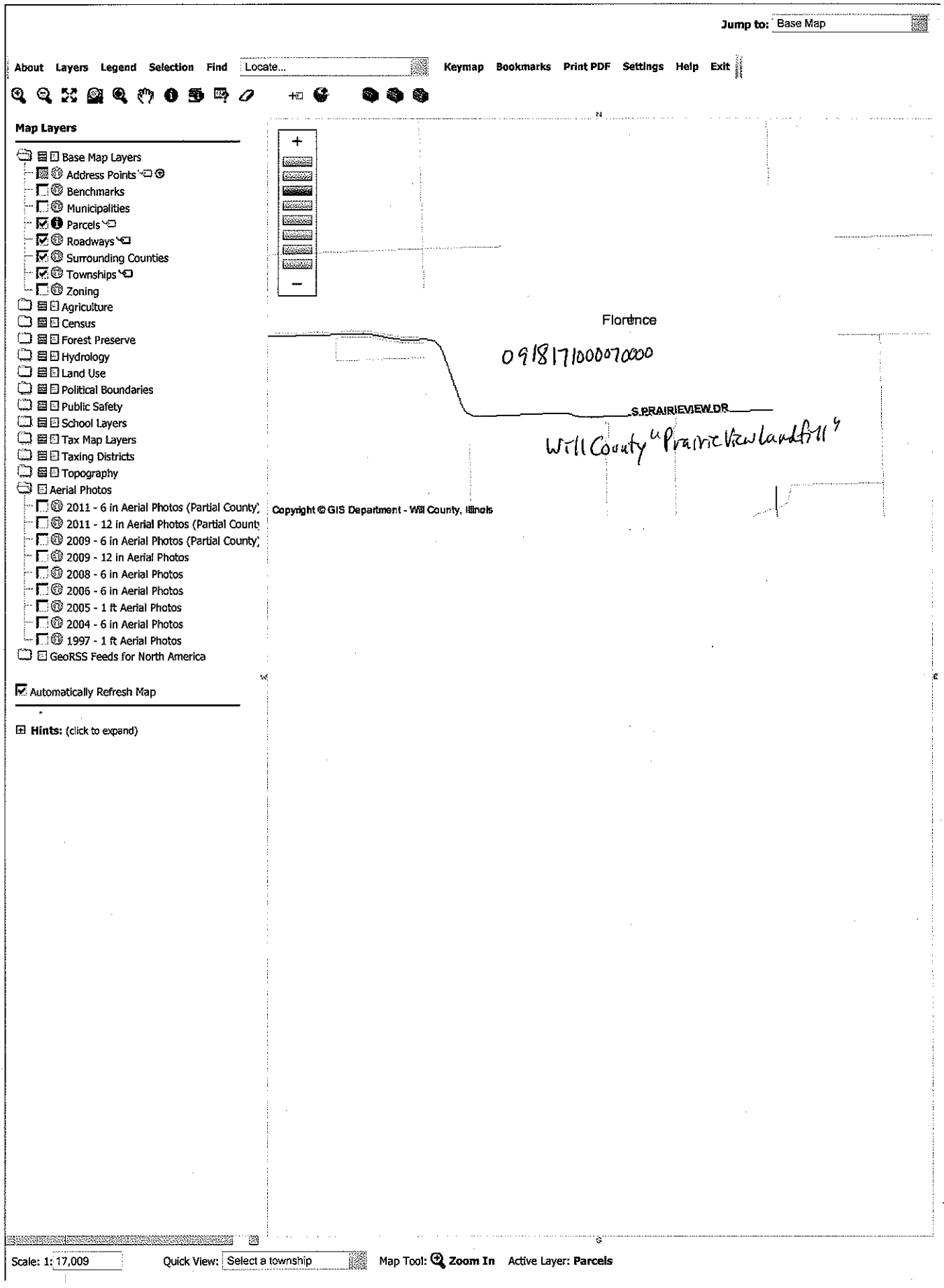
Path: [illegible]

URS

12420 Milestone Center Drive
Germantown, MD 20876

Will County GIS




Jump to: Base Map
About Layers Legend Selection Find Locate... Keymap Bookmarks Print PDF Settings Help Exit
Map Layers
Base Map Layers
Address Points
Benchmarks
Municipalities
Parcels
Roadways
Surrounding Counties
Townships
Zoning
Agriculture
Census
Forest Preserve
Hydrology
Land Use
Political Boundaries
Public Safety
School Layers
Tax Map Layers
Taxing Districts
Topography
Aerial Photos
2011 - 6 in Aerial Photos (Partial County)
2011 - 12 in Aerial Photos (Partial County)
2009 - 6 in Aerial Photos (Partial County)
2009 - 12 in Aerial Photos
2008 - 6 in Aerial Photos
2006 - 6 in Aerial Photos
2005 - 1 ft Aerial Photos
2004 - 6 in Aerial Photos
1997 - 1 ft Aerial Photos
GeoRSS Feeds for North America
Automatically Refresh Map
Hints: (click to expand)
Florence
09181710000070000
S PRAIRIEVIEW DR
Will County "Prairie View landfill"
Copyright © GIS Department - Will County, Illinois
Scale: 1: 17,009
Quick View: Select a township
Map Tool: Zoom In
Active Layer: Parcels

Enclosure 1.2 - Detailed list of properties owned by
<u>All Owners</u>
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
BN Leasing	D18	04-10-36-101-005-0000	0.05	R2000086264	R2010129644	☐	CP Ellwood LLC
BN Leasing Total		1	0.05				
BNSF 2002A	D01	04-10-23-101-002-0010	43.11	R2000086264	R2002105583	☐	CPI LLC
BNSF 2002A	D02	04-10-23-101-002-0020	14.46	R2000086264	R2002105583	☐	CPI LLC
BNSF 2002A	D04	04-10-26-200-004-0000	2.43	R2000086264	R2002105583	☐	CPI LLC
BNSF 2002A	D07	04-10-26-502-001-0000	73.01	R2000086276	R2002105583	☐	CPI LLC
BNSF 2002A	D08	04-10-36-101-001-0010	385.67	R2000086264	R2010057865	☐	BNSF
BNSF 2002A Total		5	518.68				
BNSF	D42	04-10-35-502-001-0000	13.81	R2000086264	R2003130582	☐	CPI LLC
BNSF	D44	04-10-35-502-002-0000	22.22	R2000086264	R2002227530	☐	CPI LLC
BNSF	D52	04-10-36-101-006-0000	0.05	R2000086264	R2010129644	☐	CPPT
BNSF Total		3	36.08				
BNSF; BN Leasing	D09	04-10-36-101-001-0010	13.15	R2000086264	R2010056239	☐	CPI LLC
BNSF; BN Leasing	D49	04-10-36-500-001-0000	21.7	R2000086264	R2010129644	☐	CPPT
BNSF; BN Leasing	D55	04-10-36-300-005-0000	5.06	R2000086264	R2010129644	☐	CPPT
BNSF; BN Leasing Total		3	39.91				
21561 W MISS	D26	10-11-30-101-004-0000	10.86	R2000086264	R2000086271	☐	**CPI LLC**
21561 W MISSISSIPPI LLC Total		1	10.86				
CPI LLC	D03	04-10-26-200-002-0000	45.56	R2002045744	R2002105583	☐	JADA
CPI LLC	D05	04-10-26-401-001-0000	10.62	R2002045744	R2002105583	☐	JADA
CPI LLC	D06	04-10-35-200-004-0000	148.65	R2010056234	R2010056239	☐	JADA
CPI LLC	D13	04-10-25-101-002-0000	15.04	R2000086264	R2002148335	☐	JADA
CPI LLC	D20	04-10-25-201-010-0000	32.33	R2000086264	R2011064757	☐	**CPPT**
CPI LLC	D39	04-10-35-502-004-0000	10.1	R2010056234	R2010056239	☐	**JADA**
CPI LLC	D47	04-10-36-101-001-0020	191.01	R2002045744	R2000086271	☐	**JADA**
CPI LLC Total		7	453.31				
CPI LLC; CPRSC	D11	04-10-25-101-004-0000	58.06	R2000086264	R2000086271	☐	JADA
CPI LLC; CPRSC	D12	04-10-25-101-005-0000	0.02	R2000086264	R2000086271	☐	JADA
CPI LLC; CPRSC	D14	04-10-25-101-006-0000	4.74	R2000086264	R2000086271	☐	JADA
CPI LLC; CPRSC	D15	04-10-25-101-007-0000	0.06	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D16	04-10-25-502-001-0000	8.94	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D17	04-10-25-502-002-0000	13.05	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D23	04-10-25-201-008-0000	3.33	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D28	10-11-30-101-005-0000	20.57	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D32	10-11-30-102-001-0000	3.78	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D40	04-10-35-200-003-0000	0.2	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D41	04-10-35-502-003-0000	16.93	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D43	04-10-35-402-003-0000	22.48	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D45	04-10-35-402-001-0000	6.71	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D53	04-10-36-500-002-0000	3.35	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC	D54	04-10-36-500-003-0000	7.75	R2000086264	R2000086271	☐	**JADA**
CPI LLC; CPRSC Total		15	169.97				
CPPT	D24	04-10-25-201-009-0000	6.22	R2000086264	R2000086271	☐	**Benderson Trusts (Var)**
CPPT	D29	10-11-30-101-007-0000	27.54	R2000086264	R2000086271	☐	**Benderson Trusts (Var)**

Enclosure 1.2 - Detailed list of properties owned by
<u>All Owners</u>
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	Map Label *(Att. 1.2)*	Will County Parcel Identification Number *(PIN)*	Acres	Original Deed or Transfer Document from Army *(Will County #)*	Current Deed *(Will County #)*	*Check box if ownership information is correct*	Comment
CPPT Total		2	33.76				
Deer Run POA	D19	04-10-25-201-004-0000	4.2	R2000086264	R2010057862	☐	**CPI LLC**
Deer Run POA	D25	04-10-25-201-007-0000	27.4	R2000086264	R2010057862	☐	**CPI LLC**
Deer Run POA	D30	10-11-30-301-001-0000	12.87	R2000086264	R2010057862	☐	**CPI LLC**
Deer Run POA	D31	10-11-30-102-002-0000	6.06	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D35	10-11-30-201-003-0000	5.33	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D38	10-11-30-102-003-0000	21.68	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D46	04-10-35-402-005-0000	5.85	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D48	04-10-35-401-001-0000	21.97	R2002045744	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D51	04-10-36-201-003-0000	6.67	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA	D56	04-10-36-401-001-0000	15.3	R2000086264	R2010057863	☐	**CPI LLC; CPPT**
Deer Run POA Total		10	127.33				
Elwood MHC	D34	10-11-30-100-006-0000	0.09	R2000086264	R2000086271	☐	**CPI LLC**
Elwood MHC Total		1	0.09				
Elwood Village	D27	10-11-30-101-006-0000	8.9	R2000086264	R2000086271	☐	**CPI LLC**
Elwood Village Total		1	8.9				
FJGCO LLC	A05	09-18-16-300-005-0000	256.88	R2000086264	R2000086264	☐	JADA
FJGCO LLC Total		1	256.88				
Fort James	D21	04-10-25-201-011-0000	49.19	R2000086264	R2005210234	☐	**CPRSC**
Fort James Total		1	49.19				
IUOEL	A08	09-18-16-400-002-0000	255.68	R2000086264	R2003270518	☐	JADA
IUOEL	A09	09-18-16-400-003-0000	39.43	R2005064066	R2005064067	☐	JADA
IUOEL Total		2	295.11				
JADA	A01	09-18-18-400-004-0000	255.57	R2005064066	R2005064066	☐	
JADA	A04	09-18-18-400-002-0000	103	R2004025145	R2004025145	☐	
JADA	D33	10-11-30-100-004-0000	2.62	R2000086264	R2000086271	☐	
JADA Total		3	361.19				
Liberty Property LP	D22	04-10-25-201-012-0000	47.84	R2000086264	R2000086271	☐	**CJF1 LLC**
Liberty Property LP	D50	04-10-36-201-002-0000	27.01	R2000086264	R2000086271	☐	**CJF1 LLC**
Liberty Property LP Total		2	74.85				
Prairie Craftsman	A03	09-18-18-300-003-0000	22.05	R2004025145	R2005213110	☐	JADA
Prairie Craftsman Total		1	22.05				
ProLogis	A06	09-18-17-300-003-0000	120.9	R2000086264	R2007081623	☐	JADA
ProLogis	A07	09-18-17-400-002-0000	63.45	R2000086264	R2007081624	☐	JADA
ProLogis Total		2	184.35				
U.S. Army	D10	04-10-35-200-002-0000	31.47	To be transferred		☐	U.S. Army
U.S. Army	FL01	FL01	120	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL02	FL02	45	To be transferred		☐	
U.S. Army	FL03	FL03	50	To be transferred		☐	
U.S. Army	FL04	FL04	12.5	To be transferred		☐	
U.S. Army	FL07	FL07	160.2	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL08	FL08	129.18	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL09	FL09	129.18	To be transferred		☐	

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U.S. Army	FL10	FL10	139.88	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL14	FL14	28.1	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FL23	FL23	2	To be transferred		☐	
U.S. Army	FL34	FL34	3.5	To be transferred		☐	
U.S. Army	FL5B	FL5B	9	To be transferred		☐	
U.S. Army	FLJA	FLJA	3.1	To be transferred		☐	
U.S. Army	FLU8	FLU8	6.7	TD-FS4-2013	TD-FS4-2013	☐	
U.S. Army	FM01	FM01	68	To be transferred		☐	
U.S. Army	FM02	FM02	25	To be transferred		☐	
U.S. Army	FM03	FM03	66	To be transferred		☐	
U.S. Army	FM04	FM04	136	To be transferred		☐	
U.S. Army	FM11	FM11	133	To be transferred		☐	
U.S. Army	FM15	FM15	1	To be transferred		☐	
U.S. Army	FMSE	FMSE	6	To be transferred		☐	
U.S. Army Total		22	1304.81				
USDA/FS	F001	04-10-22-100-002-0000	8.37	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F002	04-10-23-200-001-0010	286.13	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F003	04-10-24-300-003-0000	74.74	R2000086264	R2000086271	☐	
USDA/FS	F004	04-10-24-300-002-0000	81.61	R2000086264	R2004007577	☐	
USDA/FS	F005	04-10-24-100-003-0010	116.04	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F006	10-11-19-300-001-0010	59.67	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F007	10-11-19-300-002-0010	9.11	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F008	04-10-26-100-003-0010	517.73	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F009	04-10-34-400-001-0000	313.14	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F010	04-10-26-100-003-0020	144.25	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F011	10-11-31-200-001-0010	45.84	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F012	10-11-31-400-002-0000	26.93	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F013	10-11-31-400-003-0000	110.92	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F014	10-11-32-100-001-0000	156.43	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F015	10-11-32-200-001-0000	37.94	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F016	10-11-32-200-002-0000	37.47	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F017	10-11-32-200-003-0000	79.84	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F018	10-11-32-300-001-0000	160.21	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F019	10-11-32-400-001-0000	84.13	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F020	10-11-32-400-002-0000	75.85	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F021	10-11-33-100-001-0000	61.28	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F022	10-11-33-100-002-0000	16.15	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F023	10-11-33-100-003-0000	78.58	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F024	10-11-33-200-001-0000	78.09	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F025	10-11-33-200-002-0000	37.73	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F026	10-11-33-200-003-0000	0.68	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F027	10-11-33-200-004-0000	39.64	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F028	10-11-33-300-001-0000	61.25	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F029	10-11-33-300-002-0000	18.24	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F030	10-11-33-300-003-0000	80.34	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F031	10-11-33-400-001-0000	80.1	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F032	10-11-33-400-002-0000	79.5	TD-FS1-1997	TD-FS1-1997	☐	

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USDA/FS	F033	10-11-34-100-001-0000	156.69	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F034	10-11-34-200-001-0000	108.5	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F035	10-11-34-200-002-0000	48.47	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F036	10-11-34-300-001-0000	160.4	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F037	10-11-34-400-001-0000	160.66	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F038	10-11-35-100-001-0000	75.23	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F039	10-11-35-100-002-0000	40.81	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F040	10-11-35-100-003-0000	40.51	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F041	10-11-35-200-001-0000	155.63	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F042	10-11-35-300-001-0000	80	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F043	10-11-35-300-002-0000	40.36	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F044	10-11-35-300-003-0000	40.62	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F045	10-11-35-400-001-0000	39.89	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F046	10-11-35-400-002-0000	39.46	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F047	10-11-35-400-003-0000	40	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F048	10-11-35-400-004-0000	39.87	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F049	10-11-36-100-001-0000	155.83	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F050	10-11-36-200-001-0000	156.87	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F051	10-11-36-300-001-0000	159.91	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F052	10-11-36-400-001-0000	80.03	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F053	10-11-36-400-002-0000	80.8	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F054	14-12-31-100-001-0000	157	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F055	14-12-31-200-001-0000	72.1	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F056	14-12-31-300-001-0000	144.17	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F057	14-12-31-400-001-0000	7.23	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F058	03-17-03-100-002-0000	433.87	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F059	03-17-02-100-001-0000	651.3	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F060	03-17-02-100-004-0004	162.49	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F061	03-17-01-100-001-0010	595.54	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F062	03-17-01-503-001-0000	1.87	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F063	03-17-01-503-002-0000	0.05	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F064	09-18-06-100-001-0000	608.99	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F065	09-18-06-503-001-0000	6.84	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F066	09-18-06-503-002-0000	4.49	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F067	09-18-06-503-003-0000	0.44	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F068	09-18-06-503-004-0000	0.03	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F069	09-18-05-100-001-0000	640.87	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F070	09-18-04-100-001-0000	642.05	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F071	09-18-03-100-001-0000	645.7	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F072	09-18-03-100-003-0004	0	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F073	09-18-02-100-001-0000	645	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F074	09-18-01-100-001-0000	629.33	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F075	13-19-06-100-001-0000	74.77	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F076	13-19-06-300-001-0000	7.78	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F077	03-17-10-100-002-0000	481.03	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F078	03-17-11-100-001-0000	643.55	TD-FS1-1997	TD-FS1-1997		
USDA/FS	F079	03-17-12-100-001-0000	522.74	TD-FS1-1997	TD-FS1-1997		

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USDA/FS	F080	03-17-12-400-001-0000	10.97	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F081	09-18-07-100-001-0000	625.55	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F082	09-18-07-100-002-0004	0	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F083	09-18-08-100-003-0004	0	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F084	09-18-08-100-004-0000	491.87	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F085	09-18-08-200-001-0000	3.21	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F086	09-18-08-200-002-0000	56.8	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F087	09-18-09-100-002-0000	631.28	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F088	09-18-10-100-001-0000	645.75	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F089	09-18-11-100-001-0000	646.68	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F090	09-18-12-100-001-0000	403.36	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F091	03-17-15-200-002-0010	254.32	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F092	03-17-15-200-002-0020	174.19	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F093	03-17-14-100-002-0010	475.71	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F094	03-17-14-100-002-0020	150.57	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F095	03-17-13-100-002-0010	348.86	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F096	03-17-13-100-002-0020	109.86	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F097	09-18-18-100-004-0010	140.24	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F098	09-18-18-100-004-0020	121.11	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F099	09-18-17-100-006-0000	8.65	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F100	09-18-16-200-001-0010	169.21	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F101	09-18-16-200-001-0020	1.56	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F102	09-18-15-100-001-0000	641.55	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F103	09-18-14-100-001-0000	574.64	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	F104	09-18-13-100-001-0000	21.17	TD-FS1-1997	TD-FS1-1997	☐	
USDA/FS	FL25	FL25	8.2	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL27	FL27	316	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL28	FL28	211.5	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL33	FL33	198	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FL5A	FL5A	29	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLAA	FLAA	13.44	TD-FS2-2002	TD-FS2-2002	☐	
USDA/FS	FLU1	FLU1	2.49	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU2	FLU2	1.74	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU3	FLU3	1.02	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU4	FLU4	1	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU5	FLU5	2.36	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU6	FLU6	0.98	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU7	FLU7	3.5	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FLU9	FLU9	8.57	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FM10	FM10	10	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FM14	FM14	14	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FM6A	FM6A	50	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FMU1	FMU1	0	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS	FMU2	FMU2	0	TD-FS3-2005	TD-FS3-2005	☐	
USDA/FS Total		123	20316.61				
VA	V01	04-10-36-400-003-0010	259.5	TD-VA1-1996	TD-VA1-1996	☐	
VA	V02	10-11-30-300-007-0000	24.17	R2000086264	R2000076002	☐	

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VA	V03	10-11-30-300-002-0000	31.88	R2000086264	R2000076002	☐	
VA	V04	10-11-30-300-003-0000	16.91	R2000086264	R2000076002	☐	
VA	V05	10-11-30-300-004-0000	25.5	R2000086264	R2000076002	☐	
VA	V06	10-11-31-100-001-0000	9.9	TD-VA1-1996	TD-VA1-1996	☐	
VA	V07	10-11-31-100-002-0000	10.1	TD-VA1-1996	TD-VA1-1996	☐	
VA	V08	10-11-31-100-003-0000	2.1	TD-VA1-1996	TD-VA1-1996	☐	
VA	V09	10-11-31-100-004-0000	0.81	TD-VA1-1996	TD-VA1-1996	☐	
VA	V10	10-11-31-100-007-0000	46.29	TD-VA1-1996	TD-VA1-1996	☐	
VA	V11	10-11-31-100-005-0000	16.72	TD-VA1-1996	TD-VA1-1996	☐	
VA	V12	10-11-31-100-010-0000	7.65	TD-VA1-1996	TD-VA1-1996	☐	
VA	V13	10-11-31-100-006-0000	31.4	TD-VA1-1996	TD-VA1-1996	☐	
VA	V14	10-11-31-100-008-0000	11.61	TD-VA1-1996	TD-VA1-1996	☐	
VA	V15	10-11-31-100-009-0000	0.16	TD-VA1-1996	TD-VA1-1996	☐	
VA	V16	10-11-31-100-011-0000	22.71	TD-VA1-1996	TD-VA1-1996	☐	
VA	V17	10-11-31-200-001-0020	92.37	TD-VA1-1996	TD-VA1-1996	☐	
VA	V18	10-11-31-503-001-0000	7.12	TD-VA1-1996	TD-VA1-1996	☐	
VA	V19	04-10-36-400-003-0020	157.78	TD-VA1-1996	TD-VA1-1996	☐	
VA	V20	10-11-31-300-001-0000	8.9	TD-VA1-1996	TD-VA1-1996	☐	
VA	V21	10-11-31-300-002-0000	1	TD-VA1-1996	TD-VA1-1996	☐	
VA	V22	10-11-31-300-003-0000	69.65	TD-VA1-1996	TD-VA1-1996	☐	
VA	V23	10-11-31-300-004-0000	66.73	TD-VA1-1996	TD-VA1-1996	☐	
VA	V24	10-11-31-400-001-0000	10.98	TD-VA1-1996	TD-VA1-1996	☐	
VA	V25	10-11-31-503-002-0000	3.62	TD-VA1-1996	TD-VA1-1996	☐	
VA	V26	10-11-31-503-003-0000	3.39	TD-VA1-1996	TD-VA1-1996	☐	
VA	V27	03-17-01-100-001-0020	44.42	TD-VA1-1996	TD-VA1-1996	☐	
VA Total		27	983.37				
WalMart	D36	10-11-30-201-004-0000	96.07	R2000086264	R2006136007	☐	**CPI LLC**
WalMart	D37	10-11-30-201-005-0000	76.32	R2000086264	R2006171216	☐	**CPI LLC**
WalMart Total		2	172.39				
WILL COUNTY	A02	09-18-18-200-001-0000	9.06	R2005064066	R2009154372	☐	
WILL COUNTY	L01	09-18-17-100-007-0000	456.08	R2002063838	R2002063838	☐	
WILL COUNTY Total		2	465.14				
Grand Total		237	25884.88				

<u>Abbreviations</u>

21561 W MISS	21561 W Mississippi LLC
BN Leasing	BN Leasing Corporation
BNR Holding	Burlington Northern Railroad Holdings Inc.
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF 2002A	2002A BNSF Trust
CPI LLC	CenterPoint Intermodal LLC
CPPT	CenterPoint Properties Trust
CPRSC	CenterPoint Realty Services Corporation
Deer Run POA	CIC at Deer Run Property Owners Association
Elwood MHC	Elwood Maple Hill Cemetery Association

Enclosure 1.2 - Detailed list of properties owned by
<u>All Owners</u>
Based on Will County Recorder of Deed's Data
Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee *(Abberviations follow)*	**Map Label** *(Att. 1.2)*	**Will County Parcel Identification Number** *(PIN)*	**Acres**	**Original Deed or Transfer Document from Army** *(Will County #)*	**Current Deed** *(Will County #)*	*Check box if ownership information is correct*	**Comment**
FJGCO LLC	FJGCO LLC						
Fort James	Fort James Operating Company						
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation						
JADA	Joliet Arsenal Development Authority						
Liberty Property LP	Liberty Property Limited Partnership						
Prairie Craftsman	Prairie Craftsman LLC						
ProLogis	Prologis Logistics Services Inc.						
SF Pacific Railroad	Santa Fe Pacific Railroad Company						
U.S. Army	Department of the Army (U.S.)						
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie						
VA	Department of Veterans Affairs						
WalMart	WalMart Stores East LP						
Will County	Will County						

Legend

Former Joliet Boundary

Parcels

Current Owner

- BNSF
- BNSF 2002A
- BNSF;BN Leasing
- CIC DR POA
- CPI LLC
- CPI LLC; CPRSC
- CPPT
- 21561 W MISS
- ELWOOD MAPLE HILL CEMETERY
- FORT JAMES OPERATING CO
- IUOEL
- JADA
- LIBERTY PROPERTY LP
- PRAIRIE CRAFTSMAN LLC
- PROLOGIS; PROLOGIS LOGISTICS SERVICES INC
- US VA
- USDA/FS
- VILLAGE OF ELWOOD
- WALMART STORES EAST LP
- WILL COUNTY
- USA - ARMY (yet to be determined)

Notes:

1) Property onwership and transfers from U.S. Army shown are preliminary and require verification.

2) Parcel ownership is based on Will County Assessor's Office GIS data and may have discrepancies with Will County Recorder's Office GIS data.

3) Two parcels, A05 and D09, include geographically distinct subparcels.

Enclosure 1.3:
Draft Parcel Ownership - Overview

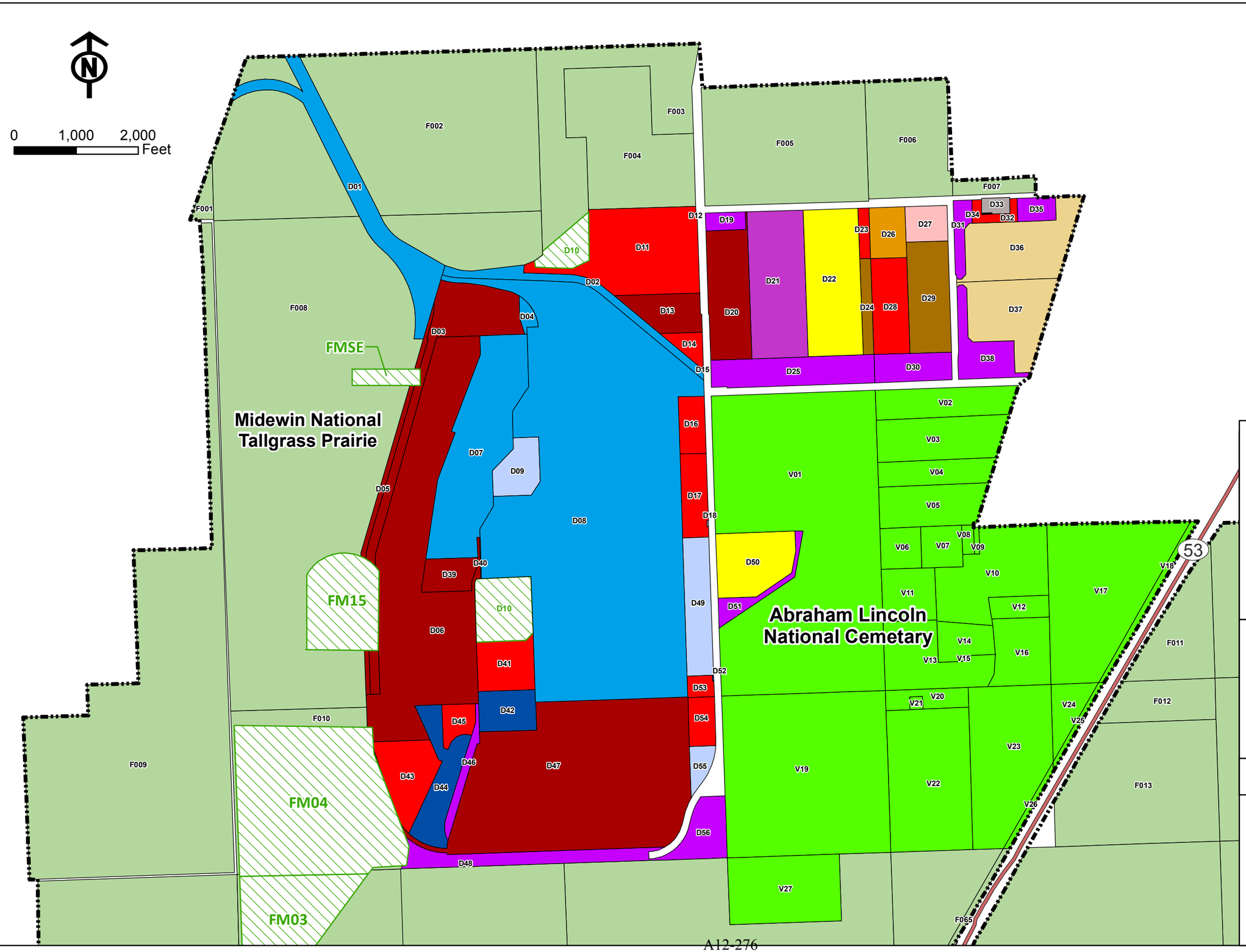
Former Joliet Army Ammunition Plant
Joliet, IL

Date: 01/08/2013

Path: G:\Projects\Former_Joliet_Army_Plant\Projects

URS
12420 Milestone Center Drive
Germantown, MD 20876

0 3,000 6,000 Feet



Legend

- Former Joliet Boundary

Parcels

Current Owner

- BNSF
- BNSF 2002A
- BNSF;BN Leasing
- CIC DR POA
- CPI LLC
- CPI LLC; CPRSC
- CPPT
- 21561 W MISS
- ELWOOD MAPLE HILL CEMETERY
- FORT JAMES OPERATING CO
- JADA
- LIBERTY PROPERTY LP
- US VA
- USDA/FS
- VILLAGE OF ELWOOD
- WALMART STORES EAST LP
- WILL COUNTY
- USA - ARMY (yet to be determined)

Notes:

1) Property onwership and transfers from U.S. Army shown are preliminary and require verification.

2) Parcel ownership is based on Will County Recorder's Office data.

3) Two parcels, A05 and D09, include geographically distinct subparcels.

Enclosure 1.4:

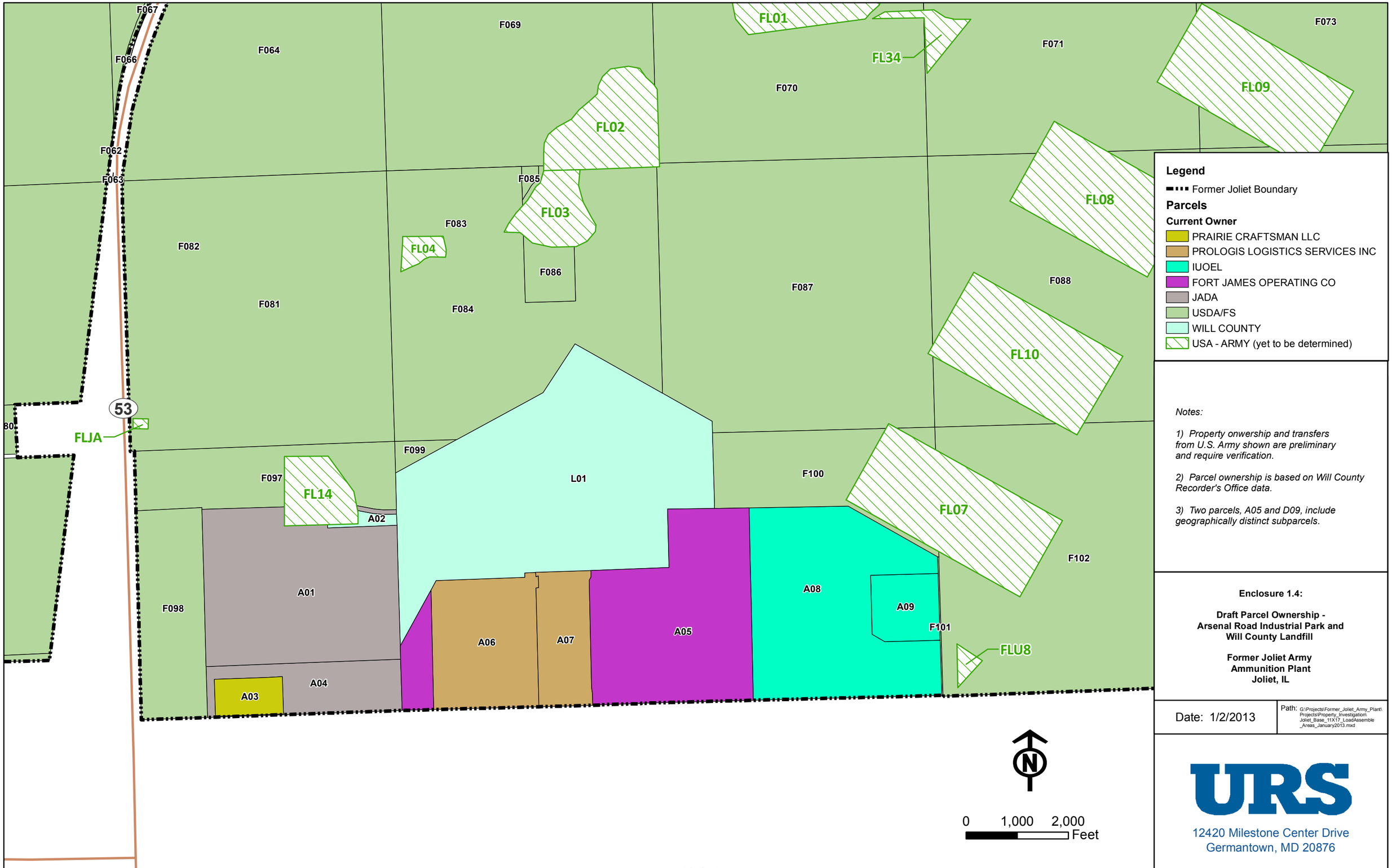
Draft Parcel Ownership
Deer Run Industrial Park and Veterans Cemetery

Former Joliet Army Ammunition Plant
Elwood, IL

Date: 1/2/2013

Path: G:\Projects\Former_Joliet_Army_Plant\Projects\Property_Investigation\Joliet_Base_11X17_Manufacturing Industrial_Areas_January2013.mxd

URS
12420 Milestone Center Drive
Germantown, MD 20876


F067
F066
F062
F063
F064
F069
FL01
FL34
F071
F073
FL09
F070
FL02
F085
FL03
F083
FL04
F082
F086
F081
F084
F087
FL08
F088
FL10
53
FLJA
F099
F097
FL14
L01
F100
FL07
A02
F102
A01
F098
A08
A09
F101
A06
A07
A05
FLU8
A04
A03
Legend
Former Joliet Boundary
Parcels
Current Owner
PRAIRIE CRAFTSMAN LLC
PROLOGIS LOGISTICS SERVICES INC
IUOEL
FORT JAMES OPERATING CO
JADA
USDA/FS
WILL COUNTY
USA - ARMY (yet to be determined)
Notes:
1) Property onwership and transfers from U.S. Army shown are preliminary and require verification.
2) Parcel ownership is based on Will County Recorder's Office data.
3) Two parcels, A05 and D09, include geographically distinct subparcels.
Enclosure 1.4:
Draft Parcel Ownership - Arsenal Road Industrial Park and Will County Landfill
Former Joliet Army Ammunition Plant Joliet, IL
Date: 1/2/2013
Path: G:\Projects\Former_Joliet_Army_Plant\Projects\Property_Investigation\Joliet_Base_11X17_LoadAssemble_Areas_January2013.mxd
N
0 1,000 2,000 Feet
URS
12420 Milestone Center Drive
Germantown, MD 20876

Appendix B
Statement of Compliance Responses

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BNSF RAILWAY

Amanda Marruffo
Manager Environmental Operations

BNSF Railway Company
5601 W. 26th St.
Cicero, IL 60804
708-924-5326 Office
214-435-4587 Cell

March 8, 2013

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

Re: Annual Questionnaires and Statement of Compliance with Deed Restrictions for Property Held by Burlington Northern & Santa Fe Railway and related compaines on the Former Joliet Army Ammunition Plant, Wilmington, Illinois
BNSF Facility: Logistics Park – Chicago

Sir:

As requested BNSF has completed and signed the enclosed Questionnaire and State of Compliance (Enclosure 1). Any future correspondence related to onsite visits should be directed toward Amanda Marruffo, Manager Environmental Operations. See header for contact information.

Respectfully submitted,

Amanda Marruffo
Manager Environmental Operations
Iowa, Illinois

EC: Dava Kaitala, BNSF
Don Girard, BNSF
Carrie Thompson, BNSF

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Enclosure 1: Annual Questionnaire and Statement of Compliance (2012)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: BNSF Railway Corporation and BN Leasing

This Questionnaire and Statement of Compliance applies to the approximately 204 acres of land owned or and approximately 690 acres of land leased by **BNSF Railway Corporation, BN Leasing and BNSF-related companies** (hereinafter referred to in summary as BNSF for owned land and BNSF – Leased for leased land) as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels BNSF owns or leases. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(If no or unsure, please describe)*
1. **Land Use Restrictions:** With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☑ Yes ☐ No ☐ Unsure
b. educational (for children in grades K-12)	☑ Yes ☐ No ☐ Unsure
c. child or adult care	☑ Yes ☐ No ☐ Unsure
d. landfill (solid or hazardous waste)	☑ Yes ☐ No ☐ Unsure
e. quarry operations	☑ Yes ☐ No ☐ Unsure
f. incineration of solid waste	☑ Yes ☐ No ☐ Unsure
g. concrete batch or asphalt plant	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

_____

_____

_____

_____

Enclosure 1: Annual Questionnaire and Statement of Compliance (2012)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner/Lessor: BNSF Railway Corporation

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation:**	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☑ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal:** The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2012)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner/Lessor: BNSF Railway Corporation

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions:** Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☑ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs):** Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☑ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2012)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner/Lessor: BNSF Railway Corporation

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☑ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **BNSF Railway Corporation**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **BNSF Railway Corporation** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

Amanda Marcello (signature) 03/08/13 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **CenterPoint Intermodal LLC and related companies**

This Questionnaire and Statement of Compliance applies to the approximately 358 acres of land owned by **CenterPoint Intermodal LLC and related companies** (herafter referred to as **CPI LLC**) as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **CPI LLC** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☒ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

The properties are used for industrial warehouse purposes

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: CPI LLC

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: CPI LLC

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: CPI LLC

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☐ Yes ☐ No ☒ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying *instrument* evidencing such transaction	☐ Yes ☐ No ☒ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

Notification given to mark tape in preparation of these documents.

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **CPI LLC**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **CPI LLC** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

Shawn Rucker (signature) 3/27/13 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **CenterPoint Intermodal Center Deer Run Property Owners Association**

This Questionnaire and Statement of Compliance applies to the 128 acres of land owned by **CenterPoint Intermodal Center Deer Run Property Owners Association** (herafter referred to as **CIC DR POA**) as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **CIC DR POA** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☒ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

Common areas within the association

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: CIC DR POA

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation:**	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: CIC DR POA

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ____	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ____	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: CIC DR POA

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☐ Yes ☐ No ☒ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☐ Yes ☐ No ☒ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

Notification was not given at time of transfer, but has since been given to the Department of Army through work with Mark Pape.

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **CIC DR POA**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **CIC DR POA** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

Shawn Purcell (signature) 3/27/13 (date)

JOHN A. TRYNER
ATTORNEY AT LAW
101 FULTON STREET
WILMINGTON, IL 60481

PH: (815) 476-9048 FAX: (815) 476-9092

April 24, 2013

VIA EMAIL ON FILE

Amibeth Sheridan
URS Group
12420 Milestone Center Dr. Suite 150
Germantown, MD 20876

RE: Elwood Maple Hill Cemetery

Dear Ms. Sheridan:

Following please find my response to your inquiry regarding deed restrictions on behalf of the Elwood Maple Hill Cemetery.

Per our phone conversation this response is limited in the following ways:

1) With respect to parcel D32: The property which the cemetery received as a grant from Centerpoint was subject to use restrictions, and the cemetery association understood that the property was subject to restrictions set forth in the recorded documents. That property (parcel D32 on your map - PIN # 10-11-30-100-005) is currently vacant land and is simply being used as a buffer between the cemetery property and the surrounding industrial uses. The cemetery may be expanded at some time in the future if the current grave sites are used up, but when or if that might happen is not known. The cemetery assumed that use of that property for burial sites would not violate the restrictions, but as there is no current plan to use the property I'm not sure that matters at this point. The questionnaire attached was answered relating to the use of that property only (D32).

2) With respect to parcels D33 and D34 (PIN #'s 10-11-30-100-004 and 006): It is my understanding, based on a prior review of property records, that these properties have been continuously owned and used by the Elwood Maple Hill Cemetery since the 1800's. These parcels were not conveyed by JADA (via Centerpoint) to the cemetery. Therefore I conclude that these

parcels are NOT subject to the restrictions and inspections set forth in your correspondence. I am also not aware of any EPA rulings or restrictions which would prevent the property's continued use for burial sites. Accordingly my answers should not be construed to include these parcels. Simply for informational purposes I do advise that the property is in use as a common cemetery for burial and other common ancillary uses typical for cemetery property.

3) As attorney for the cemetery I do not have direct knowledge of day to day activities of the cemetery, and all answers are to the best of my knowledge based on an inquiry made to the president of the cemetery association, and general familiarity with the operations of the assocation.

Very truly yours,

John A. Tryner
Attorney at Law

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Elwood Maple Hill Cemetery Association**

Parcel D32

This Questionnaire and Statement of Compliance applies to the approximately ~~65~~ acres of land owned by **Elwood Maple Hill Cemetery Association** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Elwood Maple Hill Cemetery Association** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☒ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

_____

_____

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_____

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Elwood Maple Hill Cemetery Association

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation:**	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Elwood Maple Hill Cemetery Association

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Elwood Maple Hill Cemetery Association

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

_____

_____

_____

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

_____

_____

_____

_____

_____

_____

11. **Statement of Compliance:**

As an authorized representative of **Elwood Maple Hill Cemetery Association**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Elwood Maple Hill Cemetery Association** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ atty for (signature) 4/24/13 (date)

Subject to conditions and limitations set forth in correspondence enclosed.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Village of Elwood**

This Questionnaire and Statement of Compliance applies to the approximately 15 acres of land owned by **Village of Elwood** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Village of Elwood** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*

1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.

a. residential	☑ Yes	☑ No	☐ Unsure
b. educational (for children in grades K-12)	☑ Yes	☑ No	☐ Unsure
c. child or adult care	☑ Yes	☑ No	☐ Unsure
d. landfill (solid or hazardous waste)	☑ Yes	☑ No	☐ Unsure
e. quarry operations	☑ Yes	☑ No	☐ Unsure
f. incineration of solid waste	☑ Yes	☑ No	☐ Unsure
g. concrete batch or asphalt plant	☑ Yes	☑ No	☐ Unsure

* ALL YES, DID NOT UNDERSTAND AT QUESTION FIRST

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

LAND BEING USED FOR WATER & WASTEWATER TREATMENT PLANT AS APPROVED BY EPA.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Village of Elwood

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☑ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Village of Elwood

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☑ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☑ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Village of Elwood

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☑ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

_____

_____

_____

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

_____

_____

_____

_____

_____

_____

11. **Statement of Compliance:**

As an authorized representative of **Village of Elwood**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Village of Elwood** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____(signature) 04-15-13 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **FJGCO LLC**

This Questionnaire and Statement of Compliance applies to the approximately 77 acres of land owned by **FJGCO LLC** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **FJGCO LLC** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☒ Yes ☐ No ☐ Unsure
b. educational (for children in grades K-12)	☒ Yes ☐ No ☐ Unsure
c. child or adult care	☒ Yes ☐ No ☐ Unsure
d. landfill (solid or hazardous waste)	☒ Yes ☐ No ☐ Unsure
e. quarry operations	☒ Yes ☐ No ☐ Unsure
f. incineration of solid waste	☒ Yes ☐ No ☐ Unsure
g. concrete batch or asphalt plant	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

_____

_____

_____

_____

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: FJGCO LLC

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation)	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions)	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal)	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: FJGCO LLC

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: FJGCO LLC

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

_____

_____

_____

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

_____

_____

_____

_____

_____

11. **Statement of Compliance:**

As an authorized representative of **FJGCO LLC**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **FJGCO LLC** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

Frank J Giordano 4.29.13

_____(signature) _____(date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Fort James Operating Company**

This Questionnaire and Statement of Compliance applies to the approximately 49 acres of land owned by **Fort James Operating Company** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Fort James Operating Company** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☒ Yes ☐ No ☐ Unsure
b. educational (for children in grades K-12)	☒ Yes ☐ No ☐ Unsure
c. child or adult care	☒ Yes ☐ No ☐ Unsure
d. landfill (solid or hazardous waste)	☒ Yes ☐ No ☐ Unsure
e. quarry operations	☒ Yes ☐ No ☐ Unsure
f. incineration of solid waste	☒ Yes ☐ No ☐ Unsure
g. concrete batch or asphalt plant	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

_____

_____

_____

_____

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Fort James Operating Company

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) No construction or development activities were completed in the last year.	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions)	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal)	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Fort James Operating Company

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Fort James Operating Company

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

No leases or transfers have occurred.

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed)

Fort James Operating Company, a Virginia corporation converted to a Delaware corporation on December 29, 2006. Fort James Operating Company, a Delaware corporation converted to a Delaware limited partnership on December 31, 2006 and changed its name to Georgia-Pacific Consumer Products LP.

11. **Statement of Compliance:**

As an authorized representative of **Georgia-Pacific Consumer Products LP**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Georgia-Pacific Consumer Products LP** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

William G. Lamb (signature) June 12, 2013 (date)

INTERNATIONAL UNION OF OPERATING ENGINEERS

LOCAL UNION NO. 150, 150B, 150A, 150C, 150RA, 150D, 150G, 150M

AFFILIATED WITH THE A.F.L.-C.I.O.

6140 JOLIET ROAD
COUNTRYSIDE, IL 60525

708-579-6663
FAX 708-588-1647

DALE D. PIERSON
ELIZABETH A. LAROSE
MELINDA S. HENSEL
STEVE A. DAVIDSON

LEGAL DEPARTMENT

MARC R. POULOS
MELISSA L. BINETTI
KARA PRINCIPE

April 11, 2013

URS Group
Attn: GEARS Division –Joliet AAP Project
12420 Milestone Center Drive
Suite 150
Germantown, MD 20876

RE: Questionnaire and Statement of Compliance on Property

Dear Sir or Madam:

Pursuant to Arthur Holz's letter received March 1, 2013, enclosed please find the Questionnaire and Statement of Compliance on Property. Please note that the reference on the Questionnaire lists the owner as: "International Union of Operating Engineers Local 150 150a 150b 150c Building Corporation (IOUEL Local 150)" but the correct parenthetical should be **(IUOE Local 150)**. Thank you.

Sincerely yours,

IUOE, LOCAL 150, AFL-CIO
LEGAL DEPARTMENT

Dale D. Pierson
General Counsel

DDP/cbb
Enclosure

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation (IOUEL Local 150)**

This Questionnaire and Statement of Compliance applies to the approximately 293 acres of land owned by **IOUEL Local 150** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **IOUEL Local 150** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☐ No ☒ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

The Training Center Campus consists of approximately 300 acre multi-purpose facility constructed in 2007, improved with a 302,754 square foot training center building, ancillary structures (including a 24-hour Campus Security Building), an outdoor equipment operator training area and parking for approximately 712 vehicles. The Campus Security Building is staffed 24-hours per day year round and includes incidental food preparation, eating and sleeping areas used by security personnel while on-shift.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: IOUEL Local 150

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation:**	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: IOUEL Local 150

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: IOUEL Local 150

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease* within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **IOUEL Local 150**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **IOUEL Local 150** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ (signature) 4/11/13 (date)

Dale D. Pierson
General Counsel

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Joliet Arsenal Development Authority (JADA)**

This Questionnaire and Statement of Compliance applies to the approximately 539 acres of land owned by **JADA** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **JADA** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*

1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.

a. residential	☒ Yes	No	☐ Unsure
b. educational (for children in grades K-12)	☒ Yes	No	☐ Unsure
c. child or adult care	☒ Yes	No	☐ Unsure
d. landfill (solid or hazardous waste)	☒ Yes	No	☐ Unsure
e. quarry operations	☒ Yes	No	☐ Unsure
f. incineration of solid waste	☒ Yes	No	☐ Unsure
g. concrete batch or asphalt plant	☒ Yes	No	☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

YES INDICATES WE HAVE COMPLIED WITH RESTRICTIONS. NONE OF ITEMS A-G ARE ON OUR PROPERTY

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: JADA

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: JADA

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: JADA

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☐ Yes ☐ No ☒ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☐ Yes ☐ No ☒ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

OUTSIDE COUNSEL PREPARED ALL DOCUMENTS UNABLE TO CONFIRM NOTIFICATIONS.

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **JADA**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **JADA** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

JADA _____ (signature) 3-14-13 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Liberty Property Limited Partnership (Liberty Property LP)**

This Questionnaire and Statement of Compliance applies to the approximately 75 acres of land owned by **Liberty Property LP** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Liberty Property LP** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☒ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

Both parcels are warehousing and distribution.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Liberty Property LP

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Liberty Property LP

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Liberty Property LP

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

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8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

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11. **Statement of Compliance:**

As an authorized representative of **Liberty Property LP**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Liberty Property LP** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ (signature), 3/22/13 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Prologis Logistics Services, Inc. (Prologis)**

This Questionnaire and Statement of Compliance applies to the approximately 184 acres of land owned by **Prologis** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Prologis** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☒ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

The property is vacant at this time

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Prologis

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Prologis

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

_____

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8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

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11. **Statement of Compliance:**

As an authorized representative of **Prologis**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Prologis** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ (signature) March 8th 2013 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Prologis

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Prairie Craftsman LLC**

This Questionnaire and Statement of Compliance applies to the approximately 22 acres of land owned by **Prairie Craftsman LLC** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Prairie Craftsman LLC** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*				**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.				
a. residential	☐ Yes	☒ No	☐ Unsure	
b. educational (for children in grades K-12)	☐ Yes	☒ No	☐ Unsure	
c. child or adult care	☐ Yes	☒ No	☐ Unsure	
d. landfill (solid or hazardous waste)	☐ Yes	☒ No	☐ Unsure	
e. quarry operations	☐ Yes	☒ No	☐ Unsure	
f. incineration of solid waste	☐ Yes	☒ No	☐ Unsure	
g. concrete batch or asphalt plant	☐ Yes	☒ No	☐ Unsure	

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Prairie Craftsman LLC

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Prairie Craftsman LLC

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Prairie Craftsman LLC

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **Prairie Craftsman LLC**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Prairie Craftsman LLC** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ (signature) 3/1/2013 (date)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **U.S. Army**

This Questionnaire and Statement of Compliance applies to the approximately 1303 acres of land owned by **U.S. Army** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **U.S. Army** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*

1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.

a. residential	☒ Yes	☐ No	☐ Unsure
b. educational (for children in grades K-12)	☒ Yes	☐ No	☐ Unsure
c. child or adult care	☒ Yes	☐ No	☐ Unsure
d. landfill (solid or hazardous waste)	☒ Yes	☐ No	☐ Unsure
e. quarry operations	☒ Yes	☐ No	☐ Unsure
f. incineration of solid waste	☒ Yes	☐ No	☐ Unsure
g. concrete batch or asphalt plant	☒ Yes	☐ No	☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

3 LANDFILLS WERE APPROVED IN 1998 ROD.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: U.S. Army

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☒ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: U.S. Army

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: U.S. Army

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☒ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

_____

_____

_____

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

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11. **Statement of Compliance:**

As an authorized representative of **U.S. Army**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **U.S. Army** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ (signature) 25 APR 2013 (date)

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USDA United States Department of Agriculture | Forest Service | Midewin National Tallgrass Prairie | 30239 South State Route 53
Wilmington, IL 60481
(815) 423-6370

File Code: 1480/1920
Date: APR 23 2013

URS Group
Attn: GEARS Division
Joliet AAP Project
12420 Milestone Center Drive
Suite 150
Germantown, MD 20876

GEARS Division:

Attached is the completed Questionnaire and Statement of Compliance for property held by USDA Forest Service on the former Joliet Army Ammunition Plant.

To the best of my knowledge, activities on the Midewin National Tallgrass Prairie to date have complied with the applicable land use restrictions.

I would like to point out the following discrepancies on the provided Questionnaire as it applies to Midewin National Tallgrass Prairie:

1) For the three transfers executed with the United States Department of Agriculture Forest Service, (Transfer 1, Transfer 2, and Transfer 3), land use restrictions originated from Environmental Condition of Property statements and the two Record of Decisions, not as "deed restrictions".

2) Page 2 of your letter dated March 6, 2013, refers to a Memorandum of Agreement dated the 2nd of August 2000 and Joliet Army Development Authority submitting an annual report, which does not apply to the United States Department of Agriculture Forest Service.

3) Enclosure 1: Annual Questionnaire, Item 2. Land Use Restrictions, vi. "Camping". The 2004 Record of Decision, 10.1.1.6 does not list "camping" as a use that is subject to institutional controls. The 2004 Record of Decision further states in 6.1.1 Human Health Risk Assessment, that "Activities of visitors to the Midewin National Tallgrass Prairie may include picnicking, hiking, and camping." Please remove Camping from the list of Land Use Restrictions on the Questionnaire.

If you have any questions please contact Renee Thakali or Robert Hommes at (815) 423-6370.

Sincerely,

WADE A. SPANG
Prairie Supervisor
Midewin National Tallgrass Prairie

Enclosure 1: Questionnaire and Statement of Compliance
Enclosure 2: Changes and Corrections

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ENCLOSURE 1

Annual Questionnaire and Statement of Compliance (2013)

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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Institutional Control Restrictions on Lands of the Former Joliet Army Ammunition Plant

Owner: U.S. DEPARTMENT OF AGRICULTURE (USDA)/FOREST SERVICE

This Questionnaire and Statement of Compliance applies to the 17,730 acres of land owned by **USDA/Forest Service** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as ~~Deed~~ Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **USDA/Forest Service** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Source Documents for Institutional Controls (See Enclosure 3.2 for full listing)	**Listed as**
A. EPA Superfund – Record of Decision [ROD]: Joliet Army Ammunition Plant [JOAAP] (Load-Assembly-Packing Area)[LAP] and JOAAP (Manufacturing Area)[MFG]; EPA ID: IL0210090049 and IL7213820460; OU 01, 02 & 01, 02; Joliet, IL; 30 October 1998	1998 ROD
B. EPA Superfund – Record of Decision: JOAAP LAP Area; EPA ID: IL0210090049; OU 01; Joliet, IL; 20 August 2004	2004 ROD
C. Statement of Condition (SOC) report [U.S. Army Environmental Center (USAEC); 2 August 1996	1996 SOC
D. Environmental Condition of Property (ECOP); 10.5 acre Administration Site for USDA/Forest Service at Joliet Army Ammunition Plant (JOAAP), Illinois"; May 2000	2000 ECOP
E. ECOP; JOAAP, Illinois; Land Transfer To USDA/Forest Service Midewin National Tallgrass Prairie; September 2004	2004 ECOP
F. Amendment Number 1; To The ECOP for JOAAP, Illinois; Land Transfer To USDA/Forest Service Midewin National Tallgrass Prairie; 9 August 2005	2005 ECOP

Duration: The Institutional Controls will be continued until the concentrations of hazardous substances in the soil and/or groundwater beneath are reduced to levels that allow for unlimited exposure and unrestricted use, and regulatory agreement is reached. [*2004 ROD §10.1.1.6*]

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance
Institutional Control Restrictions on Lands of the Former Joliet Army Ammunition Plant

Owner: USDA/Forest Service

Institutional Control Requirement (Sources shown; More complete information on requirements are in Enclosure 3)	Complied with Requirement? (if no or unsure, please describe)
1. Soil Exposure: The USDA/Forest Service will:	
a. Prevent unrestricted exposure to soils with residual contamination above unlimited reuse levels. [*2004 ROD, § 10.1.1.6*]	☒ Yes ☐ No ☐ Unsure
b. Prevent migration of contaminants. [*1999 ROD §6.3; 2004 ROD §7. Listed as "Restrict Soil Movement" in 5-Year Review, 2009*]	☒ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Soil Exposure)

2. Land Use Restrictions: The USDA/Forest Service will:

a. The property has been assessed and/or remediated based on criteria that were specifically developed for the Midewin National Tallgrass Prairie and its intended use as a tall grass prairie and is, therefore, not intended for unrestricted (e.g. residential) use. [*2004 ECOP, § 4.3*]

Has the USDA/Forest Service land transferred in 2005 been used for?

i. Residential housing [*2004 ROD §10.1.1.6*]	☐ Yes	☒ No	☐ Unsure
ii. Elementary and secondary schools [*ibid.*]	☐ Yes	☒ No	☐ Unsure
iii. Childcare facilities [*ibid.*]	☐ Yes	☒ No	☐ Unsure
iv. Playgrounds [*ibid.*]	☐ Yes	☒ No	☐ Unsure
v. Industrial uses [*ibid.*]	☐ Yes	☒ No	☐ Unsure
~~vi. Camping [*ibid.*]~~	~~☐ Yes~~	~~☐ No~~	~~☐ Unsure~~

[Note: Camping restriction based on comparability to residential use restriction.]

b. The Army will notify the USDA/Forest Service, EPA, and the State of any apparent violations of land or groundwater use restrictions (e.g., new drinking water wells). USDA/Forest Service will be responsible to take actions to correct incompatible uses. [*2004 ECOP, § 4.3(a)*] ☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

Item 2a. Land Use Restrictions, vi. "Camping". The 2004 ROD, 10.1.1.6 does not list "camping" as a use that is subject to institutional controls. The 2004 Record of Decision further states in 6.1.1 Human Health Risk Assessment, that "Activities of visitors to the Midewin National Tallgrass Prairie may include picnicking, hiking, and camping." Please remove Camping from the list of Land Use Restrictions on the Questionnaire.

Item 2b. Land Use Restrictions, No notifications were received from the Army.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance
Institutional Control Restrictions on Lands of the Former Joliet Army Ammunition Plant

Owner: USDA/Forest Service

Institutional Control Requirement *(Sources shown; More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
3. Monitoring Wells Requirement: The USDA/Forest Service is required "to maintain the integrity of groundwater monitoring and wells." [*1999 ROD §9.2.1.2; 2004 ECOP §6*]	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions)	
4. Groundwater Use: The USDA/Forest Service will comply with the following:	
a. Restrictions on the use or disturbance of groundwater in a way that could cause the migration of the contaminated groundwater plumes [*1999 ROD §9.2.1.2*]	☒ Yes ☐ No ☐ Unsure
b. Requirement that groundwater above the Maquoketa shale not be used for potable water supply. [*ibid.*]	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal)	
5. Groundwater Management Zone (GMZ) Restrictions: Within the GMZ (Sites M6A, M10W, and M15),the USDA/Forest Service:	
a. Shall prohibit activities that may result in migration of the groundwater contamination [*2004 ECOP §4.3*]	☒ Yes ☐ No ☐ Unsure
b. Shall prohibit the use of the groundwater at Sites M6A, M10W, and MIS for potable purposes [*2004 ECOP §4.3*]	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions)	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance
Institutional Control Restrictions on Lands of the Former Joliet Army Ammunition Plant

Owner: USDA/Forest Service

Institutional Control Requirement *(Sources shown; More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*

6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: [Not applicable. No USDA/Forest Service lands are within DRPs.]

7. **Notification of Violations:** The USDA/Forest Service shall "notify the Army and regulators of any land use restriction violations within 30 days and addresses USDA/Forest Service's obligation to comply with CERCLA Section 120 on future land transfers." [*2005 ECOP §2.a*]

☐ Yes
☒ No
☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Violations)

_____
_____
_____
_____

8. **Access to Property**: The Army shall retain an easement, running with the land, that grants a right of access for the Army, the USEPA and the IEPA for the purpose of conducting any activity related to this ROD and the FFA including, but not limited to the following activities: (a) Monitoring the work; (b) Verifying any data or information submitted to the United States or the State; (c) Conducting investigations relating to contamination at or near the Site; (d) Obtaining samples; (e) Assessing the need for, planning, or implementing additional response actions at or near the Site; (f) Implementing the work pursuant to the conditions set forth in the FFA and the ROD; (g) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by the Army or their agents, consistent with the FFA's section on Access; (h) Assessing the Army's compliance with the FFA and the ROD; and (i) Determining whether the Site or other property subject to this ROD is being used in a manner that is prohibited or restricted or that may need to be prohibited or restricted by, or pursuant to, the FFA or the ROD. [*1999 ROD §9.3.7*]

(*This requirement is met in response to request by Army*).

Please provide a description for issues, if any, relating to Access to Property

_____
_____
_____
_____

9. **Annual Reporting**: The USDA/Forest Service will "submit an Annual Certification letter certifying that the land and groundwater uses remain the same and that integrity of the land and groundwater restrictions has not been compromised." [*ECOP § 4.3.b*]

☒ Yes
☐ No
☐ Unsure

If you checked No or Unsure, please provide a description for your response (Annual Reporting)

_____
_____
_____
_____

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance
Institutional Control Restrictions on Lands of the Former Joliet Army Ammunition Plant

Owner: USDA/Forest Service

Institutional Control Requirement *(Sources shown; More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*

10. **Additional Comments** (if needed) _____

11. Statement of Compliance:

As an authorized representative of **USDA/Forest Service,** I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **USDA/Forest Service** is in compliance with the covenants, use restrictions and requirements as set forth in the RODs and Transfer Documents (SOC, ECOPs, etc.) from the U.S. Army conveying the property which **USDA/Forest Service** now owns.

Prairie Supervisor Midewin National Tallgrass Prairie (signature) 4/23/2013 (date)

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ENCLOSURE 2

Changes or Corrections

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Changes or Corrections

I would like to point out the following discrepancies on the provided Questionnaire as it applies to Midewin National Tallgrass Prairie:

1) For the three transfers executed with the United States Department of Agriculture Forest Service (Transfer 1, Transfer 2, and Transfer 3) land use restrictions originated from Environmental Condition of Property statements and the two Record of Decisions, not as "deed restrictions".
2) Page 2 of your letter dated March 6, 2013, refers to a Memorandum of Agreement of 2 August 2000 and Joliet Army Development Authority submitting an annual report, which does not apply to the United States Department of Agriculture Forest Service.
3) Enclosure 1: Annual Questionnaire, Item 2. Land Use Restrictions, vi. "Camping". The 2004 Record of Decision, 10.1.1.6 does not list "camping" as a use that is subject to institutional controls. The 2004 Record of Decision further states in 6.1.1 Human Health Risk Assessment, that "Activities of visitors to the Midewin National Tallgrass Prairie may include picnicking, hiking, and camping." Please remove Camping from the list of Land Use Restrictions on the Questionnaire.

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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Department of Veterans Affairs**

This Questionnaire and Statement of Compliance applies to the approximately 983 acres of land owned by **Department of Veterans Affairs** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Department of Veterans Affairs** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

1. **Applicable Deed Restriction – Access to Property**: The Transfer Documents specified, 'The Department of the Army will require the right of ingress and egress throughout the area to be transferred for environmental testing and cleanup. We request that you indicate your acceptance of this condition by executing the attached Notice of Acceptance and returning it to my office." (Accepted 19 June 1996, Honorable Jesse Brown, Secretary, Department of Veterans Affairs)

(This requirement is met in response to requests for access to the property by the U.S. Army).

2. **Non-Applicable Deed Restrictions**: The following deed restrictions were not included in the transfer of property the former Joliet Army Ammunition Plant (JOAAP) to the Department of Veterans Affairs. They are often specified in other transfers of JOAAP property.

a. Land Use Restrictions
b. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remediation
c. Monitoring Wells Restrictions
d. Soil Removal
e. Groundwater Management Zone (GMZ) Restrictions
f. 11. Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs):
g. Notification of Transfers
h. Annual Reporting

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Department of Veterans Affairs

3. Additional Comments (if needed) _____

4. Statement of Compliance:

As an authorized representative of **Department of Veterans Affairs**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Department of Veterans Affairs** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

Marty A. Fury (signature) 04-12-13 (date)

Enclosure 2.1 - Detailed list of properties owned by Department of Veterans Affairs Based on Will County Recorder of Deed's Data Inputs and Confirmation Required

Please provide your inputs, if any, in the highlighted (or right two) columns

Current Grantee (Abbreviations follow)	Map Label (Att. 1.2)	Will County Parcel Identification Number (PIN)	Acres (+/-)	Original Deed or Transfer Document from Army (Will County #)	Current Deed (Will County #)	Groundwater Management Zone?	Monitoring Wells on Parcel?	Deed Restricted Parcel?	Check box if ownership information is correct.	Comment
VA	V01	04-10-36-400-003-0010	259.5	TD-VA1-1996	TD-VA1-1996				✓	
VA	V02	10-11-30-300-007-0000	24.2	R2000086264	R2000076002				✓	
VA	V03	10-11-30-300-002-0000	31.9	R2000086264	R2000076002				✓	
VA	V04	10-11-30-300-003-0000	16.9	R2000086264	R2000076002				✓	
VA	V05	10-11-30-300-004-0000	25.5	R2000086264	R2000076002				✓	
VA	V06	10-11-31-100-001-0000	9.9	TD-VA1-1996	TD-VA1-1996				✓	
VA	V07	10-11-31-100-002-0000	10.1	TD-VA1-1996	TD-VA1-1996				✓	
VA	V08	10-11-31-100-003-0000	2.1	TD-VA1-1996	TD-VA1-1996				✓	
VA	V09	10-11-31-100-004-0000	0.8	TD-VA1-1996	TD-VA1-1996				✓	
VA	V10	10-11-31-100-007-0000	46.3	TD-VA1-1996	TD-VA1-1996				✓	
VA	V11	10-11-31-100-005-0000	16.7	TD-VA1-1996	TD-VA1-1996				✓	
VA	V12	10-11-31-100-010-0000	7.7	TD-VA1-1996	TD-VA1-1996				✓	
VA	V13	10-11-31-100-006-0000	31.4	TD-VA1-1996	TD-VA1-1996				✓	
VA	V14	10-11-31-100-008-0000	11.6	TD-VA1-1996	TD-VA1-1996				✓	
VA	V15	10-11-31-100-009-0000	0.2	TD-VA1-1996	TD-VA1-1996				✓	
VA	V16	10-11-31-100-011-0000	22.7	TD-VA1-1996	TD-VA1-1996				✓	
VA	V17	10-11-31-200-001-0020	92.4	TD-VA1-1996	TD-VA1-1996				✓	
VA	V18	10-11-31-503-001-0000	7.1	TD-VA1-1996	TD-VA1-1996				✓	
VA	V19	04-10-36-400-003-0020	157.8	TD-VA1-1996	TD-VA1-1996				✓	
VA	V20	10-11-31-300-001-0000	8.9	TD-VA1-1996	TD-VA1-1996				✓	
VA	V21	10-11-31-300-002-0000	1.0	TD-VA1-1996	TD-VA1-1996				✓	
VA	V22	10-11-31-300-003-0000	69.7	TD-VA1-1996	TD-VA1-1996				✓	
VA	V23	10-11-31-300-004-0000	66.7	TD-VA1-1996	TD-VA1-1996				✓	
VA	V24	10-11-31-400-001-0000	11.0	TD-VA1-1996	TD-VA1-1996				✓	
VA	V25	10-11-31-503-002-0000	3.6	TD-VA1-1996	TD-VA1-1996				✓	
VA	V26	10-11-31-503-003-0000	3.4	TD-VA1-1996	TD-VA1-1996				✓	
VA	V27	03-17-01-100-001-0020	44.4	TD-VA1-1996	TD-VA1-1996				✓	
VA Subtotal		**27**	**983.4**				-			
Grand Subtotal		**27**	**983.4**				-			

Abbreviations	Organization represented (*multiple organizations may be grouped as a single entity*)
BNSF	2002A BNSF Trust
BNSF	21561 W Mississippi LLC
BNSF	Burlington Northern & Santa Fe Railway Company
BNSF	Burlington Northern Railroad Holdings Inc.
BNSF-Leased	BN Leasing Corporation. This acronym for any parcels which BNSF retains in lease.
CIC DR POA	CIC at Deer Run Property Owners Association
CPI LLC	CenterPoint Intermodal LLC
CPI LLC	CenterPoint Properties Trust
CPI LLC	CenterPoint Realty Services Corporation
Elwood MHC	Elwood Maple Hill Cemetery Association
Elwood Village	Village of Elwood, IL
FJGCO LLC	FJGCO LLC
Fort James	Fort James Operating Company
IUOEL	International Union Of Operating Engineers Local 150 150a 150b 150c Building Corporation
JADA	Joliet Arsenal Development Authority
Liberty Property LP	Liberty Property Limited Partnership
Prairie Craftsman	Prairie Craftsman LLC
ProLogis	Prologis Logistics Services Inc.
U.S. Army	Department of the Army (U.S.)
USDA/FS	Department of Agriculture/Forestry Service - Midwein Tallgrass Prairie
VA	Department of Veterans Affairs
WalMart	WalMart Stores East LP
Will County	Will County
Wilmington FD	Wilmington Fire Department

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **WalMart Stores East LP**

This Questionnaire and Statement of Compliance applies to the approximately 172.4 acres of land owned by **WalMart Stores East LP** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **WalMart Stores East LP** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☑ Yes ☐ No ☐ Unsure
b. educational (for children in grades K-12)	☑ Yes ☐ No ☐ Unsure
c. child or adult care	☑ Yes ☐ No ☐ Unsure
d. landfill (solid or hazardous waste)	☑ Yes ☐ No ☐ Unsure
e. quarry operations	☑ Yes ☐ No ☐ Unsure
f. incineration of solid waste	☑ Yes ☐ No ☐ Unsure
g. concrete batch or asphalt plant	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

* We use the property for warehouse & distribution center purposes only.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: WalMart Stores East LP

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(If no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☑ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: WalMart Stores East LP

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☑ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☑ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: WalMart Stores East LP

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☑ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

_____

_____

_____

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

_____

_____

_____

_____

_____

11. **Statement of Compliance:**

As an authorized representative of **WalMart Stores East LP**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **WalMart Stores East LP** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

MARK McGUIRE, WAL-MART SR MANAGER, REALTY EHS COMPLIANCE (signature) _____, SR MGR REALTY EHS (date) 26 MAR 13

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WILL COUNTY LAND USE DEPARTMENT
58 E. Clinton Street, Suite 500 • Joliet, Illinois 60432
815/774-3321 • Fax 815/727-8638

March 22, 2013

URS Group, Mark Pape
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive
Suite 150
Germantown, MD 20876

SENT VIA US MAIL & ELECTRONIC MAIL TRANSMISSION

Re: Annual Questionnaires and Statements of Compliance with Deed Restrictions for Property Held by Will County (for Landfill) on the Former Joliet Army Ammunition Plant, Wilmington, Illinois

Dear Mr. Pape:

Pursuant to a recent letter you sent from Arthur M. Holz, U.S. Army JAAP Site Manager, you requested that the above referenced questionnaire by filled out (Enclosure 1) and submit to you no later than March 27, 2013. I have enclosed Enclosure 1 (referenced as Enclosures 1a & 1b in your letter) that have been filled out and signed by myself. Should you have any further questions, please contact me at (815) 774-7891.

Sincerely,

Dean Olson
Resource Recovery & Energy Division Director

CC: Will County Executive's Office
Ian Johnson, Waste Management of Illinois

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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Will County, Illinois** – For **Will County Landfill** Parcel (#09-18-17-100-007-0000) only. (The other parcel Will County owns (09-18-18-200-001-0000) has a different set of restrictions and is covered under a separate questionnaire.)

This Questionnaire and Statement of Compliance applies to the 456.08 acres of land owned by **Will County** as listed in Enclosure 2.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. A summary of the pertinent land use restrictions and other requirements are listed below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Will County** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide an explanation in item 10 (Additional Comments) in the comment section immediately below or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this questionnaire.

Land Use Requirement *(More complete information on restrictions / requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please explain)*
1) **Land Use Restrictions**: The Property has been remediated as stated in the Record of Decision (ROD) by the Grantor solely for use as a landfill.	
a) The Property may only be developed and is being utilized for landfill purposes.	☑ Yes ☐ No ☐ Unsure
b) The Grantee covenants for itself, its successors, assigns, future owners, heirs, and executors, not to develop or use the Property for residential purposes	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide an explanation for your response (Land Use Restrictions)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Will County, IL – For Will County Landfill Parcel (#09-18-17-100-007-0000) only

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please explain)*
2) **CERCLA[1] Remediation**: The Grantee, its representatives, agents, contractors, successors, assigns, future owners, heirs, and executors:	
a) Shall not undertake activities on the Property that would interfere with or impede the completion of the CERCLA cleanup at the former Joliet Army Ammunition Plant Property (JOAAP)	☑ Yes ☐ No ☐ Unsure
b) Shall comply with any institutional controls established or put in place by the Grantor [Army] relating to the Property	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide an explanation for your response (CERCLA Remediation)	
3) **Monitoring Wells Restrictions:** The Grantee, its representatives, agents, contractors, successors, assigns, future owners, heirs, and executors:	
a) Shall be expressly subject to the rights and duties of the Grantor to continue operation of any monitoring wells, treatment facilities, or other response activities	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide an explanation for your response (Monitoring Wells) _	
4) **Soil Removal Restrictions**: *No soil removal restrictions are placed on Will County for operation of the landfill.*	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites. Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Will County, IL – For Will County Landfill Parcel (#09-18-17-100-007-0000) only

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please explain)*

5) **Groundwater Use Restrictions**: The Grantee further covenants:

a) Not to use the groundwater within the glacial drift and Silurian dolomite aquifer and above the Maquoketa confining bed) for human consumption unless the Grantee meets the requirements of the Safe Drinking Water Act and applicable State law.

- [x] Yes
- [ ] No
- [ ] Unsure

If you checked No or Unsure, please provide a description for your response (Groundwater Use) __

6) **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: *No additional groundwater restrictions for DRPs are placed on Will County for operation of the landfill.*

7) **Notification of Transfers**: No additional notification of property transfer requirements are placed on Will County for operation of the landfill.

8) **Access to Property**: The [Army] reserves for itself and its representatives, the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA) and their representatives, an easement and unrestricted right of access to the Property [when they] are obligated or required to undertake any additional environmental response action, investigation, inspection, enforcement, monitoring, sampling, testing, remedial action, corrective action, or any other action necessary [...] to meet their environmental responsibilities as provided for by law and this Deed, the JOAAP FFA [Federal Facility Agreement], the JOAAP ROD [Record of Decision], [...] or other applicable environmental laws and regulations. (*This requirement will not be applicable until a request for access is made by the Army*)

9) **Annual Reporting:** No additional requirements for Annual Reporting are placed on Will County for operation of the landfill.

10) **Additional Comments**:

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Will County, IL – For Will County Landfill Parcel (#09-18-17-100-007-0000) only

11) **Statement of Compliance:**

As an authorized representative of **Will County** I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Will County** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which **Will County** now owns.

_____(signature) 3/21/13 (date)

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Will County Highway Department**

This Questionnaire and Statement of Compliance applies to the approximately 9.1 acres of land owned by **Will County Highway Department** (apart from the landfill) as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Will County Highway Department** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☑ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☑ No ☐ Unsure
c. child or adult care	☐ Yes ☑ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☑ No ☐ Unsure
e. quarry operations	☐ Yes ☑ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☑ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☑ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

THE PARCEL IS BEING UTILIZED BY THE WILL COUNTY DEPARTMENT OF HIGHWAYS AS A SATELLITE MAINTENANCE FACILITY.

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Will County Highway Department

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☑ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Will County Highway Department

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	Complied with Requirement? *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☑ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☑ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☑ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Will County Highway Department

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☑ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed) _____

11. **Statement of Compliance:**

As an authorized representative of **Will County Highway Department**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Will County Highway Department** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____ (signature) 2/4/13 (date)

COUNTY ENGINEER - WILL COUNTY

P.O. Box 245
501 N. Main St.
Wilmington, IL 60481

Phone (815) 476-6675
Fax (815) 476-0878

URS Corporation
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

April 12, 2013

Ms Amibeth Sheridan,

This is the letter you requested to let you know that the property in questions was donated to the Wilmington Fire Protection District in October of 2005 from the International Union of Operating Engineers Local 150. There is currently no building on the property.

Thank You,

Tim Zlomie, Fire Chief

Proudly serving our community since 1868

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Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: **Wilmington Fire Department**

This Questionnaire and Statement of Compliance applies to the approximately 2.5 acres of land owned by **Wilmington Fire Department** as listed in Enclosure 2. Also shown in Enclosure 2 are the parcels which include non-standard conditions (such as Deed Restricted Parcels or Groundwater Management Zones) that affect the Land Use Restrictions.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire. The pertinent land use restrictions and other requirements are listed in summary below and in more detail in Enclosure 3.

Please indicate in the checkboxes, to the best of your knowledge, whether the listed restrictions and requirements have been complied with on the parcels **Wilmington Fire Department** owns. If the restrictions and requirements are not being complied with (or if you are unsure), please provide detail in the comment section immediately below, in Item 10 (Additional Comments) or as an attachment to this questionnaire.

Upon completion of this questionnaire, please sign Item 11 (Statement of Compliance) and return it to:

URS Group
Attn: GEARS Division – Joliet AAP Project
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876.

Any changes or corrections to the property listings should be noted in Enclosure 2 and returned with this Questionnaire.

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
1. **Land Use Restrictions**: With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate whether any parcels are being used for such purposes.	
a. residential	☐ Yes ☒ No ☐ Unsure
b. educational (for children in grades K-12)	☐ Yes ☒ No ☐ Unsure
c. child or adult care	☐ Yes ☒ No ☐ Unsure
d. landfill (solid or hazardous waste)	☐ Yes ☒ No ☐ Unsure
e. quarry operations	☐ Yes ☒ No ☐ Unsure
f. incineration of solid waste	☐ Yes ☒ No ☐ Unsure
g. concrete batch or asphalt plant	☐ Yes ☒ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Land Use Restrictions)

There is currently no ~~the~~ building on the property

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Wilmington Fire Department

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
2. **CERCLA[1] Remediation**:	
a. The Owner shall conduct all construction and development activities in a manner that is consistent with the Record of Decision (ROD).	☑ Yes ☐ No ☐ Unsure
b. The Owner will not tamper with, damage, or destroy groundwater monitoring wells or otherwise interfere with ongoing remediation operations	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (CERCLA Remediation) _____	
3. **Monitoring Wells Restrictions:** The Owner shall not use, move, access, modify, remove, disturb, close, abandon, or otherwise harm or destroy any existing, or future existing, groundwater monitoring well that is owned by Grantor, without prior written permission from the U.S. Army in consultation with the USEPA and the Illinois Environmental Protection Agency (IEPA) .	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Monitoring Well Restrictions) _____	
4. **Soil Removal**: The Owner shall not remove soil from the property to an off-site location unless it is tested first and determined that the soil may be relocated in compliance with all local, state and federal laws and regulations without posing a threat to human health or the environment.	☑ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (Soil Removal) _____	

[1] Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A more detailed history of the regulatory/environmental investigation and remediation activities can be viewed in the Record of Decision (ROD) for JOAAP, dated October 1998. An electronic copy can be found through the US EPA's Superfund websites.
Manufacturing Area: www.epa.gov/superfund/sites/rods/fulltext/r0599041.pdf
Load-Assembly-Pack Area: www.epa.gov/superfund/sites/rods/fulltext/r0504676.pdf

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance
Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Wilmington Fire Department

Land Use Restriction Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
5. **Groundwater Management Zone (GMZ) Restrictions**: Within the GMZ, the Owner:	
a. shall not conduct any activity that would increase the volume or area of the contaminated groundwater (e.g., by deep excavation or drilling or pumping a well within the Siulurian dolomite aquifer)	☒ Yes ☐ No ☐ Unsure
b. shall not damage the confining layers that underlie the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
c. shall not create pathways of exposure to human or ecological receptors from the contaminated groundwater	☒ Yes ☐ No ☐ Unsure
d. For shallow groundwater encountered above the Maquoketa confining bed, the Owner • shall not use the groundwater for potable purposes • shall safely and properly manage, discharge, dispose, or treat all shallow groundwater encountered in accordance with applicable laws and regulations	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (GMZ Restrictions) ___	
6. **Additional Groundwater Restrictions for Certain Deed Restricted Parcels (DRPs)**: Within the DRP, the Owner:	
a. shall not use the groundwater above the Maquoketa confining bed for any purpose	☒ Yes ☐ No ☐ Unsure
b. shall not drill, construct, pump, or use groundwater supply wells	☒ Yes ☐ No ☐ Unsure
If you checked No or Unsure, please provide a description for your response (DRP Restrictions) ___	

Enclosure 1: Annual Questionnaire and Statement of Compliance (2013)

Annual Questionnaire and Statement of Compliance

Land Use Restrictions on Lands of the Former Joliet Army Ammunition Plant, Wilmington, IL

Owner: Wilmington Fire Department

Reporting and Access Requirement *(More complete information on requirements are in Enclosure 3)*	**Complied with Requirement?** *(if no or unsure, please describe)*
7. **Notification of Transfers**: The Owner shall provide the following information to the points of contact listed below:	
a. *Pre-transfer Notice* - 30 days written notice of any other transfer to parties not described immediately above (including a description of the deed/ lease provisions allowing for the Army's continued remediation activities)	☑ Yes ☐ No ☐ Unsure
b. *Deed/Lease*-within 14 days after the effective date of the transaction, shall provide to Grantor, USEPA, and IEPA copies of the deed, lease, or other conveying instrument evidencing such transaction	☑ Yes ☐ No ☐ Unsure

If you checked No or Unsure, please provide a description for your response (Notification of Transfers)

8. **Access to Property**: The Owner shall allow the Army representatives access in accordance with the Army's perpetual easement and right of access to the JOAAP property. (*This requirement is met in response to request by Army*).

9. **Annual Reporting**: The Owner shall provide an annual report to the U.S. Army stating that, to the best of its knowledge, it has not violated any of the deed restrictions or covenants set forth in the initial Deed. (*This requirement is satisfied with response to this Annual Questionnaire and Statement of Compliance. Copies of the compiled reports will be sent by the Army to U.S. EPA and IEPA.*)

10. **Additional Comments** (if needed)

This is a empty lot. There is currently no building on the site

11. **Statement of Compliance:**

As an authorized representative of **Wilmington Fire Department**, I certify that to the best of my knowledge, the preceding answers and statements are correct and complete and **Wilmington Fire Department** is in compliance with the covenants, use restrictions and requirements as set forth in the deed(s) from the U.S. Army conveying the property which Will County now owns.

_____(signature) 4-12-13 (date)

Appendix c
Site Inspection Field Notes and Photograph Records

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Site Inspection Notes; Site Wide Deed Restriction Implementation
Joliet Army Ammunition Plant, Illinois

Date: 12 June 2013

Participants:
Art Holz, US Army, Joliet Army Ammunition Plant
Mathew Riley, US Army Corps of Engineers, Louisville District
Meeckral Williams, US Army Environmental Command
Amibeth Sheridan, URS
Scott McClelland, URS

0830 - 1000: Group convened at Joliet Army Ammunition Plant farmhouse office. Discussed planned site visits, logistics and schedule for the day. Scott McClelland provided safety briefing and all site visit participants signed the Abbreviated Accident Prevention Plan to govern the site visit.

1000 - 1100: Group proceeded along South Patrol Road and turned North on West Patrol Road and entered access road to site FM01 (former Southern Ash Pile site) to inspect USDA/FS portions of parcels F078 and F059. Observed monitoring wells MW231, MW351 and MW640. Group proceeded north and inspected wells MW641 and MW642.

Group then continued north on West Patrol Road before turning east on access road that splits site FM11 and continued from parcel F078 into parcel F059. Continued north on westernmost access road of former igloos storage area. No evidence of construction or land use inconsistent with ICs in either F078 or F059 and all monitoring wells observed appeared in good condition. Some monitoring well locations were heavily overgrown and the wells were not seen.

1100 – 11300: Group conducted the inspection of parcel D06 by driving north along West TNT Road that forms the western bounds the west side of parcel D06. Observed wells MW216 and MW217 and observed USDA/FS creating wetlands in parcel F008 to the west of parcel D06 and to the north of monitoring well MW208. Wetlands likely represent shallow groundwater.

Drove all the way north to end of parcel D06, then crossed a railroad track and headed south along access road that parallels West TNT Road. Turned east on an access road in southern portion of parcel D06 and passed monitoring wells MW321 and MW322. Then turned north into parcel D06 on an access road that passed by wells MW307 and MW308 and then wells MW309 and MW310R. No evidence of construction or land use inconsistent with ICs was observed in parcel D06.

1130 – 1200: Group exited parcel D06 and headed north on South Industrial Park Drive (formerly Snake Road) to observe parcel DM2 (FM13 – former Gravel Pits). Well AEHA15 was observed. No evidence of construction or land use inconsistent with ICs was observed in this area which is a capped landfill.

1330 – 1430: Group travelled to parcels F069, FO83, F084, F085, F086 which surround FL02 (former Open Burning Ground site) and FL03 (former Demolition Area site) on the LAP Area. The cap associated with FL03 appeared to be in good condition and well vegetated. Monitoring well MW410 was observed to be present on the western side of the landfill. No evidence of construction or land use inconsistent with ICs was observed on sites FL03 or FL03 or on the parcels of land surrounding these sites.

1430 – 1530: Group travelled to parcel A10 and A11 owned by IUOE Local 150. Met with Melinda Hensel and Martin Turek of IEOU Local 150 who escorted the group on a driving tour of exterior portions of the property and a walking tour of the interior of the facility. During the tour the use of the security building was discussed. It was stated that a security officer is present at the facility 24 hours a day, and the security officer uses this building for sleeping and eating, and the security officer has a residence in Joliet where his wife resides.

Date: 13 June 2013

0930 – 1000: Group travelled to parcel D021 to inspect the GP/Fort James Operating Company. The site was observed to consist of a warehouse and pavement. No evidence of construction or land use inconsistent with ICs was observed.

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URS

PHOTOGRAPHIC LOG

Photo No. 1	Date: 6-12-13

Direction Photo Taken: Northwest

Description:
From northern side of former Southern Ash Landfill (FM01) looking northwest toward wells MW351 and MW640

Photo No. 2	Date: 6-12-13

Direction Photo Taken: Southwest

Description:
From northern side of former Southern Ash Landfill (FM01) looking southwest toward well MW231

URS

PHOTOGRAPHIC LOG

Photo No. 3	Date: 6-12-13

Direction Photo Taken: Southwest

Description:
Monitoring wells MW641 and MW642 located in Groundwater Management Zone associated with former Southern Ash Landfill (FM01)

Photo No. 4	Date: 6-12-13

Direction Photo Taken: East

Description:
Monitoring Wells MW216 and MW217

URS

PHOTOGRAPHIC LOG

Photo No. 5	Date: 6-12-13-

Direction Photo Taken: Southwest

Description:
Looking toward well MW208 where USDA/FS was restoring wetlands.

Photo No. 6	Date: 6-12-13

Direction Photo Taken: West/ Northwest

Description:
Monitoring wells MW307 and MW308 located in southern portion of parcel D06

URS

PHOTOGRAPHIC LOG

Photo No. 7	Date: 6-12-13

Direction Photo Taken: West/ Northwest

Description: Monitoring wells MW309 and MW310R in southern portion of parcel D06.

Photo No. 8	Date: 6-12-13

Direction Photo Taken: East/ Northeast

Description: Parcel DM2 (former gravel pit, site M13) close up

URS

PHOTOGRAPHIC LOG

Photo No. 9	Date: 6-12-13

Direction Photo Taken: Northeast

Description: Parcel DM2 (former gravel pit, site M13) wide view

Photo No. 10	Date: 6-12-13

Direction Photo Taken: South/ Southwest

Description: Prairie Creek along western side of capped landfill at Site L3 (former Demolition Area)

URS

PHOTOGRAPHIC LOG

Photo No. 11	Date: 6-12-13

Direction Photo Taken: West/ Southwest

Description: Security building used at IEOU Local 150.

Photo No. 12	Date: 6-13-13

Direction Photo Taken: South

Description: Parking lot and eastern side of warehouse at GP/Fort James Operating Co.

Appendix D
Kickoff Meeting Minutes and Regulatory Agency Communication

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MEETING NOTES

Former Joliet Army Ammunition Plant (JOAAP)
Site-Wide Deed Restrictions Implementation Plan (SWDRIP)
U.S. Army Corps of Engineers (USACE) / Louisville District
Held at JOAAP Site Office, Wilmington, IL
Tuesday, 26 July 2011

Attendees:

Arthur Holz, U.S. Army, BRAC(D), Site Manager
Matthew Riley, USACE/Louisville District, Project Engineer
Tom Barounis, U.S. EPA, Region 5, Federal Regulatory Agency Remedial Project Manager
Mike Haggitt, Illinois EPA, State Regulatory Agency Remedial Project Manager
Scott McClelland, URS Corporation, Project Manager
Mark Pape, URS Corporation, Senior Technical Manager

Handout: Presentation printout (18 pg.)

Meeting: (1000 to 1200 hrs)

This was an open and informal meeting. The outlined presentation was followed, but discussions were held throughout the presentation. The notes below provide key elements discussed, not necessarily in the order they were discussed.

Tom Barounis opened the meeting with the question of whether this project is intended to produce a Land Use Control Plan (LUCP). Art Holz answered it is not. The Army will complete its transfer of all JOAAP land in the very near future. Thereafter, Army's responsibility would be to monitor implementation of institutional controls (ICs, including deed restrictions and environmental protection provisions (EPPs)). Mr. Barounis noted that USEPA is interested in the verification (to be done in this project) that the ICs are being followed, and that he does not have concerns on LUCs other than these.

Formal Presentation:

Scott McClelland (URS) opened the presentation. He introduced the project, key people within the project and the purpose of the kickoff meeting.

Mark Pape discussed the JOAAP history, size and the transfer of its lands in accordance with Public Law 104-106. The transfers from the Army to the four specified recipients are:

Land Recipient	Purpose	Area	Transfer Status
USDA/Forest Service	Midewin Tallgrass Prairie	19,100 acres	not yet complete
US Veterans Administration	National Cemetery	982 acres	complete
Joliet Arsenal Development Authority (JADA)	Industrial Parks	3,000 acres	not yet complete
Will County	Will County Landfill	455 acres	complete

The selected remedial actions for JOAAP included institutional controls (ICs) relating to land use restrictions (LURs), groundwater management, and non-interference with remedial actions. These ICs were incorporated as Environmental Protection Provisions (EPPs) accompanying the transfer package for the properties transferred to the USDA/Forest Service. The ICs are recorded as Deed Restrictions and recorded with the Will County Recorder Office for the properties transferred to JADA and Will County. No ICs were placed on the property transferred to the Veterans Administration for the National Cemetery.

URS is in the process of determining the owners for all the lands. Several data sets are used to determine these – the Louisville Corps of Engineers for Federal-Federal transfers (to Forest Service and Veterans Administration), and three from Will County (Recorder's Office, Assessor's Office, and GIS) for the Federal-non-Federal transfers (Will County and JADA). The data derived from these sources and presented at this kickoff meeting are draft and will be cross-checked and verified before finalization.

In working with the Will County GIS office, 197 parcels of land have been identified that make up virtually all of the Former JOAAP (excluding a few roadways and remnant areas). URS presented three draft figures that indicate our land parcel ownership knowledge to date. Again it was emphasized that these are draft, and include some parcels that are known to have been transferred, but for which the current ownership data has not been matched.

URS presented the ICS used for the Industrial Parks (former JADA), Will County Landfill and the Forest Service. The restrictions as listed in the second 5-Year Review (Sep-2009) include:

- For JADA and Will County – Soil or Land Use restrictions (1); Groundwater restrictions (4) and Remedy Component restrictions (3)
- For Forest Service – Soil or Land Use restrictions (4); Groundwater restrictions (1) and Remedy Component restrictions (2)

The ICs are contained in either deed restrictions (for JADA and Will County properties) or Environmental Protection Provisions (EPPs, for Forest Service). URS noted that the shorthand title of the ICs provided in the 5-Year Review will be cross-checked and cross-referenced to the full legal language in the deed restrictions and EPPs. The shorthand titles and cross-references will be used in the Annual Compliance Questionnaire.

Mr. Holz noted that the ICs should include the following three additional elements:

- Annual certification of compliance
- Notification by the land owners of any sale or transfers of property (both before and after the transfer).
- Designation of Deed Restricted Parcels (as described in Section XII of some of the transfer documents). Deed Restricted Parcels are more restrictive than Groundwater Management Zones in that they allow no new well construction.

URS has drafted and will revise a letter and questionnaire to all land owners on the former JOAAP indicating the ICs which they are subject to (under either the deed restrictions or the EPPs) and asking for their certification that they are complying with these ICs. The Army will send out these to all owners requesting their compliance within 30 days. URS will compile a list of the respondents and briefly summarize their responses.

URS will then conduct site inspections to verify the compliance. These are intended to be non-intrusive inspections. All 100% of the owners who did not respond to the certification request and at least 15% of the owners that did respond will be inspected. The Army may select the properties to be inspected on the basis of concerns that they have on an owner's land parcels.

A discussion was held of regulatory agency coordination. URS will work primarily with the Army. The Army will keep USEPA and IEPA informed of project status, project issues and any changes in approach. USEPA and IEPA will receive a summary of the responses to the Annual Compliance Questionnaires, and the Annual Summary Report, including figures showing the ICs and affected areas (PDF format). All final documents will go in the Administration Record. USEPA and IEPA indicated that they are

comfortable with this level of participation in this project (keeping informed of Army's execution of the actions and results).

Mr. Barounis asked that USEPA also be provided:

- A pre-release copy of the Annual Questionnaire and Certification of Compliance for a simplified legal review.
- List of the property owners

The overall project schedule (slide 17) was briefly reviewed relative to the planned tasks.

Discussions:

1. Mr. Holz noted the U.S. Army BRAC (Base Realignment and Closure) mission national is scheduled to be completed in September 2011. He did not know whether that schedule would be met and he has not received information on how the JOAAP operations will be overseen thereafter.

2. Mr. Holz described the documentation to transfer land. A transfer package is prepared and submitted by him to USACE/Louisville District Real Estate Office. The Federal-Federal transfers are formalized with notification in the Federal Register. The Federal-non-Federal are recorded with the Will County Register.

3. USEPA and IEPA indicated that they do not want to see the PMP/CQCP/AAPP as it is an internal Army document.

4. Mr. Riley noted that the right of entry (ROE) to conduct site inspection for compliance is in place within the deed restrictions and EPPs. The Louisville Corps legal office will review the notification letter to be sent to owners as well as the Annual Certification Questionnaire to ensure that they are correct and sufficient.

5. Mr. Holz noted that approximately 330 acres of parcels have been transferred in the Manufacturing Area Industrial Park, but are not indicated in the figures. He also noted that only a few parcels remain to be transferred to the Forest Service and JADA, and that these will be done in the near future.

6. Mr. Holz and Mr. Riley indicated that this project is among the first to look at detailed annual verification of the implementation of institutional controls specified in CERCLA Records of Decision. The process is being developed and will likely be used at other BRAC and Army installations.

The meeting concluded at 1200.

Action Items

A. URS will prepare kickoff meeting minutes.

B. Based on the discussions held, URS will revise the draft letters and questionnaires to submit for Army review. Following Army review the letter and questionnaire will be provided to USEPA and IEPA for review and comment.

C. Based on the discussions, URS will finalize the Project Management Plan/Contractor Quality Control Plan and Abbreviated Accident Prevention Plan.

D. URS will proceed with the project as described. They will update and finalize the property owner list, and incorporate the institutional controls (deed restrictions and EPPs) into the GIS.

Site Wide Deed Restriction Implementation Plan
Joliet Army Ammunition Plant,
Wilmington, Will County, Illinois

Presenters:
Scott McClelland – URS – scott_mcclelland@urscorp.com
Mark Pape – URS – mark_pape@urscorp.com

Site Wide Deed Restriction Implementation Plan (SWDRIP)
Joliet Army Ammunition Plant (JOAAP)

1. Introductions
2. Meeting Purpose
3. Roles and Responsibilities
4. Project Background and Objective
5. Project Drivers and Guidance
6. Project Tasks
7. Preliminary Ownership and Deed Restriction Information
8. Regulatory Agency Coordination
9. Potential Risks and Mitigation Measures
10. Project Schedule

Introductions

USAEC – Program Management

- Andrew Maly, Contract Officer's Representative
- Arthur Holz, Site Manager/Commander's Representative

USACE, Louisville District – Project Management

- Christopher Inlow, Project Manager
- Brooks Evens, Senior Project Scientist
- Matthew Riley, Project Engineer

Regulatory Oversight

- Tom Barronis, USEPA Region 5
- Mike Haggitt, Illinois EPA

URS Team – Executing Contractor

- Scott McClelland, URS – Project Manager
- Mark Pape, URS – Senior Technical Manager

Meeting Purpose

- Introduce the JOAAP SWDRIP and discuss the:
  - Project background, objectives, and guidance.
  - Planned approach to execute the project.
  - Coordination with regulatory stakeholders.
  - Path forward and project schedule.

Project Background and Objective

- JOAAP was a munitions production facility that operated from 1940s-1980s
  - JOAAP covered approximately 23,537 acres (36.8 sq. miles) in Will County, IL
- Past releases and disposal practices contaminated soil and groundwater
  - COCs: Explosives Metals Pesticides/PCBs Organics Phosphates TPHC
  - Manufacturing (MFG) Area – west of Rt. 53, covers ~14 square miles
  - Load-Assemble-Package (LAP) Area – east of Rt. 53, covers ~22 square miles
  - Listed on NPL: MFG – Jul-87 (ID # IL7213820460), LAP – Mar-89 (# IL0210090049)
- Public Law 104-106 (1996) specified the JOAAP transfer to various entities
  - USDA/Forest Service — Midewin Tallgrass Prairie
  - U.S. Veterans — Abraham Lincoln National Cemetery
  - State of Illinois — Joliet Arsenal Development Authority (JADA) Industrial/Commercial
  - Will County — Will County Landfill
- Records of Decision
  - Tri-party signatures – Army, USEPA, Illinois EPA
  - Interim Soil and Groundwater RODs, Oct-1998
  - Final Soil ROD, Aug-2004

Project Drivers and Guidance

- *Illinois Land Conservation Act of 1995, PL 104-106, Div. B, Title 29012932, Feb 10, 1996,* stated that the Army will transfer JOAAP land to various federal, local and state jurisdictions.
  - USDA/Forest Service — Midewin Tallgrass Prairie — *(19,100 acres total; 17,726 to date)*
  - US Veterans Administration — Lincoln National Cemetery — *(all 982 acres transferred)*
  - State of Illinois — Joliet Arsenal Development Authority — *(3,000 acres total; 2,650 to date)*
  - Will County — Will County Landfill — *(all 455 acres transferred)*
- *ROD, Soil and Groundwater OUs – MFG and LAP Areas (1998)*
  - Identified 7 Soil Remedial Units (SRUs) and 3 Groundwater Remedial Units (GRUs) to be remediated
  - Identified institutional controls (ICs) as one of the remedial action components
    - Environmental Protection Provisions (for Federal-Federal transfers)
    - Deed Restrictions (for transfers to non-Federal owners)
- *Second 5-Year Review (Sep-2009)*
  - Identified potential issues associated with deed restrictions

Project Tasks

Task 1 - Project Plan Implementation

- Project Management Plan / Contractor Quality Control Plan / Abbreviated Accident Prevention Plan (PMP/CQCP/AAPP)
- Kick-off Meeting

Task 2 - Implement Plan

2.1 Compile list of property owners

2.2 Prepare & Distribute Letter/ Questionnaire

2.3 Compile Statements of Compliance

2.4 Notification of Compliance Outcome

2.5 Implement Annual Visual Inspection

- Conduct Inspections
- Annual Inspection Plan

Task 3 - Develop GIS

Task 4 - Project Management

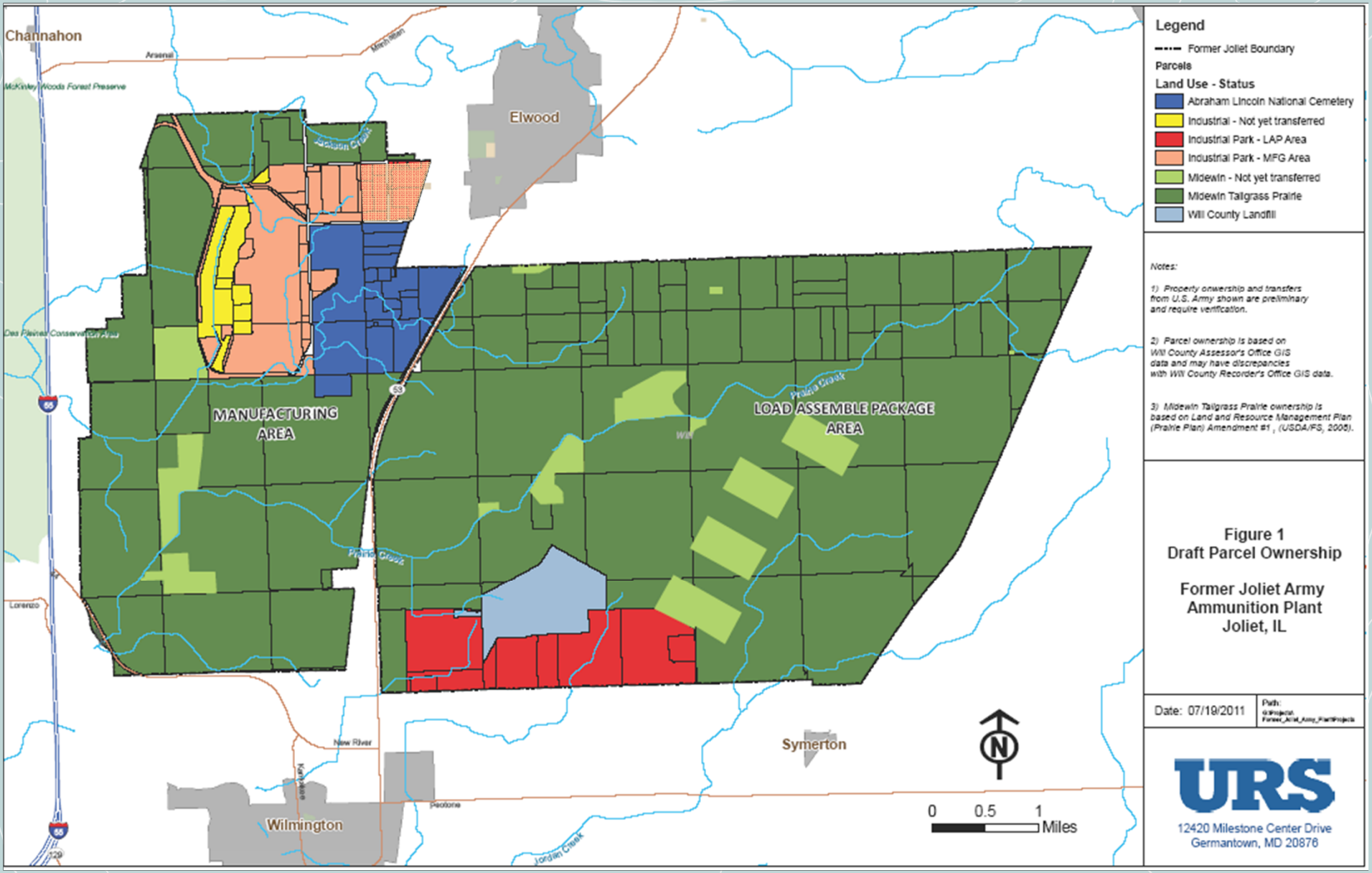
Property Owners

Draft Ownership Table

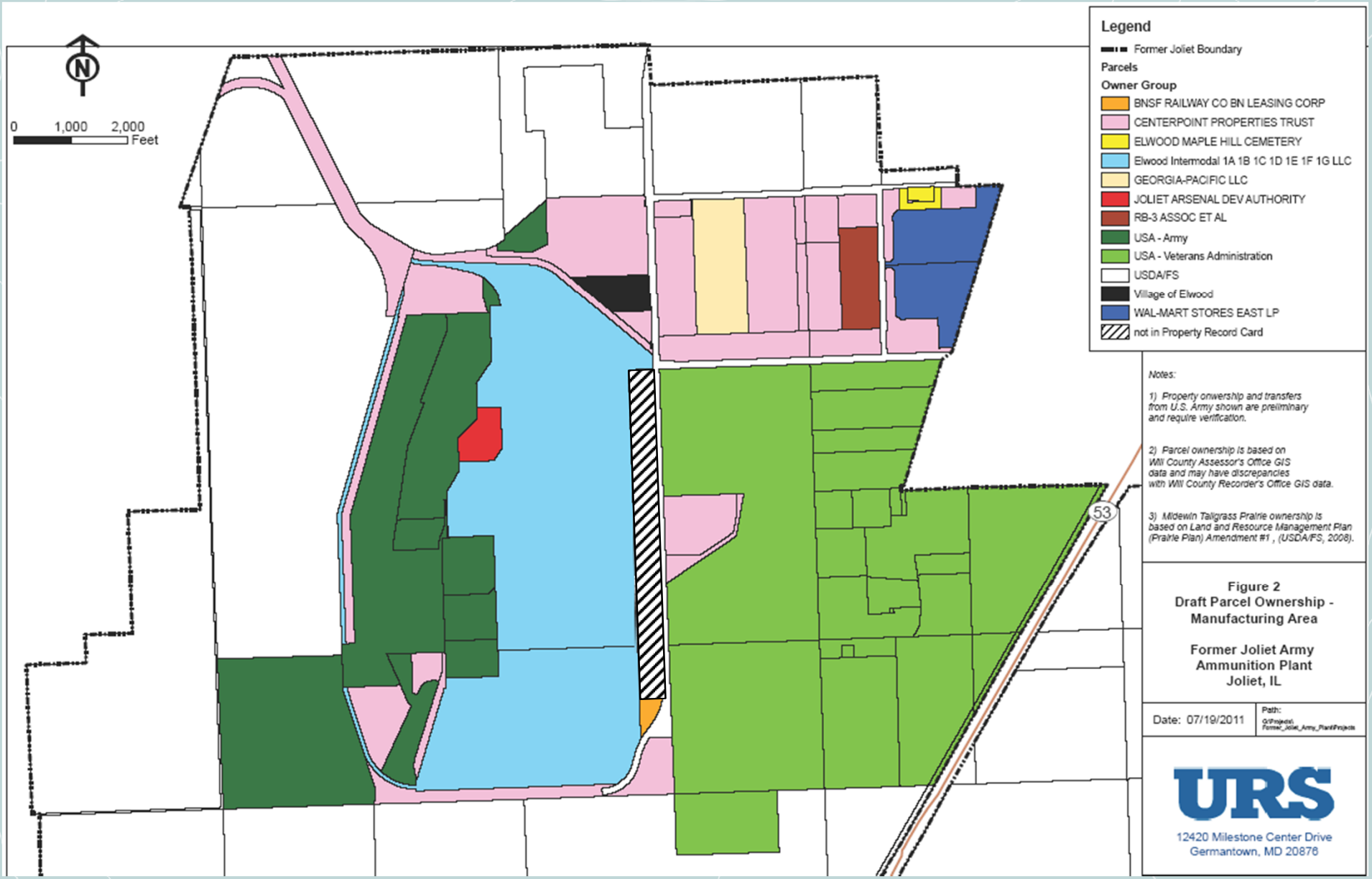
- Based on Will County Assessor listings
- Not necessarily matching with Will County Recorder listings
- Federal –Federal transfers not recorded *(only show USA as owner, if have listing at all)*
- Some owners not matched with current parcels *(e.g., BNSF includes at least 10 parcels owned but for which the IDs don't match)*
- Will County Assessor records also include some tenants *(e.g. there are 3 tenants still listed in Midewin)*
- Total acres <> Total JOAAP acres

Land Use - Status	Owner Group	Parcel count	Acres
	USA - Veterans Administration Total	27	983
Abraham Lincoln National Cemetery Total		**27**	**983**
	USA - Army Total	9	319
Industrial - Not yet transferred Total		**9**	**319**
	INTERNATIONAL UNION OPERATING ENGINEERS Total	2	295
	JOLIET ARSENAL DEV AUTHORITY Total	3	577
	PRAIRIE CRAFTSMAN LLC Total	1	22
	PROLOGIS Total	2	184
Industrial Park - LAP Area Total		**8**	**1,079**
	BNSF RAILWAY CO BN LEASING CORP Total	1	5
	CENTERPOINT PROPERTIES TRUST Total	26	480
	Elwood Intermodal 1A 1B 1C 1D 1E 1F 1G LLC Total	3	587
	ELWOOD MAPLE HILL CEMETERY Total	2	6
	GEORGIA-PACIFIC LLC Total	1	49
	JOLIET ARSENAL DEV AUTHORITY Total	1	13
	not in Property Record Card Total	5	55
	RB-3 ASSOC ET AL Total	1	28
	Village of Elwood Total	5	15
	WAL-MART STORES EAST LP Total	2	172
Industrial Park - MFG Area Total		**47**	**1,411**
	USA - Army Total	1	144
Midewin - Not yet transferred Total		**1**	**144**
	USDA/FS Total	103	19,301
Midewin Tallgrass Prairie Total		**103**	**19,301**
	COUNTY OF WILL Total	2	465
Will County Landfill Total		**2**	**465**
Grand Total		**197**	**23,702**

JOAAP Land Parcels and Ownership



JOAAP Land Parcels and Ownership – MFG Area



JOAAP Land Parcels and Ownership – LAP Area

Deed Restrictions – JADA and Will County

(source: Second 5-Year Review, USACE/USEPA, 2009)

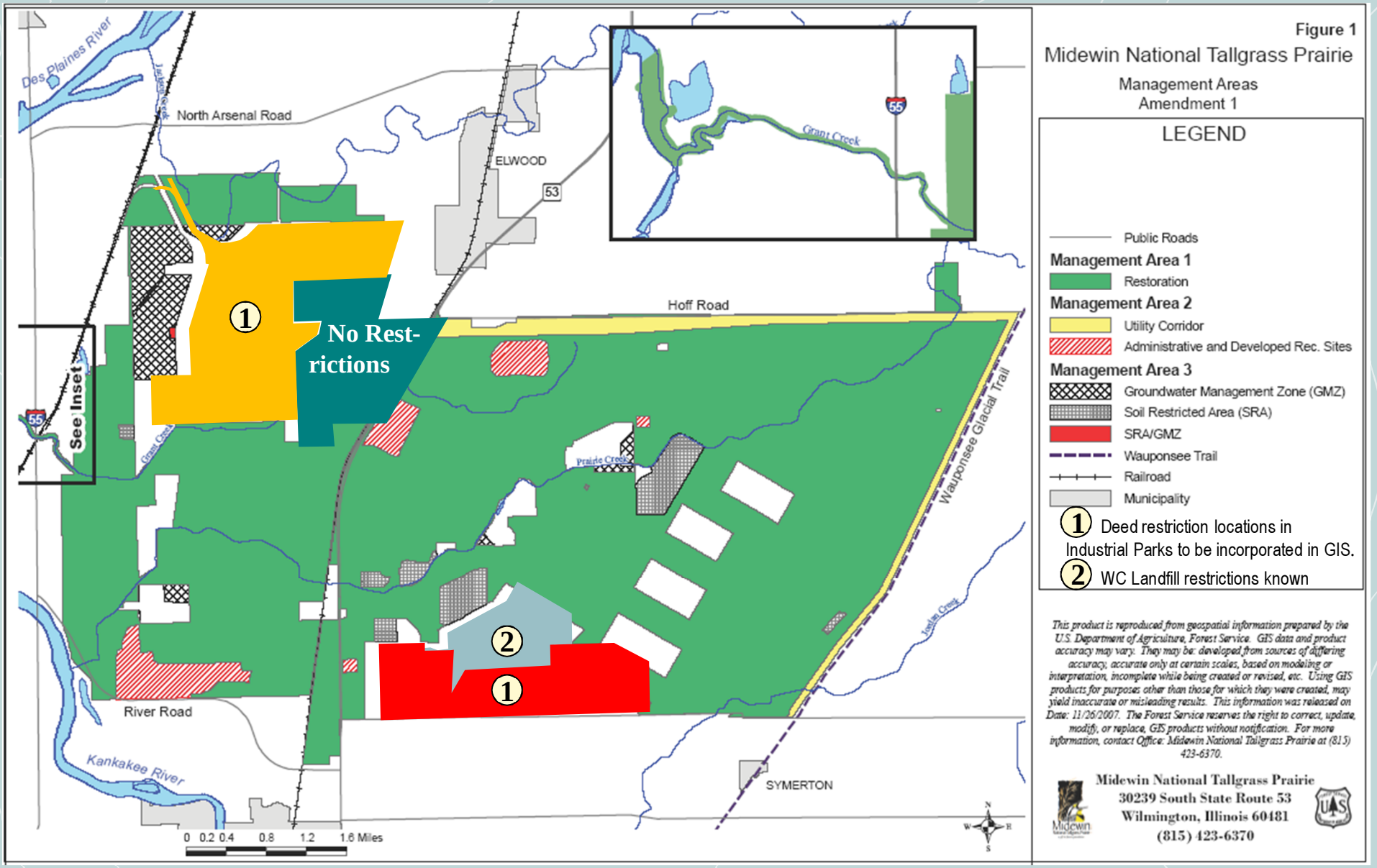
- Soil
  - Prohibit residential, educational, child or adult care use
- Groundwater
  - Prohibit potable use of contaminated water
  - Prohibit activities that could influence flow or damage confining layers
  - Require proper management or disposal of contaminated water
  - Prohibit ground water supply wells and any use of contaminated groundwater in the Groundwater Restriction Areas
- Remedy Component
  - Prohibit Interference with Remedy Components - do not damage monitor wells.
  - Permit unrestricted Army access for remediation, monitoring, operation and maintenance
  - No landfills, quarries, concrete or asphalt batching, or incineration.

Deed Restrictions – USDA/Forest Service

(source: Second 5-Year Review, USACE/USEPA, 2009)

- Soil
  - Restrict exposure to soils which have not been remediated to levels that allow for unlimited access or unrestricted use
  - Prevent development for residential, schools, childcare, playgrounds, or industrial uses
  - No camping
  - Restrict soil movement
- Groundwater
  - Prohibit installation of groundwater production wells, or any other activities that could cause migration of contaminated groundwater, within the boundaries of groundwater management zones (GMZ) defined by the U.S. Army.
- Remedy Component
  - Maintain the integrity of groundwater or monitoring wells
  - Fulfill the annual tracking and reporting requirements to the U.S. Army, USEPA, and Illinois EPA

JOAAP Deed Restrictions - Draft



Source: Prairie Plan Amendment # 1 (2008), modified to also show non-Midewin areas

Regulatory Agency Coordination

- URS will coordinate project activities to ensure that stakeholders are kept informed of:
  - the project status,
  - existing or potential problems, and
  - changes required to prudently manage the project and meet the needs of the Installation's project stakeholders and decision-makers.

To achieve this, USEPA and IEPA will:

- Participate in the Kickoff Meeting
- Receive:
  - Summary Table of Annual Compliance Requests and Responses
  - Annual Summary Report
  - GIS Representation of Deed Restrictions/Affected Areas (in PDF format)
  - Administration Record

Potential Risks and Mitigation Measures

- Identification of owners
  - Inconsistent Will County GIS database
  - USACE documentation of transfers – particularly Federal-Federal transfers

  Will cross-check and verify ownership until have consistent data
- Tracking of Deed Restrictions to parcels that have been split

  Copy of deed restriction documents from Will County Recorder and identify their extents

  Work with Will County GIS to identify current and, if necessary, historical, parcels
- Are soil-based Deed Restrictions still applied when SRU closed?

  Onus is on property owner to apply for removal of Deed Restriction.
- Seek high level of response/participation in Annual Questionnaire and Statement of Compliance to Deed Restrictions

  Simplify and tailor-fit questionnaire to individual owners

  Follow up and encourage completion

JOAAP SWDRIP Schedule

	Start	Finish
Notice to Proceed		**5/27/2011**
Task 1 - Project Plan Implementation	**27-May-11**	**1-Aug-11**
Draft PMP/CQCP/AAPP	*27-May-11*	*27-Jun-11*
Kick-off Meeting	*25-Jul-11*	*26-Jul-11*
Final PMP/CQCP/AAPP	*27-Jul-11*	*2-Aug-11*
Task 2 - Implement Plan	**27-May-11**	**16-Mar-12**
2.1 Compile list of property owners	**27-May-11**	**26-Jul-11**
2.2 Prepare & Distribute Letter/ Questionnaire	**26-Jul-11**	**4-Oct-11**
Prepare Draft Letter/Questionnaires	*26-Jul-11*	*24-Aug-11*
Submit Draft Letter/Questionnaires to Army	*24-Aug-11*	*24-Aug-11*
Prepare Final Letters/Questionnaires	*14-Sep-11*	*27-Sep-11*
Mail Letters/Questionnaires	*4-Oct-11*	*4-Oct-11*
2.3 Compile Statements of Compliance	**4-Oct-11**	**8-Nov-11**
2.4 Notification of Compliance Outcome	**8-Nov-11**	**6-Dec-11**
Draft Notification to Army	*8-Nov-11*	*22-Nov-11*
2.5 Implement Annual Visual Inspection	**6-Dec-11**	**16-Mar-12**
Request ROEs	*6-Dec-11*	*3-Feb-12*
Conduct Inspections	*6-Feb-12*	*10-Feb-12*
Draft Annual Inspection Plan	*10-Feb-12*	*24-Feb-12*
Submit Final Annual Inspection Plan	*9-Mar-12*	*16-Mar-12*
Task 3 - Develop GIS	**27-May-11**	**25-May-12**
Prepare GIS and Database	*27-May-11*	*26-Jul-11*
Maintain GIS and Database	*26-Jul-11*	*25-May-12*
Task 4 - Project Management	**27-May-11**	**25-May-12**

Questions/Discussion

McClelland, Scott

Subject: FW: JOAAP - Sitewide Deed Restriction Implementation Plan - Compliance Lettersd (UNCLASSIFIED)
Attachments: Sitewide Dee Restr Comp ltrs EPA cmts 2-1-13.docx

-----Original Message-----
From: Barounis.Thomas@epamail.epa.gov [mailto:Barounis.Thomas@epamail.epa.gov]
Sent: Friday, February 01, 2013 12:02 PM
To: arthur.m.holz@us.army.mil; Riley, Matthew J LRL
Cc: michael.haggitt@illinois.gov; Berman.Michael@epamail.epa.gov
Subject: JOAAP - Sitewide Deed Restriction Implementation Plan - Compliance Lettersd

Art and Matt,

We've reviewed the letters and we think they look good. We have two comments. Please see attached (hard copy sent).

Tom Barounis, RPM
U.S. EPA, Region 5, Superfund
(312) 353-5577
barounis.thomas@epa.gov

(See attached file: Sitewide Dee Restr Comp ltrs EPA cmts 2-1-13.docx)

Classification: UNCLASSIFIED
Caveats: NONE

February 1, 2013 SR-6J

Mr. Arthur Holz
Commander's Representative
Joliet Army Ammunition Plant
29401 South Route 53
Wilmington, IL 60481-9979

Subject: **JOAAP Sitewide Deed Restriction Implementation Plan – Compliance Letters, Joliet Army Ammunition Plant, Wilmington, Illinois**

Dear Mr. Holz:

The U.S. Environmental Protection Agency (EPA) received electronic files containing the subject documents directly from Matt Riley on January 25, 2013. We have reviewed these documents. Based upon our review we have the following two comments:

1. Cover letter, first par., last sentence, it is suggested that the words at the end of the sentence, "are being complied with", be deleted.

2. Industrial Park Owner letter - Statement of Compliance says "Will County" instead of owner of industrial park.

We find these documents to be thorough and well-prepared.

If you have any questions, or require additional information, please feel free to contact me by phone at (312) 353-5577 or by e-mail (barounis.thomas@epa.gov).

Sincerely,

Tom Barounis
Remedial Project Manager

cc: Michael Haggitt, IEPA
Matt Riley, USACE
Michael Berman, ORC

McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, July 25, 2013 4:17 PM
To: McClelland, Scott
Subject: FW: JOAAP - Sitewide Deed Restriction Implementation Plan - Compliance Lettersd (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Haggitt, Michael [mailto:Michael.Haggitt@Illinois.gov]
Sent: Tuesday, February 05, 2013 8:30 AM
To: Barounis.Thomas@epamail.epa.gov; arthur.m.holz@us.army.mil; Riley, Matthew J LRL
Cc: Berman.Michael@epamail.epa.gov
Subject: RE: JOAAP - Sitewide Deed Restriction Implementation Plan - Compliance Lettersd

Illinois EPA also concurs with the letters and has no comments. Thanks, Mike

From: Barounis.Thomas@epamail.epa.gov [mailto:Barounis.Thomas@epamail.epa.gov]
Sent: Friday, February 01, 2013 11:02 AM
To: arthur.m.holz@us.army.mil; matthew.j.riley@usace.army.mil
Cc: Haggitt, Michael; Berman.Michael@epamail.epa.gov
Subject: JOAAP - Sitewide Deed Restriction Implementation Plan - Compliance Lettersd

Art and Matt,

We've reviewed the letters and we think they look good. We have two comments. Please see attached (hard copy sent).

Tom Barounis, RPM
U.S. EPA, Region 5, Superfund
(312) 353-5577
barounis.thomas@epa.gov

(See attached file: Sitewide Dee Restr Comp ltrs EPA cmts 2-1-13.docx)

Classification: UNCLASSIFIED
Caveats: NONE

McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, July 25, 2013 4:18 PM
To: McClelland, Scott
Subject: FW: [POSSIBLE SPAM] FW: Site Visit Justification Letter (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Barounis, Thomas [mailto:barounis.thomas@epa.gov]
Sent: Friday, May 10, 2013 1:14 PM
To: Holz, Arthur M Mr CIV USA OSA; 'Mike Haggitt'
Cc: laura.l.peters15.civ@mail.mil; Riley, Matthew J LRL
Subject: RE: [POSSIBLE SPAM] FW: Site Visit Justification Letter (UNCLASSIFIED)

Thanks, Art.

I've read through the letter and URS' approach seems fine to me.

I've forwarded to Mike Berman, our attorney for the site and asked him to get back to me with any comments he may have in the next week or so.

Tom Barounis, RPM
U.S. EPA Region 5, Superfund
(312) 353-5577
barounis.thomas@epa.gov

-----Original Message-----
From: Holz, Arthur M Mr CIV USA OSA [mailto:arthur.m.holz@us.army.mil]
Sent: Wednesday, May 01, 2013 9:45 AM
To: Barounis, Thomas; 'Mike Haggitt'
Cc: laura.l.peters15.civ@mail.mil; 'Riley, Matthew J LRL'
Subject: [POSSIBLE SPAM] FW: Site Visit Justification Letter (UNCLASSIFIED)

Gentlemen

Regarding our project to track compliance of deed restrictions, we have completed the solicitation and questionnaire segment.

In accordance with previously agreed procedure, we have selected certain properties for "on-site review".

Attached is a letter explaining the selections and the rationale for the choices. A map is also enclosed.

We are targeting early June to conduct the site visits.

Please advise if you have any comments on this path forward.

Arthur M. Holz
Site Manager/Cmdr's Rep
Joliet Army Ammunition Plant
29401 S. Route 53
Wilmington, IL 60481-8879
815/423-2870 (Fax - 2871)

Classification: UNCLASSIFIED
Caveats: NONE

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McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, July 25, 2013 4:18 PM
To: McClelland, Scott
Subject: FW: [POSSIBLE SPAM] FW: Site Visit Justification Letter (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Barounis, Thomas [mailto:barounis.thomas@epa.gov]
Sent: Thursday, May 23, 2013 1:31 PM
To: Holz, Arthur M Mr CIV USA OSA; 'Mike Haggitt'
Cc: laura.l.peters15.civ@mail.mil; Riley, Matthew J LRL
Subject: RE: [POSSIBLE SPAM] FW: Site Visit Justification Letter (UNCLASSIFIED)

At,

I don't believe that I sent you a follow-up on our review of the Site Justification Letter, so here it is.

My attorney, Mike Berman, reviewed the letter and had no comments; thought it was well done.

I had already sent you a message saying that I had no comments either, so you should proceed, subject to IEPA's review.

Thanks.

Tom Barounis, RPM
U.S.EPA Region 5
77 W. Jackson Boulevard
Chicago, IL 60604

-----Original Message-----
From: Holz, Arthur M Mr CIV USA OSA [mailto:arthur.m.holz@us.army.mil]
Sent: Wednesday, May 01, 2013 9:45 AM
To: Barounis, Thomas; 'Mike Haggitt'
Cc: laura.l.peters15.civ@mail.mil; 'Riley, Matthew J LRL'
Subject: [POSSIBLE SPAM] FW: Site Visit Justification Letter (UNCLASSIFIED)

Gentlemen

Regarding our project to track compliance of deed restrictions, we have completed the solicitation and questionnaire segment.

In accordance with previously agreed procedure, we have selected certain properties for "on-site review".

Attached is a letter explaining the selections and the rationale for the choices. A map is also enclosed.

We are targeting early June to conduct the site visits.

Please advise if you have any comments on this path forward.

Arthur M. Holz
Site Manager/Cmdr's Rep
Joliet Army Ammunition Plant
29401 S. Route 53
Wilmington, IL 60481-8879
815/423-2870 (Fax - 2871)

Classification: UNCLASSIFIED
Caveats: NONE

McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, July 25, 2013 4:17 PM
To: McClelland, Scott
Subject: FW: Site Visit Justification Letter (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Haggitt, Michael [mailto:Michael.Haggitt@Illinois.gov]
Sent: Thursday, May 23, 2013 2:56 PM
To: Riley, Matthew J LRL; 'arthur.m.holz@us.army.mil'
Cc: 'laura.l.peters15.civ@mail.mil'; Barounis, Thomas
Subject: RE: Site Visit Justification Letter (UNCLASSIFIED)

Looks good to me. Thanks, Mike

-----Original Message-----
From: Riley, Matthew J LRL [mailto:Matthew.J.Riley@usace.army.mil]
Sent: Thursday, May 23, 2013 12:58 PM
To: Haggitt, Michael
Subject: FW: Site Visit Justification Letter (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: Holz, Arthur M Mr CIV USA OSA [mailto:arthur.m.holz@us.army.mil]
Sent: Wednesday, May 01, 2013 10:28 AM
To: 'Barounis, Thomas'; 'Mike Haggitt'
Cc: laura.l.peters15.civ@mail.mil; Riley, Matthew J LRL
Subject: FW: Site Visit Justification Letter (UNCLASSIFIED)

Gentlemen

Regarding our project to track compliance of deed restrictions, we have completed the solicitation and questionnaire segment.

In accordance with previously agreed procedure, we have selected certain properties for "on-site review".

Attached is a letter explaining the selections and the rationale for the choices. A map is also enclosed.

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Arthur M. Holz
Site Manager/Cmdr's Rep
Joliet Army Ammunition Plant
29401 S. Route 53
Wilmington, IL 60481-8879
815/423-2870 (Fax - 2871)

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, October 17, 2013 2:03 PM
To: McClelland, Scott; Salvatore, Amibeth
Subject: FW: JOAAP - Site Wide Deed Restriction Annual Report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

FYI

I will forward Tom's response as soon as it is received

-----Original Message-----
From: Haggitt, Michael [mailto:Michael.Haggitt@Illinois.gov]
Sent: Thursday, October 17, 2013 2:01 PM
To: Riley, Matthew J LRL; THOMAS BAROUNIS
Cc: Art Holz (arthur.m.holz@us.army.mil)
Subject: [EXTERNAL] RE: JOAAP - Site Wide Deed Restriction Annual Report (UNCLASSIFIED)

I have no comments, it looks good. Mike

-----Original Message-----
From: Riley, Matthew J LRL [mailto:Matthew.J.Riley@usace.army.mil]
Sent: Thursday, October 17, 2013 12:50 PM
To: THOMAS BAROUNIS; Haggitt, Michael
Cc: Art Holz (arthur.m.holz@us.army.mil)
Subject: JOAAP - Site Wide Deed Restriction Annual Report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Tom and Mike - you guys should have received a hard copy of the report, prepared by URS, that documented the deed restriction work that the Army has performed.

I know the shutdown mess has caused headaches, but please let me know the status of your review.

I checked my emails and I didn't see where you all have provided comments or notices that the reports were good to go

Thank you

MR

Matthew J. Riley, P.E.
U.S. Army Corps of Engineers
Louisville District, CELRL-ED-E-E

Environmental Branch, Rm 351
600 Dr. Martin Luther King Jr. Pl.
Louisville, KY 40202
P: (502) 315-6342
BB: (502) 438-7114
F: (502) 315-6309

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, October 17, 2013 5:23 PM
To: McClelland, Scott; Salvatore, Amibeth
Cc: Art Holz (arthur.m.holz@us.army.mil)
Subject: FW: JOAAP - Site Wide Deed Restriction Annual Report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Scott and Amibeth - here is US EPA comment

-----Original Message-----
From: Barounis, Thomas [mailto:barounis.thomas@epa.gov]
Sent: Thursday, October 17, 2013 3:13 PM
To: Riley, Matthew J LRL; Haggitt, Michael
Cc: Art Holz (arthur.m.holz@us.army.mil)
Subject: [EXTERNAL] RE: JOAAP - Site Wide Deed Restriction Annual Report (UNCLASSIFIED)

Matt,

I read through the report, thought that it was done well, and had no comments. I passed it along to my attorney in September, primarily to let him see Army's progress, but I did ask him to let me know if he had any comments. I will check with him tomorrow and I expect to forward any comments that he may have by the end of the month.

Does that meet your schedule?

Tom Barounis, RPM
U.S.EPA Region 5
77 W. Jackson Boulevard
Chicago, IL 60604

-----Original Message-----
From: Riley, Matthew J LRL [mailto:Matthew.J.Riley@usace.army.mil]
Sent: Thursday, October 17, 2013 12:50 PM
To: Barounis, Thomas; Haggitt, Michael
Cc: Art Holz (arthur.m.holz@us.army.mil)
Subject: JOAAP - Site Wide Deed Restriction Annual Report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Tom and Mike - you guys should have received a hard copy of the report, prepared by URS, that documented the deed restriction work that the Army has performed.

I know the shutdown mess has caused headaches, but please let me know the status of your review.

I checked my emails and I didn't see where you all have provided comments or notices that the reports were good to go

Thank you

MR

Matthew J. Riley, P.E.
U.S. Army Corps of Engineers
Louisville District, CELRL-ED-E-E
Environmental Branch, Rm 351
600 Dr. Martin Luther King Jr. Pl.
Louisville, KY 40202
P: (502) 315-6342
BB: (502) 438-7114
F: (502) 315-6309

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

McClelland, Scott

From: Riley, Matthew J LRL <Matthew.J.Riley@usace.army.mil>
Sent: Thursday, October 17, 2013 5:24 PM
To: McClelland, Scott; Salvatore, Amibeth
Cc: Art Holz (arthur.m.holz@us.army.mil)
Subject: FW: Site Wide Deed Restriction Implementation (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Scott and Amibeth - AEC legal's comment on report

-----Original Message-----
From: Williams, Meeckral L CIV (US)
[mailto:meeckral.l.williams.civ@mail.mil]
Sent: Tuesday, October 15, 2013 3:07 PM
To: Riley, Matthew J LRL
Subject: Site Wide Deed Restriction Implementation (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hey Matt,

I just got approval from legal on the SW Drip project.

Thanks,

Meeckral Williams

U.S. Army Environmental Command- Cleanup & Munitions Response Division

Environmental Restoration Manager

2450 Connell Road Bldg. 2264

San Antonio, TX 78234-7664

(210)466-1696 Office

meeckral.l.williams.civ@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

ATTACHMENT 13

RESPONSES TO USEPA REVIEW COMMENTS

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF: SR-6J

January 29, 2015

Mr. Arthur Holz
Site Manager/Commander's Representative
Joliet Army Ammunition Plant
29401 South Route 53
Wilmington, IL 60481-8879

Subject: **U.S. EPA Comments on the Draft Third Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, IL, October 2014**

Dear Mr. Holz:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject **Draft Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP)** (FYR), which we received from USACE – Buffalo District by FedEx in early November 2014. Enclosed, please find our comments. EPA's comments represent review of the FYR by EPA technical support, Five Year Review Coordinator Office of Regional Counsel and Institutional Controls Coordinator.

If you have any questions, or require additional information, please feel free to contact me by phone at (312) 353-5577 or by e-mail (barounis.thomas@epa.gov).

Sincerely,

Tom Barounis

Tom Barounis
Remedial Project Manager

Enclosure

cc: Andrew Maly, US Army Environmental Command
James Stachowski, USACE
Robin Paul, USACE
Nefertiti DiCosmo, RRB2/Section 7
Michael Berman, ORC
Bonnie Eleder, FYR Coordinator
Monica McEaddy, FFRRO

Recycled/Recyclable • Printed with Vegetable Oil Based Inks on 100% Recycled Paper (100% Post-Consumer)

U.S. EPA Comments on the Draft Third Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, IL, October 2014

January 29, 2015

Comments by TechLaw, Inc.

GENERAL COMMENTS

1. The Site-Wide Deed Restriction Implementation Report presented in Attachment 12 states in Section 3.0, Summary and Recommendations, that "data from questionnaires revealed confusion among some property owners regarding the notification requirements when a property is transferred, and it appears that property owners are not submitting annual reports to the Army verifying their compliance with ICs [institutional controls]." This section recommends that the Army make annual requests for Statement of Compliance questionnaires from each property owner. However, these issues and recommendations are not identified or discussed in the main body of the FYR Report (e.g., in the Five-Year Review Summary Form). To ensure that these issues and recommendation are not overlooked going forward, and that the subsequent five-year review addresses them, revise the main body of the FYR Report and the Five-Year Review Summary Form to list these issues and recommendations.

2. Section 1.3, Institutional Control Overview, of Attachment 12, Site-Wide Deed Restriction Implementation Report, states that for properties conveyed from the Army to the State of Illinois via the Joliet Arsenal Development Authority for subsequent transfer to private entities, "a Memorandum of Agreement (MOA) included with the deeds, or included by reference, details requirements for compliance, enforcement, and annual reporting associated with the ICs." However, the FYR Report does not explicitly state what these requirements are, nor is it clear if the requirements are being met by the private entities. To demonstrate that the ICs are functioning as intended, revise the FYR Report to list the requirements for compliance, enforcement, and annual reporting associated with the ICs applicable to the properties conveyed from the Army to the State of Illinois via the Joliet Arsenal Development Authority. In addition, provide documentation of the annual reporting (if available).

3. Based on review of the FYR Report, several sites have already been transferred to the U.S. Department of Agriculture (USDA)/Forest Service (e.g., Site L5, Site M1, Site M12, etc.). The FYR Report states that the USDA/Forest Service will submit an annual certification letter certifying that land and groundwater uses remain the same and that the integrity of the land and groundwater use restrictions has not been compromised. It is unclear if the USDA/Forest Service has submitted these annual certification letters since the time of property transfer, as this is not discussed. Revise the FYR Report to discuss if the annual reporting is being conducted as specified,

particularly given that formal deeds were not recorded for these property transfers. In addition, reference the location where the annual certification letters may be found.

4. The recommendations for Groundwater Remediation Units 1 and 2 (Section 6.3.10 and Section 6.4.10) include a proposal to use a soil leaching model to determine "what the allowable residual soil source concentrations would be so that the groundwater RGs [remedial goals] can be met." The recommendations also state that post-remedial action residual soil concentrations will be compared to these levels to ensure that no new soil source term is contributing to the groundwater contamination. However, it is noted that all historical investigation/remediation data (not just confirmation sampling data) should be used in this evaluation to ensure that all potential residual source concentrations are considered at each site. Revise these recommendations to indicate that all of the historical investigation/remediation data for the sites in Groundwater Remediation Units 1 and 2 will be used in the soil leaching model.

5. Section 5.5.5.2, Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?, states that Site L4 will become part of the Midewin National Tallgrass Prairie; however, the site was remediated to the 1998 Record of Decision (ROD) RGs, which may not be protective of ecological receptors. This section goes on to state that residual concentrations of contaminants presented in the Remedial Action Completion Report for Site L4 were compared to the 2004 ROD remedial goals, and that none of the residual contaminant concentrations exceeded ecological remedial goals. Similar assessments and statements are made for Site M1 (Section 5.17.5.2) and Site M11 (Section 5.26.5.2). However, no data are provided to support these determinations. In order to support the assessments, revise Sections 5.5.5.2, 5.17.5.2 and 5.26.5.2 to include a reference to the data tables which present the sample results cited in the sections and the ecological remedial goals from the 2004 ROD.

6. Section 5.7.3, Site Inspection, states that 2012 and 2013 aerial photography was evaluated to assess site conditions and land use at Site L6; however, no discussion of an onsite inspection is provided. Similar statements are made for Site L14 (Section 5.13.3), Site L17 (Section 5.15.3), and Site M5 (Section 5.21.3), but no site inspection checklists for these sites could be located in Attachment 4, Site Inspection Checklists. It is unclear why the site inspection consisted of assessment of aerial photography only (and why this was considered to be an appropriate form of assessment). Revise Sections 5.7.3, 5.13.3, 5.15.3, and 5.21.3, respectively, to clarify (1) if the Army is responsible for inspecting Sites L6, L14, L17, and M5; (2) if these sites were or were not inspected in person; and, (3) how the assessment of aerial photography is sufficient to evaluate whether current land use is compatible with the institutional controls for these sites. Alternatively, clarify the entity responsible for inspecting these sites (e.g., Will County), explain any required site inspection procedures, and provide proof of the inspections as applicable.

7. The soil RGs from the 1998 ROD listed in Table 5-1, Soil Remediation Goals, do not match those listed in Attachment A, Table A.8-1, Review of Changes in Risk Based Concentrations and Associated Toxicity Criteria from 1998 to 2013 for Protection of Human Health at Industrial Use Sites. For example, the RGs for RDX and arsenic are listed as 78 and 21 mg/kg, respectively in Table 5-1, but are listed as 53 and 3.8 mg/kg in Table A.8-1. Revise the FYR Report to address any discrepancies between the two tables or explain why the values listed are not the same.

8. The FYR Report cites EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007, June 2001); however, several supplemental guidance documents have been published by EPA since June 2001 [e.g., Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews (OSWER 9200.2-111, September 13, 2012), Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance" (OSWER Directive 9355.7-18, September 13, 2011), etc.]. Ensure that all applicable supplemental guidance documents are cited in the FYR Report, and clarify that these guidance documents have been used and applied to all applicable sections/evaluations in the FYR Report.

9. The FYR Report does not indicate if risk-based screening levels and toxicity criteria have been established for any detected compounds that were not evaluated in the original human health risk assessments (HHRAs) due to the absence of toxicity information. The FYR Report should document those compounds and indicate whether inclusion of the additional detected compounds potentially impacts the protectiveness of the remedy. Also, clarify if such compounds should be added to the list of current COCs on the basis of new toxicity information. If new compounds are included, demonstrate that the remedy remains protective, even when the additional compounds are considered.

10. Attachment 8, Risk Assessment and Toxicology Evaluation, does not discuss the source of the exposure factors used in the original human health risk assessment (HHRA); however, it is noted that since publication of the 1998 ROD, EPA has published several resources with more current exposure factors, including the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, dated December 2002; the Child-Specific Exposure Factors Handbook, dated 2008; the Exposure Factors Handbook: 2011 Edition, dated September 2011; and, OSWER Directive 9200.1-120 (Update of Standard Default Exposure Parameters), dated February 6, 2014. The FYR Report should clarify if any of the exposure factors used in the original HHRA has changed since that time, and if so, if the changes necessitate re-calculations of risk and hazard. In evaluating exposure assumptions, EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007, June 2001) also states that the FYR should evaluate "whether there are changed or new land uses, including zoning changes, changed or new routes of exposure or receptors, changed physical site conditions that may affect the protectiveness of the remedy, new contaminants, or a new understanding of geological conditions." Revise the FYR Report to discuss changes in exposure factors and exposure assumptions, including

exposure pathways and receptors, and clarify if any of these changes affect the protectiveness of the remedy.

11. The Protectiveness Determinations for Sites L4, M1, and M11 in Attachment 8, Risk Assessment and Toxicology Evaluation, reference tables in post-ROD reports that compare soil excavation and backfill confirmation sample results with the 2004 ROD preliminary remediation goals (PRGs) to conclude that excavation and backfilling at these sites are protective of both human health and the environment. However, the tables were not included in the FYR Report and therefore, the comparisons and protectiveness determinations could not be verified. Amend the FYR Report by providing the tables referenced in the protectiveness evaluations as attachments.

12. The Protectiveness Determination for Site L4 in Attachment 8, Risk Assessment and Toxicology Evaluation, states, "most of the organic COCs were not detected" when comparing residual soil concentrations to PRGs; however no assessments were provided for the COCs that were detected. Therefore, it is unclear whether residual concentrations of the detected organic COCs in soil are higher or lower than PRGs. Amend the FYR Report to clarify how the concentrations of detected organic COCs compare to PRGs.

13. The Protectiveness Determinations for Sites M1 and M11 in Attachment 8, Risk Assessment and Toxicology Evaluation, state that polycyclic aromatic hydrocarbons (PAHs) at Site M1 and PAHs and other organic COCs at Site M11 were "detected at low levels" when comparing residual soil concentrations to PRGs. However, the term "low levels" is not quantified; it is unclear whether residual concentrations of these organic COCs in soil are higher or lower than PRGs. Amend the FYR Report to clarify how residual concentrations of these organic COCs in soil compare to PRGs.

SPECIFIC COMMENTS

1. **Five-Year Review Summary Form, Page xxiii:** This form states that the five-year review period was April 2013 through December 2014; however, the "triggering action date" is listed as May 6, 2009. As such, the five-year review period should be listed as beginning in May 2009 (i.e., from the date of the last five-year review). Revise the form accordingly.

2. **Table 1-1, Summary of SRU Sites:** The issues and recommendations for Site L6 under the "Third Five-Year Review (October 2014)" column include evaluation of excavation sampling data to determine if the site may be suitable for unrestricted use. This is inconsistent with Section 5.7, Site L6 – Group 70, which states that impacted soils remain which do not allow for unrestricted use. In addition, no recommendation to evaluate excavation data is presented in Section 5.7. Revise Table 1-1 such that the issues and recommendations for Site L6 are consistent with the information and issues/recommendations presented in Section 5.7.

3. **Section 3.6.1, Soil Operable Unit, Page 3-8:** This section discusses the cleanup objectives for the Soil Operable Unit, and states that final RGs for soil were established for recreational land use scenarios. However, RGs for soil were also established for the industrial land use scenario. This is not discussed in Section 3.6.1. Revise Section 3.6.1 to clarify that RGs for soil were also established based on industrial land use.

4. **Section 5.1.3.8, Institutional Controls, Page 5-7:** This section states that the objectives of the institutional controls identified in the 1998 ROD include preventing "the development and use of [the] property for industrial or residential uses." Given that the current/future land use of the majority of the Soil Operable Unit sites is that of industrial, it is unclear why one of the objectives of the institutional controls is prevention of development of property for industrial use (or if this statement was made in error). Clarify if this objective was incorrectly stated, or revise Section 5.1.3.8 to clarify what is meant by this statement, given the current/future uses of the majority of the Soil Operable Unit sites.

5. **Section 4.6, Interviews, Page 4-2:** This section indicates that interview questionnaires were issued to six parties and that completed interview records are provided in Attachment 6. However, it appears from review of Attachment 6 that only one interview took place. It is unclear why the other interviews were not conducted. Revise Section 4.6 to explain why only one of the planned interviews were conducted. In addition, the information provided in Attachment 6 for the one interview that was conducted does not include the name of the interviewer and interviewee, nor does it list the date of the interview. This information should be included in the interview information presented in Attachment 6.

6. **Section 5.4.6, Issues, Page 5-36:** This section indicates that eroded and displaced riprap on the west side of the Site L3 landfill has been observed since 2010. However, observations of riprap and areas requiring repair are not identified in the five-year review inspection checklist for Site L3 provided in Attachment 4. Revise the FYR Report to describe the events which have identified the eroded and displaced riprap on the west side of the Site L3 landfill, and explain why the areas in question were not identified in the five-year inspection.

7. **Section 5.29.7, Recommendations for Follow-up Actions, Page 5-199:** This section recommends that five-year reviews be discontinued at Site M16. However, based on review of the information presented for Site M16 in Section 5.29, Site M16 – Motor Pool Area, this recommendation may be inappropriate. Given that a land use control is in place to prevent residential and other types of development of the property, five-year reviews are warranted for Site M16 per EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007, June 2001). Alternatively, propose the preparation of a comprehensive assessment which demonstrates that no contaminants are present at Site M16 which exceed applicable residential screening criteria (and the removal of the land use control).

8. **Section 6.4.8.1, Question A: Is the remedy functioning as intended by the decision documents?, Page 6-80:** Elevated concentrations of 2,4-DNT have been detected consistently at downgradient well MW362 at Site M13 since 2009. According to the Draft Final Work Plan Addendum – Site M13 Monitoring Well Installation, dated November 14, 2013 (Work Plan), a new well will be (or has been) installed downgradient of well MW362. However, the installation of this additional well is not discussed in the FYR Report. In addition, the Work Plan indicates that the installation of this well "will be an initial step in determining if the exceedances at MW362 are originating from the landfill." Revise Section 6.4.8.1 to discuss the installation of the additional downgradient well and discuss whether the exceedances detected at well MW362 have any impact on the functionality of the remedy.

9. **Table 7-1, Recommendations to Address Current Issues at JOAAP SOU Sites, Page 7-1:** As discussed in Section 5.4.8, Protectiveness Statement, Site L3 is considered to be currently protective; however, eroded and displaced riprap on the west side of the landfill at Site L3 requires repair to ensure future protectiveness. This issue is not reflected in the protectiveness determination in Table 7-1, which indicates that the remedy at Site L3 will be protective in the future. Revise Table 7-1 to indicate that the remedy at Site L3 is only currently protective at this time and effects on future protectiveness are possible. This will make Table 7-1 consistent with the Five-Rear Review Summary Form presented on pages xxiii through xxvii.

10. **Attachment 4, Site Inspection Checklists:** Site inspection checklists could not be located in Attachment 4 for numerous sites (e.g., Site L4, Site L6, Site L7, Site L8, L14, etc.). Revise Attachment 4 to include site inspection checklists for all sites or revise the FYR Report to explain each instance in which a site inspection checklist is not included.

11. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-1:** This section states that the vast majority of the RGs chosen for the Midewin National Tallgrass Prairie land use scenario were based on protection of ecological receptors because "the ecological RGs were more stringent." However, it is unclear if all ecological RGs were more stringent than human health RGs (i.e., those that would be protective of a prairie worker or visitor) or if instances exist where an ecological RG was chosen that was not as stringent as a human health RG. Revise this section to discuss any instances in which a chosen ecological RG was less stringent than a human health RG and any potential excess risk to a prairie worker or visitor.

12. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-5:** The first paragraph on this page states that ten COCs currently have significantly lower EPA Regional Screening Levels (RSLs) for industrial land use compared to the 1998 ROD RGs; however, the discussion does not specify which COCs are considered to have "significantly lower" EPA RSLs. For clarity, revise this discussion to specify the COCs at issue, the degree

of the changes to the toxicity criteria, and the associated increase in risk or hazard by individual pathway and in a cumulative assessment.

13. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-5:** The second paragraph on this page lists six COCs for which remediation to the 1998 ROD RGs results in unacceptable risk or hazard. It is noted that the 1998 ROD RG for 1,2,4-trichlorobenzene (a COC at Site L6 and Site M16) results in a risk of 1E-04; however, 1,2,4-trichlorobenzene is not included in the list of COCs for which remediation to the 1998 ROD RGs results in unacceptable risk or hazard. Given that the excess risk associated with 1,2,4-trichlorobenzene is at the high end of the relative risk range, provide a comparison of the residual concentrations of 1,2,4-trichlorobenzene at Sites L6 and M16 to current EPA RSLs to demonstrate that the remedy is still protective at these sites.

14. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Pages A8-5 through A8-7:** A summary of the Army's assessment of whether remediation to the 1998 ROD RGs was adequately protective is provided on Pages A8-5 through A8-7; however, no data are provided to support these assessments. For example, the protectiveness discussion for Site L6 states that no PAHs were detected above the laboratory reporting limits in the majority of samples; however, the residual PAH concentrations are unclear. For transparency, and to support the discussions, provide data summary tables which present the results of the screenings of residual COC concentrations at each site against current RSLs.

15. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-6:** The protectiveness discussion for Site L6 states that PAHs were not detected above 1 mg/kg in the majority of confirmation samples at Site L6; however, it is noted that the industrial RSL for certain PAHs is less than 1 mg/kg (e.g., benzo(a)pyrene, dibenz(a,h)anthracene). As such, it is unclear whether concentrations of PAHs that remain at Site L6 potentially exceed applicable RSLs. Revise the discussion for Site L6 to assess what impact this has, if any, on the protectiveness determination for Site L6.

16. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.2, Environmental Health (Ecological Assessment), PageA8-10:** The last sentence of the first paragraph indicates that remediating to the PRG of 2 mg/kg for benzo(a)pyrene should remove all PAHs to acceptable levels because all PAHs are expected to be co-located with benzo(a)pyrene. However, this approach may not account for other toxic PAH(s), i.e. calculation of a benzo(a)pyrene toxic equivalence quotient (BaP TEQ) to measure PAH toxicity. The FYR Report should be amended to specify calculation of a BaP TEQ for remediation of PAHs.

17. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.2, Environmental Health (Ecological Assessment), M11 Protectiveness**

Determination, PageA8-11: The first sentence states that Site M11 is a soil remediation unit site that will become part of the Midewin National Tallgrass Prairie, which contradicts the fifth sentence of the last paragraph on page A8-10, which states that M11 is one of four sites within the Midewin National Tallgrass Prairie boundaries. Amend the FYR Report to address this discrepancy.

Comments by EPA Region 5 FYR Coordinator

GENERAL COMMENT

1. There are some discrepancies between the Executive Summary narrative, FYR Summary Form, Table of Contents, and Tables 1-1 & 1-2 regarding which Sites are in each OU and which Sites remedies are being evaluated in this FYR. Please ensure consistency and clarify as needed.

SPECIFIC COMMENTS

1. **Page xix, Executive Summary, Purpose**:

   a) The first bullet lists 28 SOU sites, but further down the number of SOU sites is referred to as 28. The second bullet lists 11 GOU sites, but further down, and in Table 1-2, Site M10 is included. Please clarify the difference and ensure consistency.
   b) As the two bullets of this section are the first instance of the terms "Soil Operable Unit" and "Groundwater Operable Unit," indicate the abbreviations "SOU" and "GOU" after each.
   c) **2nd ¶, 5th line**: Change "second five year reviews" to "the second five year review."

2. **Page xix, Executive Summary, Joliet Army Ammunition Plant, last ¶, last sentence**: Please state that this FYR is evaluating the protectiveness of the remedies for all SOU and GOU Sites as described in the SOU and GOU sections below (and as identified in Tables 1-1 and 1-2).

   On page 6-116 it states that GRU3, site M10 is not being evaluated in this FYR. Please clarify this here and provide the basis for not including GRU2 M10 in the FYR.

3. **Page xxi, Executive Summary, Report Format**: See Specific Comment 1 regarding the number of SOU sites and the number of GOU sites.

4. **Page xxiii, Five-Year Review Summary Form, Site Status**: Although a variety of follow-up investigative and cleanup activities continue at the Site, EPA's definition of construction completion relates to the ROD-specified remedial actions that have taken

place. The satisfactory completion of ROD-required remedial actions for the JOAAP is documented in the September 10, 2008 Preliminary Closeout Report (PCOR). Therefore, the answer to the question "Has the site achieved construction completion?" should be "Yes."

5. **Page xxiii, Five-Year Review Summary Form, Review Status, Due date**: The triggering action date for the third five year review is five years after the Region 5 Superfund Division Director's signature on the previous FYR. Therefore, please replace "May 6, 2014" with "September 28, 2014."

6. **Page xxiv, AOC(s) without Issues/Recommendations Identified in the Five-Year Review**: Based upon the prior description of GOU sites, add those sites ("GRU1 [L1, L2, L3, L14], GRU2 [M1, M5, M7, M8, M13], GRU3 [M3]") those sites to this section for consistency (and consistent with Tables 1-1 and 1-2).

7. **Pages xxv and xxvi, Protectiveness Statement(s)**: For internal tracking purposes, EPA will track this FYR as an addendum to the "deferred protectiveness determination" made by EPA on September 16, 2014. However, because the deferral was made as a result of the unavailability of the FYR by the due date, and the current submittal is, in fact, the third FYR, no further addendum is anticipated. Therefore, please delete the text "*Addendum due date (if applicable)* Not Applicable" form the four AOC summary boxes.

8. **Page xxvi, Protectiveness Statements (SRU Sites), 1st ¶, 1st sentence**: Delete Site M6 (it also appears in the second ¶), and, per earlier comments, include M8, M11, M13 and M16 to this category of "protective of human health and the environment."

9. **Page xxvi, Protectiveness Statements (SRU Sites), 2nd ¶, 1st sentence**: Reword the beginning sentence as follows: "*The remedies at Sites L3, L5, and M6 are currently protective of human health and the environment in the short term because*:"

10. **Page xxvi, Protectiveness Statements (GRU Sites), 1st ¶, 1st sentence**: "GRU3 Site M3…" should read as "…GRU3 site $M3_2$."

11. **Pages xxvi and xxvii, Protectiveness Statements (GRU Sites), 2nd ¶, 1st sentence**: Rewrite this sentence as follows: "*The remedy at GRU2 site M6 is currently protective of human health and the environment in the short term based on information and observations noted above. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness*:"

12. **Page 2-10, Table 2-1, Chronology of Site Events**: Site M16 should be included in the chronology, as it is in the Executive Summary.

13. **Page 2-10, Table 2-1, Groundwater Operable Unit**: Include GRU1 Sites L1, L2, L3, L14, GRU2 Sites M1, M5, M6 and GRU3 Site M3, as they are also included in the Executive Summary.

14. **Page 3-2, Section 3.4.1, Soil Operable Unit**: See previous comments regarding the number of SOU sites (26 vs. 28). Clarify and ensure consistency as needed.

15. **Page 3-3, Table 3-1, Soil Operable Unit COCs**: Based upon previous comments, thee table should include Sites L6 and M16.

16. **Page 5-7, Section 5.1.3.8, Institutional Controls**: Please include a summary discussion regarding current compliance with the ICs, and of long term stewardship procedures that are in place (and/or needed) to ensure the long term protectiveness of the remedy (procedures for maintaining, monitoring, enforcement, reporting). See: http://www.epa.gov/superfund/policy/ic/guide/641333.pdf and http://www.epa.gov/superfund/policy/ic/guide/Final%20PIME%20Guidance%20December%202012.pdf (Section 8).

17. **Page 6-30, Section 6.3.9, Issues**: Please clarify whether or not any of these issues affect the long term protectiveness of the remedy? If any do affect long term protectiveness, please revise the protectiveness statement and make the appropriate revisions in the Executive Summary, FYR Summary Form, Section 7.

18. **Page 6-82, Section 6.4.9, Issues**: Please clarify which issues affect the long-term protectiveness of the remedy and which do not. See similar comment for GRU1 issues.

19. **Page 6-116, Section 6.5.1.2, Site M10, last ¶, last sentence**: Please include this conclusion (e.g., "*Therefore, Site M10 is not evaluated in this five-year review*").

20. **Pages 7-1 and 7-2, Table 7-1, Recommendations to Address Current Issues at JOAAP SOU Sites, Issues 2, 3 and 5, Affects Future Protectiveness?**: The answer to this question for the three issues related to Sites L3 (Issue 2), L5 (Issue 3) and M6 (Issue 5) is appropriately shown as "Yes" in the FYR Summary Form. Please change Table 7-1 accordingly, from "No", "No" and "Possible" to "Yes", "Yes" and "Yes".

21. **Page 7-4, Table 7-2, Recommendations to Address Current Issues at JOAAP GOU Sites, Issue 6, Affects Future Protectiveness?**: The answer to the question for Issue 6 (GRU2 Site M6) is appropriately shown as "Yes" in the FYR Summary Form. Please change Table 7-2 accordingly from "No" to "Yes."

22. **Page 7-5, Section 7.2.2, Groundwater Operable Unit, 1st ¶, 1st sentence**: For consistency with the Executive Summary Tables 1-1 and 1-2, revise as follows:

"The Ongoing RAs for GRU1 (sites L1, L2, L3, L14), GRU2 (sites M1, M5, M7, M8, and M13) and GRU3 (site M3) are protective of human health and the environment."

23. **Page 7-5, Section 7.2.2, Groundwater Operable Unit, 2nd ¶, 1st sentence**: So as to accurately reflect ;the status of the RA for GRU2, please revise as follows:

"The Ongoing RA for GRU2 Site M6 currently protects human health and the environment in the short term because: "

Comments by EPA Region 5 Office of Regional Counsel

1. **Executive Summary, P. xxi, Paragraph 1**: Only one questionnaire is discussed, but there are many that were received. Please state that other questionnaires were received.

2. **Executive Summary, P. xxi. Paragraph 2**: Publishing only in the Wilmington paper is too limited. In the future there should be more outreach.

3. **Page 5-13, Table 5-4**: In IC Objectives, it says no landfill; however, a large part of the Will County property is a landfill. We believe that the ICs for the Will County landfill, do not say no landfill. Please make sure the statement in the table accurately reflects the situation.

4. **Page 5-16, Section 5.2.2.1, Implementation, 5th. Paragraph, 4th line**: Change L17 to L1.

5. **Page 5-18, Section 5.2.3, Site Inspection, 2nd Paragraph, 3rd line and Page 5-15, Section 5.2.7, Recommendations for Follow-up Actions**: Identify repair of the large hole in the fence as a follow-up action.

6. **Page 5-35, Section 5.4.3, Site Inspection, 2nd Paragraph, 3rd line, and Page 5-37, Recommendations for Follow-up Actions**: Identify the placement of a lock on the gate as a follow-up action.

7. **Page 5-43, Section 5.5.5.2, Question B, 2nd Paragraph, line 10**: Were the organic COCs that were detected below the ecological RGs from the 2004 ROD?

8. **Page 5-51, Section 5.6.5.2, Question B**: This paragraph discusses the portion of the JOAAP lands to become part of the MNTP, but does not discuss the portion of the lands the Army will retain. This is also confusing, since, according to 5.6.1, part of the property is already owned by the MNTP. Please address both parts of the Site, clarify who currently owns which part and answer question B for both parts of site L5.

9. **Page 5-80, Section 5.11.2.1, Implementation, SRU1 Soil, line 3**: Change L9 to L10.

10. **Page 5-170, Section 5.25.2.3, Land Use/Institutional Controls**: The second bullet says the site can't be used for industrial purposes. However, this paragraph also says the future use of this site is industrial. Please clarify/resolve these contradictory statements.

11. **Page 5-177, Section 5.26.2.2, Operation, Maintenance and Monitoring**: The second bullet notes that the gate was chained shut instead of locked. Identify the placement of a lock on gate as an action item, to help prevent unauthorized access.

12. **Page 5-179, Section 5.26.5.2, Question B, Paragraph 1, last line**: It is stated that the RGs may not be protective of the environment. The next paragraph states that, although the COC concentrations in the post-excavation samples were compared to the 1998 ROD RGs for protection of human health, most of the organic COCs were not detected or detected at low levels. The explanation needs to address all the COCs.

13. **Page. 5- 184, Section 5.27.2.3, Land Use/Institutional Controls**: GMZ Restrictions - Why are these listed for site M12, when the restriction refers to M6A, M10W, and MIS?

14. **Page 5-189, Section 5.28.1, Background Information**: It says the site is owned by the Army, but Figure 5-25 shows commercial use of the site. This is inconsistent. Please correct.

15. **Page 5-191, Section 5.28.2.3, Land Use/Institutional Controls**: It says the site should not be used for industrial purposes, but Figure 5-25 shows commercial use of the site. Also it appears that there are no restrictions for schools, day care facilities, etc.

16. **Page 5-192, Section 5.28.4, Progress Since Last Five Year Review**: A lock needs to be installed on the gate. This was a request from the last 5 year review and apparently has still not been done. This is an issue and needs a recommendation, see 5.28.6 and 5.23.7

17. **Page 5-199, Section 5.29.5.2, Question B, line 8**: Text states that only a few sites had COCs for which the 1998 RGs would now represent an unacceptable risk and that this includes potential COCs at Site M16. It goes on to stat that the 1998 ROD should not have identified soil COCs for this site and that there is no new evidence to indicate the presence of soil COCs at the site. Why should the 1998 ROD not have identified COCs for the site?

18. **Page 6-16, Section 6.3.4, Site Inspections, Paragraph 3**: Identify the repair of the hole in the fence as an action item, since the site is publicly accessible via the MNTP.

19. **Attachment 6, Interviews**: Identify who gave the interview that is in this Attachment. Also where are the other interview records concerning interviews that were to be done?

20. **Attachment 12, Questionnaires**: Please number the pages in this attachment. The order of items is confusing. It appears some questionnaires were not answered, but then the responses are actually found later in the attachment. Are there responses from 21561 W. Mississippi, LLC and SF Pacific Railroad?

21. **Attachment 12, Questionnaires**: The International Union of Operating Engineers transferred a part of their property to the Wilmington Fire Protection District without conveying the deed restrictions. What is the Army's plan for correcting this discrepancy?

22. **Attachment 12, Questionnaires**: JADA says that map label D33 is not JADA property and that part of AO5 was transferred to FJGCO, LLC. Please verify that these statements are correct. If they are correct, please correct the map label. Also make sure the deed restrictions have been transferred to FJGCO, LLC.

23. **Attachment 12, Questionnaires**: Question 1 is confusing. Change question one. You can say, "... please indicate whether there is compliance with the restrictions on these parcels".

24. **Attachment 12, Questionnaires, IUOE Local 150**: Is their use of the property protective of human health? As indicated, there may be a use in contravention of the residential deed restriction (security officer sleeps and eats on the Site). Also, is their use as a training facility an acceptable use of the property? Also see, Attachment 7, Appendix C, Site Inspection Notes, June 12, 2013, Paragraph 8.

25. **Attachment 12, Questionnaires**: Prairie Craftsman, LLC, answered no instead of yes to question 1, but did not explain. This needs to be addressed with Prairie Craftsman, LLC.

26. **Attachment 12, Questionnaires**: USDA response to questionnaire, camping issue was raised. This needs to be addressed. If the USDA is correct, then the questionnaire to the USDA needs to be modified.

27. **Attachment 12, Questionnaires**: USDA/Forest Service, MNTP, USDA answered the questionnaire incorrectly by saying no to both parts of question 2 with no explanation. This needs to be addressed with the USDA/Forest Service/ MNTP.

28. **Attachment 12, Questionnaires**: USDA/Forest Service, MNTP. Please explain why they said no to question 7.

29. **Attachment 12, Questionnaires**: Department of Veterans Affairs, Questionnaire, p. 2, Statement of Compliance says that Will County owns the property. This is not correct.

30. **Attachment 12, Questionnaires**: Walmart Stores East LP, Questionnaire, Page 4, Statement of Compliance, says that Will County owns the property. This is not correct.

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON IL 60481-8879

REPLY TO
ATTENTION OF
Site Manager

20 MAR 2015

Mr. Tom Barounis
Remedial Project Manager
US Environmental Protection Agency
ATTN: SRF 6J
77 West Jackson Boulevard
Chicago, IL 60604-3590

SUBJECT: Response to Comments, Draft Third Five-year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, Illinois.

1. Forwarded for your review and comment, is the subject report.

2. The point of contact is the undersigned at 815/423-2870.

Sincerely,

Arthur M. Holz
Site Manager

CF:
ILEPA (Mr. Haggitt)
CELRL (Mr. Riley)
USAEC (Ms. Paul)
USAEC (Ms. Sigler)
USACE-CX (Ms. Errett)
USACE (Mr. Stachowski)
MWH (Mr. Ramsby)

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON IL 60481-8879

REPLY TO
ATTENTION OF
Site Manager

20 MAR 2015

Mr. Michael Haggitt
Illinois Environmental Protection Agency
1021 North Grand Avenue East
PO Box 19276
Springfield, IL 62794-9276

SUBJECT: Response to Comments, Draft Third Five-year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, Illinois.

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US Army Responses to USEPA Comments, dated January 29, 2015, on the Draft Third Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, IL, October 2014

Comments by TechLaw, Inc.

GENERAL COMMENTS

1. The Site-Wide Deed Restriction Implementation Report presented in Attachment 12 states in Section 3.0, Summary and Recommendations, that "data from questionnaires revealed confusion among some property owners regarding the notification requirements when a property is transferred, and it appears that property owners are not submitting annual reports to the Army verifying their compliance with ICs [institutional controls]." This section recommends that the Army make annual requests for Statement of Compliance questionnaires from each property owner. However, these issues and recommendations are not identified or discussed in the main body of the FYR Report (e.g., in the Five-Year Review Summary Form). To ensure that these issues and recommendation are not overlooked going forward, and that the subsequent five-year review addresses them, revise the main body of the FYR Report and the Five-Year Review Summary Form to list these issues and recommendations.

   Response: The issue and recommendation identified in section 3 of the Site-Wide Deed Restriction Implementation Report (Attachment 12) and noted above will be added to the main body of the FYR Report as summarized below:

   - Executive Summary – brief statement will be added to the Issues, Recommendations, and Follow-up Actions section
   - FYR Summary Form
   - Table 1-1
   - Section 5 – for appropriate SOU sites, the issue will added to the Site Inspection sections and the recommendation will be added to the Issues section
   - Table 7-1

2. Section 1.3, Institutional Control Overview, of Attachment 12, Site-Wide Deed Restriction Implementation Report, states that for properties conveyed from the Army to the State of Illinois via the Joliet Arsenal Development Authority for subsequent transfer to private entities, "a Memorandum of Agreement (MOA) included with the deeds, or included by reference, details requirements for compliance, enforcement, and annual reporting associated with the ICs." However, the FYR Report does not explicitly state what these requirements are, nor is it clear if the requirements are being met by the private entities. To demonstrate that the ICs are functioning as intended, revise the FYR Report to list the requirements for compliance, enforcement, and annual reporting associated with the ICs applicable to the properties conveyed from the Army to the State of Illinois via the Joliet Arsenal Development Authority. In addition, provide documentation of the annual reporting (if available).

   Response: The requirements for compliance are identified in Section 5.1.3.8. ICs for Land Transferred to JADA and summarized in Table 5-3.

3. Based on review of the FYR Report, several sites have already been transferred to the U.S.

Department of Agriculture (USDA)/Forest Service (e.g., Site L5, Site M1, Site M12, etc.). The FYR Report states that the USDA/Forest Service will submit an annual certification letter certifying that land and groundwater uses remain the same and that the integrity of the land and groundwater use restrictions has not been compromised. It is unclear if the USDA/Forest Service has submitted these annual certification letters since the time of property transfer, as this is not discussed. Revise the FYR Report to discuss if the annual reporting is being conducted as specified, particularly given that formal deeds were not recorded for these property transfers. In addition, reference the location where the annual certification letters may be found.

Response: Annual reporting by the USDA/FS has not been received since 2009. They have committed to adding an appendix to the Annual Prairie Management Plan to specifically address the issues associated with transferred US Army land that has additional restrictions. This explanation will be incorporated into the five year review report. The recommendations section will also capture this issue.

4. The recommendations for Groundwater Remediation Units l and 2 (Section 6.3.10 and Section 6.4.10) include a proposal to use a soil leaching model to determine "what the allowable residual soil source concentrations would be so that the groundwater RGs [remedial goals] can be met." The recommendations also state that post-remedial action residual soil concentrations will be compared to these levels to ensure that no new soil source term is contributing to the groundwater contamination. However, it is noted that all historical investigation/remediation data (not just confirmation sampling data) should be used in this evaluation to ensure that all potential residual source concentrations are considered at each site. Revise these recommendations to indicate that all of the historical investigation/remediation data for the sites in Groundwater Remediation Units 1 and 2 will be used in the soil leaching model.

   Response: Soil remediation was determined using risk-based soil RGs for a given site based on future land use. Leach modeling will be used to determine site-specific groundwater protection RGs using variables specific to each site. The soil RGs for the specific future land use scenarios will initially be used as default concentrations in the soil leaching model. This will determine if the soil RG concentrations would be capable of creating a groundwater exceedance at that site. If so, a site-specific groundwater protection RG will be calculated for comparison to excavation confirmation samples and RI results for soils remaining to determine potential residual source areas.

   Additionally, where soil RGs are determined to exceed the groundwater protection RGs, an average concentration of the remediated material from the BTF will be compared to the groundwater protection RG to verify concentrations remaining in the treated soil used as backfill do not exceed the groundwater RG.

5. Section 5.5.5.2, Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?, states that Site L4 will become part of the Midewin National Tallgrass Prairie; however, the site was remediated to the 1998 Record of Decision (ROD) RGs, which may not be protective of ecological receptors. This section goes on to state that residual concentrations of contaminants presented in the Remedial Action Completion Report for Site L4 were compared to the 2004 ROD remedial goals, and that none of the residual contaminant concentrations exceeded ecological remedial goals. Similar assessments and statements are made for Site Ml (Section 5.17.5.2) and Site M1l (Section 5.26.5.2). However, no data are provided to support these determinations. In order to support the assessments,

revise Sections 5.5.5.2, 5.17.5.2 and 5.26.5.2 to include a reference to the data tables which present the sample results cited in the sections and the ecological remedial goals from the 2004 ROD.

Response: Sections 5.5.5.2, 5.17.5.2, and 5.26.5.2 refer the reader to Attachment 8 of the Report. Table A.8-10 presents the 2004 ROD Cleanup Levels. Pages A8-11 and A8-12 of this report identify the tables from the respective Remedial Action Completion reports for these 3 sites that contain the post-remedial action residual concentrations evaluated. These are:

- L4: Tables 4-1 and 4-2 from the Site L4 Remedial Action Completion Report (MKM 2007)
- M1: Table 4-1 from the Site M1 Remedial Action Completion Report (MKM 2009c)
- M11: Tables 3-6, 3-7, and 3-8 from the Site M11 Remedial Action Completion Report (MKM 2009a)

A decision was made to not extract and repeat all the data tables from the Remedial Action Reports into the Five Year Review Report. An electronic compilation of all the relevant documents is available via CD if desired.

6. Section 5.7.3, Site Inspection, states that 2012 and 2013 aerial photography was evaluated to assess site conditions and land use at Site L6; however, no discussion of an onsite inspection is provided. Similar statements are made for Site L14 (Section 5.13.3), Site L17 (Section 5.15.3), and Site M5 (Section 5.21.3), but no site inspection checklists for these sites could be located in Attachment 4, Site Inspection Checklists. It is unclear why the site inspection consisted of assessment of aerial photography only (and why this was considered to be an appropriate form of assessment). Revise Sections 5.7.3, 5.13.3, 5.15.3, and 5.21.3, respectively, to clarify (1) if the Army is responsible for inspecting Sites L6, 114, 117, and M5; (2) if these sites were or were not inspected in person; and, (3) how the assessment of aerial photography is sufficient to evaluate whether current land use is compatible with the institutional controls for these sites. Alternatively, clarify the entity responsible for inspecting these sites (e.g., Will County), explain any required site inspection procedures, and provide proof of the inspections as applicable.

   Response: A drive-by inspection was performed for these sites, changed conditions since the second FYR were not observed. This was supplemented by evaluating recent aerial photography.

7. The soil RGs from the 1998 ROD listed in Table 5-1, Soil Remediation Goals, do not match those listed in Attachment A, Table A.8-1, Review of Changes in Risk Based Concentrations and Associated Toxicity Criteria from 1998 to 2013 for Protection of Human Health at Industrial Use Sites. For example, the RGs for RDX and arsenic are listed as 78 and 21 mg/kg, respectively in Table 5-1, but are listed as 53 and 3.8 mg/kg in Table A8-l. Revise the FYR Report to address any discrepancies between the two tables or explain why the values listed are not the same.

   Response: Concur; the values listed in Table 5-1 will be corrected to reflect the industrial use remediation goals from Table 6-2 of the 1998 ROD, which is what is presented in Table A.8-1. The values provided in the draft Table 5-1 are the interim cleanup goals for USDA lands for SRU 1, 2, 3, and 5 and should not have been identified as the final,

industrial use soil cleanup goals from the 1998 ROD.

8. The FYR Report cites EPA's Comprehensive Five-Year Review Guidance (EPA 540- R-01-007, June 2001); however, several supplemental guidance documents have been published by EPA since June 2001 [e.g., Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews (OSWER 9200.2-111, September 13, 2012), Recommended Evaluation of lnstitutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance" (OSWER Directive 9355.7-18, September 13, 2011), etc.]. Ensure that all applicable supplemental guidance documents are cited in the FYR Report, and clarify that these guidance documents have been used and applied to all applicable sections/evaluations in the FYR Report.

   Response: All supplemental EPA FYR guidance documents will be cited in the report.

9. The FYR Report does not indicate if risk-based screening levels and toxicity criteria have been established for any detected compounds that were not evaluated in the original human health risk assessments (HHRAs) due to the absence of toxicity information. The FYR Report should document those compounds and indicate whether inclusion of the additional detected compounds potentially impacts the protectiveness of the remedy. Also, clarify if such compounds should be added to the list of current COCs on the basis of new toxicity information. If new compounds are included, demonstrate that the remedy remains protective, even when the additional compounds are considered.

   Response: Attachment 8 provides a review of changes in risk assessment methods and toxicity criteria which have occurred since the RODs were signed. As that review indicates, at least one key site-related compound, 4,6-di-nitro-2-aminophenol (DNAP) lacked toxicity criteria at the time that the 1998 ROD was developed and signed. Instead, a surrogate compound, 2,4-dinitrophenol (2,4-DNP) was used to evaluate risk and develop cleanup goals. Since the 1998 ROD was signed, new provisional toxicity criteria have been developed for DNAP. The impact on the protectiveness of the remedy from this new toxicity criteria is discussed in Attachment 8 and carried forward to the main body of the report where the answers to Question B for each site are presented. No other new compounds were identified at the time that post-remedial action sampling was performed. No new risk-based screening levels or toxicity criteria have been established for any detected compounds that were not evaluated in the original HHRAs due to lack of toxicity criteria. The risk assessment and ROD had previously identified 79 contaminants of concern in JOAAP soil and sediment, 40 contaminants of concern in groundwater, and 45 contaminants of concern in surface water. Remediation goals were identified for all of these in the 1998 ROD.

10. (a) Attachment 8, Risk Assessment and Toxicology Evaluation, does not discuss the source of the exposure factors used in the original human health risk assessment (HHRA); however, it is noted that since publication of the 1998 ROD, EPA has published several resources with more current exposure factors, including the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, dated December 2002; the Child-Specific Exposure Factors Handbook, dated 2008; the Exposure Factors Handbook: 2011 Edition, dated September 2011; and, OSWER Directive 9200.1-120 (Update of Standard Default Exposure Parameters), dated February 6, 2014. The FYR Report should clarify if any of the exposure factors used in the original HHRA has changed since that time, and if so, if the changes necessitate re-calculations of risk and hazard. (b) In evaluating exposure assumptions, EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007, June 2001) also states that the FYR should evaluate "whether there are changed or

new land uses, including zoning changes, changed or new routes of exposure or receptors, changed physical site conditions that may affect the protectiveness of the remedy, new contaminants, or a new understanding of geological conditions." Revise the FYR Report to discuss changes in exposure factors and exposure assumptions, including protectiveness of the remedy.

Response:

(a) Attachment 8 will be updated to indicate that the 1996 PRG derivation document which preceded the 1998 ROD cited the EPA's 1991 Standard Default Exposure Parameters for Risk Assessment (EPA 1991, *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual Supplemental Guidance, Standard Default Exposure Factors*. OSWER Directive 9285.6-03, March 1991.) These exposure factors would have been used for the development of cleanup goals, as per the USEPA Region 3 October 1995 Risk Based Concentrations (RBCs). These exposure parameter values are provided in Table B-1 of the 1996 PRG derivation document (OHM 1996). Attachment 8 already states that the changes in the exposure factors that were used to develop the RGs versus what is currently recommended by the EPA are reflected in changes in risk based concentrations presented in Table A.8-1 (please see discussion of Table A8-1 on pages A8-1 and A8-2). New cancer risks and/or non-cancer hazards are then calculated and presented in Tables A.8-1 and A.8-2, and the implications for protectiveness of each of the sites are discussed in the "significant findings" portion of Attachment 8, as well as in the answers to Question B in the main body of the report.

(b) These determinations also consider what the actual current exposure is (e.g., generally less than what was assumed in the HHRA and development of the cleanup goals) and how the lower amount of exposure currently occurring at some of the sites impacts protectiveness. For example, this description of the change in exposure assumptions and the resulting implication for protectiveness currently occurs in the protectiveness statement for Site L6, "In addition, currently the site is part of the Will County Landfill. As such, actual exposure to potentially contaminated soil would be much less than what was assumed in developing RGs and USEPA industrial RSLs (exposure to open soil areas for 8 hours a day, 250 days a year, for 25 years). For both of these reasons (low residual concentrations of PAHs and limited human exposure), the previous removal action would still be considered protective of human health at Site L6."

11. The Protectiveness Determinations for Sites L4, M1, and M11 in Attachment 8, Risk Assessment and Toxicology Evaluation, reference tables in post-ROD reports that compare soil excavation and backfill confirmation sample results with the 2004 ROD preliminary remediation goals (PRGs) to conclude that excavation and backfilling at these sites are protective of both human health and the environment. However, the tables were not included in the FYR Report and therefore, the comparisons and protectiveness determinations could not be verified. Amend the FYR Report by providing the tables referenced in the protectiveness evaluations as attachments.

Response: See response to TechLaw General Comment 5.

12. The Protectiveness Determination for Site L4 in Attachment 8, Risk Assessment and Toxicology Evaluation, states, "most of the organic COCs were not detected" when comparing residual soil concentrations to PRGs; however no assessments were provided for the COCs that were detected. Therefore, it is unclear whether residual concentrations of the detected organic COCs in soil are higher or lower than PRGs. Amend the FYR Report to

clarify how the concentrations of detected organic COCs compare to PRGs.

Response: Concur, the following sentence will be edited in the paragraph on L-4 (bold type used to identify edit): *"Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs protective of human health in Table 4-2 of the Remedial Action Completion Report (MKM 2007), most of the organic COCs were not detected,* ***and those that were detected (e.g., 2,4,6-TNT at 7.3 mg/kg, naphthalene at 0.26 mg/kg) were all well below the ecological RGs from the 2004 ROD. In addition,*** *all of the metals were* ***also*** *below ecological RGs from the 2004 ROD."*

13. The Protectiveness Determinations for Sites M1 and M11 in Attachment 8, Risk Assessment and Toxicology Evaluation, state that polycyclic aromatic hydrocarbons (PAHs) at Site Ml and PAHs and other organic COCs at Site M11 were "detected at low levels" when comparing residual soil concentrations to PRGs. However, the term "low levels" is not quantified; it is unclear whether residual concentrations of these organic COCs in soil are higher or lower than PRGs. Amend the FYR Report to clarify how residual concentrations of these organic COCs in soil compare to PRGs.

    Response: Concur, the following sentence in Attachment 8 regarding M-1 will be edited to read (bold type used to identify edit): *"Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs protective of human health in Table 4-1 of the Remedial Action Completion Report (MKM 2009c), most of the organic COCs were not detected or detected at low levels* ***well below the ecological RGs (such as individual PAHs each at well below 0.1 mg/kg)*** *and all of the metals would also be below ecological RGs from the 2004 ROD."*

    The following edits will be made in Attachment 8 regarding M11, in the 2nd paragraph of its protectiveness determination (bold type used to identify edits): *"The Remedy in Place Report for this site was reviewed (MKM 2009a). After excavation of the southern and northeastern debris areas in Site M11, both the bioremediated soil and the off-site soil selected for backfill were evaluated to determine whether or not they were suitable for use as backfill in the excavated areas. Although the COC concentrations in those soils were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels* ***below the ecological RGs*** *(primarily* ***individual*** *PAHs* ***at up to 0.015 mg/kg each*** *but also low levels of DNT and TNT in the bioremediated soils,* ***up to 4.6 mg/kg****) and all of the metals were detected below ecological RGs established in the 2004 ROD (Tables 3-6 and 3-7 of MKM 2009a). Finally, there were several soil samples obtained in the limits of the excavation (sidewalls, bottoms). Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels* ***well below the RGs (average*** *DNTs* ***detected less than 2.2 mg/kg****, TNT* ***up to 2.4 mg/kg , individual*** *PAHs* ***up to 0.48 mg/kg****, PCBs –* ***Aroclors up to 0.33 mg/kg****).* ***All*** *of the metals were detected below ecological RGs from the 2004 ROD (Table 3-8, MKM 2009a). Therefore, the excavation and backfilling of the southern and northeastern debris areas at M11 is protective of both human health and the environment."*

SPECIFIC COMMENTS

1. **Five-Year Review Summary Form, Page xxiii:** This form states that the five-year review period was April 2013 through December 2014; however, the "triggering action date" is listed as May 6, 2009. As such, the five-year review period should be listed as beginning in May 2009 (i.e., from the date of the last five-year review). Revise the form accordingly.

Response: The review period on the FYR summary form (April 2013 – December 2014) is in accordance with OSWER No. 9355.7-03B-P.

2. **Table 1-1, Summary of SRU Sites:** The issues and recommendations for Site L6 under the "Third Five-Year Review (October 2014)" column include evaluation of excavation sampling data to determine if the site may be suitable for unrestricted use. This is inconsistent with Section 5.7, Site L6- Group 70, which states that impacted soils remain which do not allow for unrestricted use. In addition, no recommendation to evaluate excavation data is presented in Section 5.7. Revise Table 1-1 such that the issues and recommendations for Site L6 are consistent with the information and issues/recommendations presented in Section 5.7.

   Response: The issues and recommendations for Site L6 in Table 1-1 will be revised for consistency with Section 5.7.

3. **Section 3.6.1, Soil Operable Unit, Page 3-8:** This section discusses the cleanup objectives for the Soil Operable Unit, and states that final RGs for soil were established for recreational land use scenarios. However, RGs for soil were also established for the industrial land use scenario. This is not discussed in Section 3.6.1. Revise Section 3.6.1 to clarify that RGs for soil were also established based on industrial land use.

   Response: Section 3.6.1 will be revised to indicate that industrial land use remedial goals were also established.

4. **Section 5.1.3.8, Institutional Controls, Page 5-7**: This section states that the objectives of the institutional controls identified in the 1998 ROD include preventing "the development and use of [the] property for industrial or residential uses." Given that the current/future land use of the majority of the Soil Operable Unit sites is that of industrial, it is unclear why one of the objectives of the institutional controls is prevention of development of property for industrial use (or if this statement was made in error). Clarify if this objective was incorrectly stated, or revise Section 5.1.3.8 to clarify what is meant by this statement, given the current/future uses of the majority of the Soil Operable Unit sites.

   Response: The institutional control objectives for land in areas designated for industrial park prevent residential development and use. Areas designated for the USDA/FS cannot be used for industrial or residential purposes. Section 5.1.3.8 will be revised to clarify these requirements.

5. **Section 4.6, Interviews, Page 4-2**: This section indicates that interview questionnaires were issued to six parties and that completed interview records are provided in Attachment 6. However, it appears from review of Attachment 6 that only one interview took place. It is unclear why the other interviews were not conducted. Revise Section 4.6 to explain why only one of the planned interviews were conducted. In addition, the information provided in Attachment 6 for the one interview that was conducted does not include the name of the interviewer and interviewee, nor does it list the date of the interview. This information should be included in the interview information presented in Attachment 6.

   Response: The questionnaires were sent to the individuals intended for interview by mail. There was only one interview questionnaire returned. The final sentence of Section 4.6 will be revised to state: *"Returned…."*.

6. **Section 5.4.6, Issues, Page 5-36**: This section indicates that eroded and displaced riprap on the west side of the Site L3 landfill has been observed since 2010. However, observations of

riprap and areas requiring repair are not identified in the five-year review inspection checklist for Site L3 provided in Attachment 4. Revise the FYR Report to describe the events which have identified the eroded and displaced riprap on the west side of the Site L3 landfill, and explain why the areas in question were not identified in the five-year inspection.

Response: Observations of areas requiring repair will be added to the FYR Site Inspection Checklist.

7. **Section 5.29.7, Recommendations for Follow-up Actions, Page 5-199**: This section recommends that five-year reviews be discontinued at Site M16. However, based on review of the information presented for Site M16 in Section 5.29, Site M16 -Motor Pool Area, this recommendation may be inappropriate. Given that a land use control is in place to prevent residential and other types of development of the property, five-year reviews are warranted for Site M16 per EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007, June 2001). Alternatively, propose the preparation of a comprehensive assessment which demonstrates that no contaminants are present at Site M16 which exceeds applicable residential screening criteria (and the removal of the land use control).

   Response: The Baseline Risk Assessment for M16 indicated that no risk was calculated because no samples were obtained (i.e. no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). There is no evidence to indicate the presence of soil COCs at the site. Due to this, Section 5.29 will be revised as follows:

   - 5.29.1, 4th paragraph; *"The Baseline Risk Assessment for M16 indicated that no risk was calculated because no samples were obtained (i.e. no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). There is no evidence to indicate the presence of soil COCs at the site. "*

8. **Section 6.4.8.1, Question A: Is the remedy functioning as intended by the decision documents?, Page 6-80:** Elevated concentrations of 2,4-DNT have been detected consistently at downgradient well MW362 at Site M13 since 2009. According to the Draft Final Work Plan Addendum - Site M13 Monitoring Well Installation, dated November 14, 2013 (Work Plan), a new well will be (or has been) installed downgradient of well MW362. However, the installation of this additional well is not discussed in the FYR Report. In addition, the Work Plan indicates that the installation of this well "will be an initial step in determining if the exceedances at MW362 are originating from the landfill." Revise Section 6.4.8.1 to discuss the installation of the additional downgradient well and discuss whether the exceedances detected at well MW362 have any impact on the functionality of the remedy.

   Response: Monitoring well MW811 at Site M13 was not installed during the period that the FYR report was prepared. Review of the analytical results for the first sampling conducted following well installation (October 2014) has not been completed. Results will be included in the 2014 Semi-annual Groundwater Monitoring Report.

9. **Table 7-1, Recommendations to Address Current Issues at JOAAP SOU Sites, Page 7-1:** As discussed in Section 5.4.8, Protectiveness Statement, Site L3 is considered to be currently protective; however, eroded and displaced riprap on the west side of the landfill at Site L3 requires repair to ensure future protectiveness. This issue is not reflected in the protectiveness determination in Table 7-1, which indicates that the remedy at Site L3 will be protective in the future. Revise Table 7-1 to indicate that the remedy at Site L3 is only

currently protective at this time and effects on future protectiveness are possible. This will make Table 7-1 consistent with the Five-Rear Review Summary Form presented on pages xxiii through xxvii.

Response: Requested change will be made

10. **Attachment 4, Site Inspection Checklists**: Site inspection checklists could not be located in Attachment 4 for numerous sites (e.g., Site L4, Site L6, Site L7, Site L8, L14, etc.). Revise Attachment 4 to include site inspection checklists for all sites or revise the FYR Report to explain each instance in which a site inspection checklist is not included.

    Response: Site inspection checklists were not completed for these sites because a brief drive by inspection was performed. Changed conditions since the second five-year review were not observed. In the main body of the report it will be explained that a drive by inspections were completed and that was appropriate/all that was needed. Abbreviated inspection forms will be added to Attachment 4.

11. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-1:** This section states that the vast majority of the RGs chosen for the Midewin National Tallgrass Prairie land use scenario were based on protection of ecological receptors because "the ecological RGs were more stringent." However, it is unclear if all ecological RGs were more stringent than human health RGs (i.e., those that would be protective of a prairie worker or visitor) or if instances exist where an ecological RG was chosen that was not as stringent as a human health RG. Revise this section to discuss any instances in which a chosen ecological RG was less stringent than a human health RG and any potential excess risk to a prairie worker or visitor.

    Response: Clarification, Table 30 from the *Joliet Army Ammunition Plant Human Health Preliminary Remedial Goals, Midewin National Tallgrass Prairie*, Human Health Work Group Report, August 2000, presents recommended PRGs for MNTP Prairie Workers. Comparison of the human health RGs in that table with those identified for industrial workers in the 1998 ROD and also the RGs finalized in the 2004 ROD indicates that ecological RGs were more stringent for every constituent, with the exception of DNTs and PAHs. This is also noted in Table A.8-10. [The 2004 ROD does indicate that the RGs for these organic compounds, although designed for protection of human health, area also protective of ecological receptors. Section 7.1 of the 2004 ROD states, "The RGs (Tables 6-1 and 6-2) developed by the JOAAP Management Team provide an acceptable level of risk for human health (i.e. less than 1x10-6 for carcinogens and Hazard Index less than 1 for noncarcinogens) and do not pose a risk to populations of plants or animals or individual endangered or threatened species."] The text in Section 1.1 and other relevant sections of Attachment A8 will be clarified as follows: This sentence will be edited (bold type added to indicate edit) and another sentence (in bold) will be added: *"However, the vast majority of the RGs chosen for that land use and presented in the 2004 ROD were developed for protection of ecological receptors because the ecological RGs were more stringent,* ***with the exception of RGs for DNT and PAHs. The RGs for these compounds were based on protection of human health in both the 1998 and 2004 RODs, with the RGs presented in the 1998 ROD being lower than those in the 2004 ROD.*** *Therefore, this section regarding protection of human health will focus on the risk based RGs developed in 1996 for industrial use and documented in the 1998 ROD…"*

12. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-5:** The first paragraph on this page

states that ten COCs currently have significantly lower EPA Regional Screening Levels (RSLs) for industrial land use compared to the 1998 ROD RGs; however, the discussion does not specify which COCs are considered to have "significantly lower" EPA RSLs. For clarity, revise this discussion to specify the COCs at issue, the degree of the changes to the toxicity criteria, and the associated increase in risk or hazard by individual pathway and in a cumulative assessment.

Response: Concur, the first sentence on page A8-5 will be revised from, "Despite the multiple toxicity criteria changes and the updates to several risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for the Superfund program between 1998 and 2013, there are only ten constituents within five industrial land use sites that currently have significantly lower USEPA RSLs (used as PRGs in the JOAAP 1998 ROD) for protection of industrial workers using today's methods (Table A8-2)." to, "*The multiple toxicity criteria changes and the updates to several risk assessment methods (notably for assessing dermal risks, inhalation risks, and cancer risks for early life exposures to mutagens) that occurred in the USEPA's Risk Assessment Guidance for the Superfund program between 1998 and 2013, resulted in several constituents that currently have lower USEPA RSLs (used as PRGs in the JOAAP 1998 ROD) for protection of industrial workers using today's methods. These are identified with bold font in Table A8-2."* The remaining portion of the human health risk assessment evaluation in Attachment 8 goes on to evaluate the implication of these newer lower RGs on current protectiveness by evaluating the associated increase in risk or hazard by individual pathway and in a cumulative assessment. A sentence will be added to the 2nd paragraph on page A8-5 (second paragraph under heading "significant findings") which indicates that although many of the risk-based concentrations (RGs) would be lower now, the resulting increase in risk is not enough to result in a cumulative risk (presented in Table A.8-2) which is above the EPA's acceptable risk range for cancer or non-hazard cancer indices at most of the sites, with the exception of sites L6, M5, M6, M13, and M16, which are already discussed in Attachment 8. Please also see the protectiveness determinations for sites L6, M5, M6, M13, and M16 presented in Attachment 8.

13. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-5:** The second paragraph on this page lists six COCs for which remediation to the 1998 ROD RGs results in unacceptable risk or hazard. It is noted that the 1998 ROD RG for 1,2,4- trichlorobenzene (a COC at Site L6 and Site Ml6) results in a risk of 1E-04; however, 1,2,4-trichlorobenzene is not included in the list of COCs for which remediation to the 1998 ROD RGs results in unacceptable risk or hazard. Given that the excess risk associated with 1,2,4-trichlorobenzene is at the high end of the relative risk range, provide a comparison of the residual concentrations of 1,2,4-trichlorobenzene at Sites L6 and Ml6 to current EPA RSLs to demonstrate that the remedy is still protective at these sites.

Response: No soil samples were analyzed at site L6 or M16 for 1,2,4-trichlorobenzene. This constituent was identified as a COC for site L6 because base neutral acid semi-volatile compounds were listed as COCs for this site. However, review of the Final Report of the Removal Action at L6 indicates that the only BNAs considered were polyaromatic hydrocarbons (PAHs). For M16, as explained in Attachment 8, no COCs should have been identified for this site at the time of the 1998 ROD, and there is no new evidence to

indicate the presence of soil COCs at the site. No soil data exists for M16, and so residual concentrations of 1,2,4-trichlorobenzene cannot be evaluated. Table A.8-2 will be revised to indicate that 1,2,4-trichlorobenzene is not a COC for any of the sites included in this review (despite its inclusion in the list of COCs for the 1998 ROD). The list of COCs for Site L6 will be corrected to only identify PAHs and PCBs as COCs. A footnote already appears on Table A.8-2 with respect to site M16.

14. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Pages A8-5 through A8-7:** A summary of the Army's assessment of whether remediation to the 1998 ROD RGs was adequately protective is provided on Pages A8-5 through A8-7; however, no data are provided to support these assessments. For example, the protectiveness discussion for Site L6 states that no PAHs were detected above the laboratory reporting limits in the majority of samples; however, the residual PAH concentrations are unclear. For transparency, and to support the discussions, provide data summary tables which present the results of the screenings of residual COC concentrations at each site against current RSLs.

    Response: As stated in the response to comment #5, a decision was made to not extract and repeat all the data tables from the Remedial Action Reports into the Five Year Review Report, since it would add undue length to the report. An electronic compilation of all the relevant documents is available via CD if desired. To support the protectiveness determination for L6, the following information from Section 2.2.4 of the Final Report of the Removal Action for Group 70 (Site L6) will be added to Attachment 8: *"Some of the individual confirmation samples collected resulted in values higher than the established PRGs for the JOAAP, as presented in Table 2-2 of the 1998 Removal Action Report. The text in Section 2.2.4 of that report explains that in those cases, further excavation of impacted soils was performed and additional confirmation samples collected, and the analyses of which is reported in Appendix D of that report."*

15. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.1, Human Health Risk-Based Remediation Goals, Page A8-6:** The protectiveness discussion for Site L6 states that PAHs were not detected above 1 mg/kg in the majority of confirmation samples at Site L6; however, it is noted that the industrial RSL for certain PAHs is less than 1 mg/kg (e.g., benzo(a)pyrene, dibenz(a,h)anthracene). As such, it is unclear whether concentrations of PAHs that remain at Site L6 potentially exceed applicable RSLs. Revise the discussion for Site L6 to assess what impact this has, if any, on the protectiveness determination for Site L6.

    Response: As indicated in the response to comment #14, to support the protectiveness determination for L6, the following information from Section 2.2.4 of the Final Report of the Removal Action for Group 70 (Site L6) will be added to Attachment 8: *"Some of the individual confirmation samples collected resulted in values higher than the established PRGs for the JOAAP, as presented in Table 2-2 of the 1998 Removal Action Report. The text in Section 2.2.4 of that report explains that in those cases, further excavation of impacted soils was performed and additional confirmation samples collected, the analyses of which is reported in Appendix D of that report."* Please also note that Illinois EPA has determined background concentrations for PAHs in soil across the state, and for individual PAHs, that background or ambient concentration is approximately 1 ppm (mg/kg). (Please see Illinois Code Title 35: Environmental Protections, Subchapter f, Risk Based Cleanup Objectives, Part 42 Tiered Approach to Corrective Action Objectives Subpart D Section 742 Appendix A Table H.). Therefore, the remediation of site L6 was determined to be protective.

16. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.2, Environmental Health (Ecological Assessment), Page A8-10**: The last sentence of the first paragraph indicates that remediating to the PRG of 2 mg/kg for benzo(a)pyrene should remove all PAHs to acceptable levels because all PAHs are expected to be co-located with benzo(a)pyrene. However, this approach may not account for other toxic PAH(s), i.e. calculation of a benzo(a)pyrene toxic equivalence quotient (BaP TEQ) to measure PAH toxicity. The FYR Report should be amended to specify calculation of a BaP TEQ for remediation of PAHs.

    Response: The text on page A8-10 will be revised to indicate that since all PAHs are expected to be co-located with benzo(a)pyrene, remediation to 2 mg/kg benzo(a)pyrene should remove PAHs down to approximately background concentrations. As such, further ecological risk evaluations on background/ambient level of constituents is not necessary.

17. **Attachment 8, Risk Assessment and Toxicology Evaluation, Section 1.2, Environmental Health (Ecological Assessment), M11 Protectiveness Determination, Page A8-11:** The first sentence states that Site M11 is a soil remediation unit site that will become part of the Midewin National Tallgrass Prairie, which contradicts the fifth sentence of the last paragraph on page A8-10, which states that M11 is one of four sites within the Midewin National Tallgrass Prairie boundaries. Amend the FYR Report to address this discrepancy.

    Response: Concur, the sentence on page A8-10 which states that "Four sites (L3, M11, L4, and M1) are within the MNTP boundaries" will be deleted. Sites L3, L4, and M11 are currently still owned by the US Army, as is the southern half of M1. The following sentences regarding L3, M11, and L4 and M1 will be clarified by adding the phrase, *"when they are transferred to the USDA"* when habitat for the MNTP is discussed.

Comments by EPA Region 5 FYR Coordinator

GENERAL COMMENT

1. There are some discrepancies between the Executive Summary narrative, FYR Summary Form, Table of Contents, and Tables 1-1 & 1-2 regarding which Sites are in each OU and which Sites remedies are being evaluated in this FYR. Please ensure consistency and clarify as needed.

    Response: The Executive summary, FYR Summary Form, Table of Contents, and Tables 1-1 & 1-2 will be checked for consistency. Any discrepancies will be resolved.

SPECIFIC COMMENTS

1. **Page xix, Executive Summary, Purpose:**

    a) The first bullet lists 28 SOU sites, but further down the number of SOU sites is referred to as [26]. The second bullet lists 11 GOU sites, but further down, and in Table l-2, Site M10 is included. Please clarify the difference and ensure consistency.

    Response: Two sites (L6 and M16) were identified for no further action and 26 sites were identified for remediation of contaminated soils. The FYR report addresses these 28 sites. Groundwater at Site M10 was granted closure according to the RAOs set in the 1998 ROD by regulatory acceptance of the *Final Site M10 Closure Report* and was not evaluated in the FYR report (refer to section 6.5.1.2). M10 was closed in March 2003. The table already

indicates that M-10 was removed from the five year review report. A footnote will be added to the table to highlight this.

b) As the two bullets of this section are the first instance of the terms "Soil Operable Unit" and "Groundwater Operable Unit," indicate the abbreviations "SOU" and "GOU" after each.

Response: Requested change will be made

c) **2nd ¶, 5th line:** Change "second five year reviews" to "the second five year review."

Response: Requested change will be made

2. **Page xix, Executive Summary, Joliet Army Ammunition Plant, last ¶, last sentence:** Please state that this FYR is evaluating the protectiveness of the remedies for all SOU and GOU Sites as described in the SOU and GOU sections below (and as identified in Tables l-1 and 1-2).

Response: Requested change will be made

On page 6-116 it states that GRU3, site M10 is not being evaluated in this FYR. Please clarify this here and provide the basis for not including GRU2 M10 in the FYR.

Response: Groundwater at Site M10 was granted closure according to the RAOs set in the 1998 ROD by regulatory acceptance of the *Final Site M10 Closure Report* and was not evaluated in the FYR report (refer to section 6.5.1.2). A footnote will be added to the table to highlight this.

3. **Page xxi, Executive Summary, Report Format:** See Specific Comment 1 regarding the number of SOU sites and the number of GOU sites.

Response: See response to USEPA Specific Comment 1.

4. **Page xxiii, Five-Year Review Summary Form, Site Status:** Although a variety of follow-up investigative and cleanup activities continue at the Site, EPA's definition of construction completion relates to the ROD-specified remedial actions that have taken place. The satisfactory completion of ROD-required remedial actions for the JOAAP is documented in the September 10, 2008 Preliminary Closeout Report (PCOR). Therefore, the answer to the question "Has the site achieved construction completion?" should be "Yes."

Response: Investigations and new/revised remedial actions are ongoing or planned at JOAAP. A yes response to the construction completion box in the Five-Year Review Summary Form would require a site-wide protectiveness statement, which is inappropriate at this time.

5. **Page xxiii, Five-Year Review Summary Form, Review Status, Due Date:** The triggering action date for the third five year review is five years after the Region 5 Superfund Division Director's signature on the previous FYR. Therefore, please replace "May 6, 2014" with "September 28. 2014."

Response: Requested change will be made

6. **Page xxiv, AOC(s) without Issues/Recommendations Identified in the Five-Year Review:** Based upon the prior description of GOU sites, add those sites ("GRU1 [L1, L2, L3,

L14], GRU2 [M1, M5, M7, M8, M13], GRU3 [M3]") those sites to this section for consistency (and consistent with Tables 1-1 and 1-2).

Response: Requested change will be made

7. **Pages xxv and xxvi, Protectiveness Statement(s):** For internal tracking purposes, EPA will track this FYR as an addendum to the "deferred protectiveness determination" made by EPA on September 16, 2014. However, because the deferral was made as a result of the unavailability of the FYR by the due date, and the current submittal is, in fact, the third FYR, no further addendum is anticipated. Therefore, please delete the text *"Addendum due date* (if applicable) Not Applicable" form the four AOC summary boxes.

   Response: Requested change will be made

8. **Page xxvi, Protectiveness Statements (SRU Sites), 1st ¶, 1st sentence:** Delete Site M6 (it also appears in the second), and, per earlier comments, include M8, M11, M13 and M16 to this category of "protective of human health and the environment."

   Response: Requested changes will be made

9. **Page xxvi, Protectiveness Statements (SRU Sites), 2nd ¶, 1st sentence:** Reword the beginning sentence as follows: *"The remedies at Sites L3. L5. and M6 are currently protective of human health and the environment in the short term because:"*

   Response: Requested change will be made

10. **Page xxvi, Protectiveness Statements (GRU Sites), 1st ¶, 1st sentence:** "GRU3 SiteM3 ..." should read as "...GRU3 site M3,"

    Response: Requested change will be made

11. **Pages xxvi and xxvii, Protectiveness Statements (GRU Sites), 2nd ¶, 1st sentence:** Rewrite this sentence as follows: *"The remedy at GRU2 site M6 is currently protective of human health and the environment in the short term based on information and observations noted above. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness:"*

    Response: Requested change will be made

12. **Page 2-10, Table 2-1, Chronology of Site Events:** Site M16 should be included in the chronology, as it is in the Executive Summary.

    Response: The table provides a hierarchy of site events 1) Facility-Wide, 2) Load-Assemble-Package Area, 3) Manufacturing Area, 4) Soil Operable Unit, 5) Soil Operable Unit Sites, 6) Groundwater Operable Unit, and 7) Groundwater Operable Unit Sites. There are no site events for M16 that warrant inclusion in the table. A footnote will be added to the table that provides clarification for this.

13. **Page 2-10, Table 2-1, Groundwater Operable Unit:** Include GRU1 Sites L1, L2, L3, L14, GRU2 Sites M1, M5, M6 and GRU3 Site M3, as they are also included in the Executive Summary.

    Response: The table provides a hierarchy of site events 1) Facility-Wide, 2) Load-Assemble-

Package Area, 3) Manufacturing Area, 4) Soil Operable Unit, 5) Soil Operable Unit Sites, 6) Groundwater Operable Unit, and 7) Groundwater Operable Unit Sites. There are no site events for Groundwater Operable Unit Sites L1, L2, L3, L14, M1, M3, M5, and M6 that warrant inclusion in the table. A footnote will be added to the table that provides clarification for this.

14. **Page 3-2, Section 3.4.1, Soil Operable Unit:** See previous comments regarding the number of SOU sites (26 vs. 28). Clarify and ensure consistency as needed.

    Response: See response to USEPA Specific Comment 1.

15. **Page 3-3, Table 3-1, Soil Operable Unit COCs:** Based upon previous comments, the table should include Sites L6 and M16.

    Response: Site L6 will be added to the table. Site M16 will be not added to the table. The Baseline Risk Assessment for M16 indicated that no risk was calculated because no samples were obtained (i.e. no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). There is no evidence to indicate the presence of soil COCs at the site. Furthermore, section 5.29 will be revised as follows:

    - 5.29.1, 4th paragraph; *"The Baseline Risk Assessment for M16 indicated that no risk was calculated because no samples were obtained (i.e. no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). There is no evidence to indicate the presence of soil COCs at the site. "*

16. **Page 5-7, Section 5.1.3.8, Institutional Controls:** Please include a summary discussion regarding current compliance with the ICs, and of long term stewardship procedures that are in place (and/or needed) to ensure the long term protectiveness of the remedy (procedures for maintaining, monitoring, enforcement, reporting). See: http:1/wvAv.epa. gov/super:fundlpolicy/ic/guide/641333.pdf and http://v.'WW.epa.gov/super:fundlpolicy/ic/guide/Final%20PIME%20Guidance%20De cember%202012.pdf (Section 8).

    Response: Section 5.1.3 discusses remedy selection; it is inappropriate to discuss the status of compliance in this section. Compliance with ICs and long term stewardship is provided in the individual sections for each SOU site.

17. **Page 6-30, Section 6.3.9, Issues:** Please clarify whether or not any of these issues affect the long term protectiveness of the remedy? If any do affect long term protectiveness, please revise the protectiveness statement and make the appropriate revisions in the Executive Summary, FYR Summary Form, Section 7.

    Response: These issues do not affect long-term protectiveness.

18. **Page 6-82, Section 6.4.9, Issues:** Please clarify which issues affect the long-term protectiveness of the remedy and which do not. See similar comment for GRU1 issues.

    Response: All issues do not affect long-term protectiveness except the new toxicology data for 2-NT that indicates the RG should be changed from 5,100 µg/L to 1.3 µg/L. The presentation will be reformatted to include two separate tables, 1) O&M Concerns That Do Not Affect Protectiveness and 2) Issues That Affect Protectiveness.

19. **Page 6-116, Section 6.5.1.2, Site M10, last ¶, last sentence:** Please include this conclusion (e.g., *"Therefore, Site M10 is not evaluated in this five-year review"*).

    Response: Requested change will be made

20. **Pages 7-1 and 7-2, Table 7-1, Recommendations to Address Current Issues at JOAAP SOU Sites, Issues 2, 3 and 5, Affects Future Protectiveness?:** The answer to this question for the three issues related to Sites L3 (Issue 2), L5 (Issue 3) and M6 (Issue 5) is appropriately shown as "Yes" in the FYR Summary Form. Please change Table 7-1 accordingly, from "No", "No" and "Possible" to "Yes", "Yes" and "Yes".

    Response: Requested change will be made

21. **Page 7-4, Table 7-2, Recommendations to Address Current Issues at JOAAP GOU Sites, Issue 6, Affects Future Protectiveness?:** The answer to the question for Issue 6 (GRU2 Site M6) is appropriately shown as "Yes" in the FYR Summary Form. Please change Table 7-2 accordingly from "No" to "Yes."

    Response: Requested change will be made.

22. **Page 7-5, Section 7.2.2, Groundwater Operable Unit, 1st ¶, 1st sentence:** For consistency with the Executive Summary Tables 1-1 and 1-2, revise as follows:

    "The Ongoing RAs for GRU1 (sites L1, L2, L3, L14), GRU2 (sites M1, M5, M7, M8, and M13) and GRU3 (site M3) are protective of human health and the environment."

    Response: Requested change will be made.

23. **Page 7-5, Section 7.2.2, Groundwater Operable Unit, 2nd ¶, 1st sentence:** So as to accurately reflect the status of the RA for GRU2, please revise as follows:

    "The Ongoing RA for GRU2 Site M6 currently protects human health and the environment in the short term because:"

    Response: Requested change will be made.

Comments by EPA Region 5 Office of Regional Counsel

1. **Executive Summary, P. xxi, Paragraph 1:** Only one questionnaire is discussed, but there are many that were received. Please state that other questionnaires were received.

   Response: Only one completed questionnaire was received. See response to TechLaw Specific Comment 5.

2. **Executive Summary, P. xxi. Paragraph 2:** Publishing only in the Wilmington paper is too limited. In the future there should be more outreach.

   Response: Comment noted

3. **Page 5-13, Table 5-4:** In IC Objectives, it says no landfill; however, a large part of the Will County property is a landfill. We believe that the ICs for the Will County landfill, do not say no landfill. Please make sure the statement in the table accurately reflects the situation.

   Response: Correct, the land use restrictions state that the property may only be developed

and is being utilized for landfill purposes. Table 5-4 will be revised to reflect this.

4. **Page 5-16, Section 5.2.2.1, Implementation, 5th.Paragraph, 4th line:** Change L17 to Ll.

   Response: Requested change will be made

5. **Page 5-18, Section 5.2.3, Site Inspection, 2nd Paragraph, 3rd line and Page 5-15, Section 5.2.7, Recommendations for Follow-up Actions:** Identify repair of the large hole in the fence as a follow-up action.

   Response: The remedial action was completed in accordance with the ROD and the fence is no longer needed to restrict site access. An action item requiring fence repair is in appropriate for the FYR.

6. **Page 5-35, Section 5.4.3, Site Inspection, 2ndParagraph, 3rd line, and Page 5-37, Recommendations for Follow-up Actions:** Identify the placement of a lock on the gate as a follow-up action.

   Response: Requested change will be made

7. **Page 5-43, Section 5.5.5.2, Question B, 2nd Paragraph, line 10:** Were the organic COCs that were detected below the ecological RGs from the 2004 ROD?

   Response: Yes

8. **Page 5-51, Section 5.6.5.2, Question B:** This paragraph discusses the portion of the JOAAP lands to become part of the MNTP, but does not discuss the portion of the lands the Army will retain. This is also confusing. since, according to 5.6.1, part of the property is already owned by the MNTP. Please address both parts of the Site, clarify who currently owns which part and answer question B for both parts of site L5.

   Response: The text in Section 5.6.5.2 could be edited to include the following information: Ecological RGs developed in 2000 and presented in the 2004 ROD were more stringent for every constituent, with the exception of DNTs and PAHs. The 2004 ROD does indicate that the RGs for these organic compounds, although designed for protection of human health, area also protective of ecological receptors. Section 7.1 of the 2004 ROD states, “The RGs (Tables 6-1 and 6-2) developed by the JOAAP Management Team provide an acceptable level of risk for human health (i.e. less than 1x10-6 for carcinogens and Hazard Index less than 1 for noncarcinogens) and do not pose a risk to populations of plants or animals or individual endangered or threatened species.”

9. **Page 5-80, Section 5.11.2.1, Implementation, SRU1 Soil, line 3:** Change L9 to L10.

   Response: Requested change will be made

10. **Page 5-170, Section 5.25.2.3, Land Use/Institutional Controls:** The second bullet says the site can't be used for industrial purposes. However, this paragraph also says the future use of this site is industrial. Please clarify/resolve these contradictory statements.

    Response: The reference to industrial use will be removed. See also the response to TechLaw Specific Comment 4.

11. **Page 5-177, Section 5.26.2.2, Operation, Maintenance and Monitoring:** The second

bullet notes that the gate was chained shut instead of locked. Identify the placement of a lock on gate as an action item, to help prevent unauthorized access.

Response: Placement of a lock on the fence gate has been identified as an action item in routine OM&M reports developed by the US Army and is being addressed. This will be discussed in the main body of the five-year review report.

12. **Page 5-179, Section 5.26.5.2, Question B, Paragraph 1, last line:** It is stated that the RGs may not be protective of the environment. The next paragraph states that, although the COC concentrations in the post-excavation samples were compared to the 1998 ROD RGs for protection of human health, most of the organic COCs were not detected or detected at low levels. The explanation needs to address all the COCs.

    Response: Concur, the answer to Question B provided in Section 5.26.5.2 will be edited for consistency with the edits provided for Site M11 in Attachment 8, as per the response to General Comment #13 above.

13. **Page. 5-184, Section 5.27.2.3, Land Use/Institutional Controls:** GMZ Restrictions -Why are these listed for site M12, when the restriction refers to M6A, M10W, and M1S?

    Response: These restrictions apply to GRU sites transferred to the USDA/FS, which includes M12. Because the restrictions are specific to sites M6A, M10W, and M1S, they will be removed.

14. **Page 5-189, Section 5.28.1, Background Information:** It says the site is owned by the Army; but Figure 5-25 shows commercial use of the site. This is inconsistent. Please correct.

    Response: The capped landfill at M13 is owned by the US Army. The reminder of Site is owned by BNSF and CPI, LLC. The text will be revised accordingly.

15. **Page 5-191, Section 5.28.2.3, Land Use/Institutional Controls:** It says the site should not be used for industrial purposes, but Figure 5-25 shows commercial use of the site. Also it appears that there are no restrictions for schools, day care facilities, etc.

    Response: Property owned by the US Army, BNSF and CPI, LLC cannot be used for the following purposes or activities: residential, educational, child or adult care, landfill, quarry operations, incineration, and concrete batch or asphalt plant. The land use questionnaire completed by the US Army in Attachment 12 noted exceptions for three landfills (including the M13 landfill). The text will be revised accordingly.

16. **Page 5-192, Section 5.28.4, Progress Since Last Five Year Review:** A lock needs to be installed on the gate. This was a request from the last 5 year review and apparently has still not been done. This is an issue and needs a recommendation, see 5.28.6 and 5.23.7.

    Response: A lock is present on the gate, the FYR report will be revised accordingly.

17. **Page 5-199, Section 5.29.5.2, Question B, line 8:** Text states that only a few sites had COCs for which the 1998 RGs would now represent an unacceptable risk and that this includes potential COCs at Site M16. It goes on to state that the 1998 ROD should not have identified soil COCs for this site and that there is no new evidence to indicate the presence of soil COCs at the site. Why should the 1998 ROD not have identified COCs for the site?

Response: This is explained in Section A8, page A8-7, and repeated here: The BRA for Site M16 indicates that no risk was calculated for this site because no soil samples were obtained (no evidence of staining or contamination) and potential contamination that may have been carried to the nearby Acid Ditch was assessed as part of Site M8 instead (Dames and Moore 1993, 1994). The 1998 ROD should not have identified soil COCs for this site, as it did in Table 6-3. There is no new evidence to indicate the presence of soil COCs at the site. It is recommended that the surface water and sediment sampling results presented in Table 5.16-2 of the Phase II RI (Dames and Moore 1993) be evaluated and perhaps this site may be released for UU/UE.

18. **Page 6-16, Section 6.3.4, Site Inspections, Paragraph 3:** Identify the repair of the hole in the fence as an action item, since the site is publicly accessible via the MNTP.

    Response: The remedial action was completed in accordance with the ROD and the fence is no longer needed to restrict site access. An action item requiring fence repair is in appropriate for the FYR.

19. **Attachment 6, Interviews:** Identify who gave the interview that is in this Attachment. Also where are the other interview records concerning interviews that were to be done?

    Response: The interview questionnaires were sent to the interviewees by Toltest, who has been identified in the first sentence of Section 4.6. See response to Techlaw Specific Comment #5.

20. **Attachment 12, Questionnaires:** Please number the pages in this attachment. The order of items is confusing. It appears some questionnaires were not answered, but then the responses are actually found later in the attachment. Are there responses from 21561 W. Mississippi, LLC and SF Pacific Railroad?

    Response: Page numbers and order of items in the final report are final and can be revised for future reports to aid future reviewers. 21561 W Mississippi LLC and SF Pacific Railroad are related companies owned by BNSF. BNSF was sent a questionnaire and they responded.

21. **Attachment 12, Questionnaires:** The International Union of Operating Engineers transferred a part of their property to the Wilmington Fire Protection District without conveying the deed restrictions. What is the Army's plan for correcting this discrepancy?

    Response: It is our understanding that the deed restrictions were conveyed with the transfer of the deed and nothing can be found in recorder's office that the restrictions weren't conveyed with the deed. The Wilmington Fire Protection District was sent the compliance questionnaire and they indicated that they were in compliance with all of the deed restrictions. This is something that can further investigated for the Second Annual Site-Wide Deed Restriction report currently under contract. The five-year review report will be revised to indicate that this issue will be addressed in the Second Annual Site-Wide Deed Restriction report. .

22. **Attachment 12, Questionnaires:** JADA says that map label D33 is not JADA property and that part of A05 was transferred to FJGCO, LLC. Please verify that these statements are correct. If they are correct, please correct the map label. Also make sure the deed restrictions have been transferred to FJGCO, LLC.

Response: As contained in the final report, Figure 2.1 Parcel Ownership shows D33 being a

dark-gray shade and therefore owned by Elwood Maple Hill Cemetery.

Figure 2-1 is an updated figure that is different from the one sent with the ownership verification letters. The ownership verification response by JADA was used to update the parcel ownership information in the compliance questionnaire packet, which included Figure 2-1. The parcel IDs changed at that time, so the parcel referred to as "A05" in their response is actually "A08" and "A09" on Figure 2-1, which are indicated correctly as owned by JADA and FJGCO, LLC, respectively.

23. **Attachment 12, Questionnaires:** Question 1 is confusing. Change question one. You can say, "... please indicate whether there is compliance with the restrictions on these parcels".

    Response: This report is final and will not be changed for inclusion into the Third Five Year Review for JOAAP; however, this language will be revised for the 2nd Annual Site Wide Deed Restriction report currently under contract. The question will be revised as follows: *"With limited exceptions, the property may not be used for the purpose or activities listed below; please indicate if you are in compliance with this requirement on all of your parcels."* This information will be included in the five-year review report.

24. **Attachment 12, Questionnaires, IUOE Loca1150:** Is their use of the property protective of human health? As indicated, there may be a use in contravention of the residential deed restriction (security officer sleeps and eats on the Site). Also, is their use as a training facility an acceptable use of the property? Also see, Attachment 7, Appendix C, Site Inspection Notes, June 12, 2013, Paragraph 8.

    Response: This is identified in the site wide deed restriction report and brought to the attention of US Army Environmental Command (USAEC) attorneys and it is our understanding that any enforcement action or any further evaluation of the current use of the property will be handled by USAEC attorneys. This information will be included in the five-year review report.

25. **Attachment 12, Questionnaires:** Prairie Craftsman, LLC, answered no instead of yes to question 1, but did not explain. This needs to be addressed with Prairie Craftsman, LLC.

    Response: We understand that this question was ambiguous and caused confusion. This language will be revised for the 2nd Annual Site Wide Deed Restriction report currently under contract. The revised language will be as follows: *"With limited exceptions, the property may not be used for the purpose or activities listed below; please indicate if you are in compliance with this requirement on all of your parcels."* The Consultant, Installation and USACE team made the assumption that Prairie Craftsman, LLC were in compliance, but due to the confused question answered the question incorrectly. This information will be included in the five-year review report.

26. **Attachment 12, Questionnaires:** USDA response to questionnaire, camping issue was raised. This needs to be addressed. If the USDA is correct, then the questionnaire to the USDA needs to be modified.

    Response: Concur; however, this report is final and won't be changed for inclusion into the Third Five Year Review for JOAAP. The questionnaire language will be revised and camping will be removed from this question for the 2nd Annual Site Wide Deed Restriction report currently under contract.

27. **Attachment 12, Questionnaires:** USDA/Forest Service, MNTP, USDA answered the questionnaire incorrectly by saying no to both parts of question 2 with no explanation. This needs to be addressed with the USDA/Forest Service/ MNTP.

    Response: We understand that this question was ambiguous and caused confusion. This language will be revised for the 2nd Annual Site Wide Deed Restriction report currently under contract. The question will read as follows: *"With limited exceptions, the property may not be used for the purposes or activities listed below; please indicate if you are in compliance with this requirement on all of your parcels."* The Consultant, Installation and USACE team made the assumption that USDA/Forest Service, MNTP and USDA were in compliance, but due to the confused question answered the question incorrectly.

28. **Attachment 12, Questionnaires:** USDA/Forest Service, MNTP. Please explain why they said no to question 7.

    Response: We understand that this question was ambiguous and caused confusion. This language will be revised to be a direct question instead of a statement for the 2nd Annual Site Wide Deed Restriction report currently under contract. After the statement about the notification of violations, the question will read as follows: *"If there have been any land use restriction violations, have you complied with this requirement"*.

29. **Attachment 12, Questionnaires:** Department of Veterans Affairs, Questionnaire, p. 2, Statement of Compliance says that Will County owns the property. This is not correct.

    Response: Concur, there is an error in the report and will be revised for the 2nd Annual Site Wide Deed Restriction report currently under contract. The statement of compliance will correctly identify the Department of Veterans affairs as the owner of the property.

30. **Attachment 12, Questionnaires:** Walmart Stores East LP, Questionnaire, Page 4, Statement of Compliance, says that Will County owns the property. This is not correct.

    Response: Concur, there is an error in the report and will be revised for the 2nd Annual Site Wide Deed Restriction report currently under contract. The statement of compliance will correctly identify Walmart Stores East LP as the owner of the property.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

May 7, 2015

REPLY TO THE ATTENTION OF: SR-6J

Mr. Arthur Holz
Site Manager/Commander's Representative
Joliet Army Ammunition Plant
29401 South Route 53
Wilmington, IL 60481-8879

Subject: **U.S. EPA Region 5 Review of Responses to Comments on the Draft Third Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, IL**

Dear Mr. Holz:

The U.S. Environmental Protection Agency (EPA) has completed review of the U.S. Army's (Army) responses to comments on the Draft Third Five-Year Review Report for the Joliet Army Ammunition Plant Superfund Site. Based upon our review, the majority of EPA's comments have been satisfactorily addressed. For several of the responses additional information is needed. Our review of the specific responses to for which EPA requests additional changes to the Five-Year Review Report is enclosed.

If you have any questions, or require additional information, please feel free to contact me by phone at (312) 353-5577 or by e-mail (barounis.thomas@epa.gov).

Sincerely,

Tom Barounis
Remedial Project Manager

Enclosure

cc: Andrew Maly, US Army Environmental Command
James Stachowski, USACE
Robin Paul, USACE
Nefertiti DiCosmo, RRB2/Section 7
Michael Berman, ORC
Bonnie Eleder, FYR Coordinator

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U.S. EPA Region 5 Review of Responses to Comments on the Draft Third Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, IL

May 7, 2015

Following is the U.S. Environmental Protection Agency's (EPA) review of the U.S. Army's responses to EPA comments on the Draft Third Five-Year Review Report (FYR) for the Joliet Army Ammunition Plant Superfund Site. Only those comments for which EPA requires additional changes to the FYR or additional information are discussed. The remainder of the Army's responses to comments are considered acceptable.

Review of Responses to Comments by EPA Region 5 FYR Coordinator

US Army response to comment:

16. **Page 5-7, Section 5.1.3.8, Institutional Controls:** Please include a summary discussion regarding current compliance with the ICs, and of long term stewardship procedures that are in place (and/or needed) to ensure the long term protectiveness of the remedy (procedures for maintaining, monitoring, enforcement, reporting). See: http:1/wvAv.epa.gov/super:fundlpolicy/ic/guide/641333.pdf and http://v.'WW.epa.gov/super:fundlpolicy/ic/guide/Final%20PIME%20Guidance%20December%202012.pdf (Section 8).

Response: Section 5.1.3 discusses remedy selection; it is inappropriate to discuss the status of compliance in this section. Compliance with ICs and long term stewardship is provided in the individual sections for each SOU site.

In response:
Section 5.1.3 "Remedy Selection" contains subsections, including 5.1.3.8 "Institutional Controls", which provides an overall summary of the ICs for the Site. ICs discussions in FYRs address current compliance as well as long term stewardship (LTS). As 5.1.3.8 provides an overall summary of ICs for the Site, it should also address overall compliance and LTS. Inclusion of a reference in 5.1.3.8 would be helpful to indicate that the specific details regarding ICs for each operable unit (OU) are included in each of the individual OU sections. It is noted that the OU-specific sections do not address long term stewardship nor current compliance. Each provides only a summary of the IC restrictions that apply. The OU-specific ICs, as well as current compliance and OU-specific details regarding LTS should be included in each of the OU-specific sections.

US Army response to comments:

17. **Page 6-30, Section 6.3.9, Issues:** Please clarify whether or not any of these issues affect the long- term protectiveness of the remedy? If any do affect long term protectiveness, please revise the protectiveness statement and make the appropriate revisions in the Executive Summary, FYR Summary Form, Section 7.

Response: These issues do not affect long-term protectiveness.

18. **Page 6-82, Section 6.4.9, Issues:** Please clarify which issues affect the long-term protectiveness of the remedy and which do not. See similar comment for GRU1 issues.

Response: All issues do not affect long-term protectiveness except the new toxicology data for 2-NT that indicates the RG should be changed from 5,100 µg/L to 1.3 µg/L. The presentation will be reformatted to include two separate tables, 1) O&M Concerns That Do Not Affect Protectiveness and 2) Issues That Affect Protectiveness.

In response:
Comments 17 & 18 request clarification as to which issues affect long term protectiveness of the remedy. The referenced sections should be revised to specify those issues that affect the protectiveness of the remedy. Issues which may affect current and/or future protectiveness of the remedy are identified and recommended actions are included in Tables 7-1 and 7-2, and also in the FYR Summary Form and the appropriate protectiveness statements.

For issues which do not affect current nor long term protectiveness of the remedy, they should be removed from the Tables 7-1 and 7-2, as well as from the corresponding portions of the FYR Summary Form and the protectiveness statements. Such recommendations (which do not affect the current nor future protectiveness of the remedy) can be included as a separate narrative but are not included in Tables 7-1 and 7-2, the FYR Summary Form, nor the protectiveness statements. The issues and recommended actions identified in each of the OU-specific sections, in Tables 7-1 and 7-2, in the FYR Summary Form, and the protectiveness statements should be consistent.

Comments by EPA Region 5 Office of Regional Counsel

8. **Page 5-51, Section 5.6.5.2, Question B:** This paragraph discusses the portion of the JOAAP lands to become part of the MNTP, but does not discuss the portion of the lands the Army will retain. This is also confusing, since, according to 5.6.1, part of the property is already owned by the MNTP. Please address both parts of the Site, clarify who currently owns which part and answer question B for both parts of site L5.

Response: The text in Section 5.6.5.2 could be edited to include the following information: Ecological RGs developed in 2000 and presented in the 2004 ROD were more stringent for every constituent, with the exception of DNTs and PAHs. The 2004 ROD does indicate that the RGs for these organic compounds, although designed for protection of human health, area also protective of ecological receptors. Section 7.1 of the 2004 ROD states, "The RGs (Tables 6-1 and 6-2) developed by the JOAAP Management Team provide an acceptable level of risk for human health (i.e. less than 1x10-6 for carcinogens and Hazard Index less than 1 for noncarcinogens) and do not pose a risk to populations of plants or animals or individual endangered or threatened species."

In response:
Page 5-51, Section 5.6.5.2, Question B, L5 – The Army provided a response, but did not indicate if it applied to the portion of L5 owned by the Army. Also the Army needs to state what portion of L5 it still owns.

12. **Page 5-179, Section 5.26.5.2, Question B, Paragraph 1, last line:** It is stated that the RGs may not be protective of the environment. The next paragraph states that, although the COC concentrations in the post-excavation samples were compared to the 1998 ROD RGs for protection of human health, most of the organic COCs were not detected or detected at low levels. The explanation needs to address all the COCs.

Response: Concur, the answer to Question B provided in Section 5.26.5.2 will be edited for consistency with the edits provided for Site M11 in Attachment 8, as per the response to General Comment #13 above.

In response:
Page 5-179, Section 5.26.5.2, Question B, Paragraph 1, last line, M11 – The Army responded in regard to M16 and not M11. There is no reference to M11 in Attachment 8. Please respond to comment 12 in regard to M11.

22. **Attachment 12, Questionnaires:** JADA says that map label D33 is not JADA property and that part of A05 was transferred to FJGCO, LLC. Please verify that these statements are correct. If they are correct, please correct the map label. Also make sure the deed restrictions have been transferred to FJGCO, LLC.

Response: As contained in the final report, Figure 2.1 Parcel Ownership shows D33 being a dark-gray shade and therefore owned by Elwood Maple Hill Cemetery. Figure 2-1 is an updated figure that is different from the one sent with the ownership verification letters. The ownership verification response by JADA was used to update the parcel ownership information in the compliance questionnaire packet, which included Figure 2-1. The parcel IDs changed at that time, so the parcel referred to as "A05" in their response is actually "A08" and "A09" on Figure 2-1, which are indicated correctly as owned by JADA and FJGCO, LLC, respectively.

In response:
Attachment 12, Questionnaires, A05 - Part of the comment was answered, but the Army did not address the question whether the deed restrictions were transferred to FJGCO, LLC when part of the property was transferred to it.

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON IL 60481-8879

REPLY TO
ATTENTION OF
Site Manager

2 June 2015

Mr. Tom Barounis
Remedial Project Manager
US Environmental Protection Agency
ATTN: SRF 6J
77 West Jackson Boulevard
Chicago, IL 60604-3590

SUBJECT: Draft, Third Five-Year Review, Response to USEPA Follow-up Comments dated May 7, 2015,
Joliet Army Ammunition Plant, Wilmington, Illinois.

1. Forwarded for your review and comment, is the subject report.

2. The point of contact is the undersigned at 815/423-2870.

Sincerely,

Arthur M. Holz
Site Manager

CF:
ILEPA (Mr. Haggitt)
CELRL-DL-B (Ms. Hyde)
SFIM-AEC-CDP (Ms. Paul)
SFIM-AEC (Mr. Maly)

DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S ROUTE 53
WILMINGTON IL 60481-8879

REPLY TO
ATTENTION OF
Site Manager

2 June 2015

Mr. Michael Haggitt
Illinois Environmental Protection Agency
1021 North Grand Avenue East
PO Box 19276
Springfield, IL 62794-9276

SUBJECT: Draft, Third Five-Year Review, Response to USEPA Follow-up Comments dated May 7, 2015,
Joliet Army Ammunition Plant, Wilmington, Illinois.

1. Forwarded for your review and comment, is the subject report.

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Sincerely,

Arthur M. Holz
Site Manager

Encl
CF:
USEPA (Mr. Barounis)
CELRL-DL-B (Ms. Hyde)
SFIM-AEC-CDP (Ms .Paul)
SFIM-AEC (Mr. Maly)

Responses to Comments by EPA Region 5 FYR Coordinator

USEPA Comment 16, Page 5-7, Section 5.1.3.8, Institutional Controls: Please include a summary discussion regarding current compliance with the ICs, and of long term stewardship procedures that are in place (and/or needed) to ensure the long term protectiveness of the remedy (procedures for maintaining, monitoring, enforcement, reporting). See: http:1/wvAv.epa.gov/super:fundlpolicy/ic/guide/641333.pdf and http://v.'WW.epa.gov/super:fundlpolicy/ic/guide/Final%20PIME%20Guidance%20December%202012.pdf (Section 8).

> **US Army Response (March 20, 2015):** Section 5.1.3 discusses remedy selection; it is inappropriate to discuss the status of compliance in this section. Compliance with ICs and long term stewardship is provided in the individual sections for each SOU site.
>
> **USEPA Response (May 7, 2015):** Section 5.1.3 "Remedy Selection" contains subsections, including 5.1.3.8 "Institutional Controls", which provides an overall summary of the ICs for the Site. ICs discussions in FYRs address current compliance as well as long term stewardship (LTS). As 5.1.3.8 provides an overall summary of ICs for the Site, it should also address overall compliance and LTS. Inclusion of a reference in 5.1.3.8 would be helpful to indicate that the specific details regarding ICs for each operable unit (OU) are included in each of the individual OU sections. It is noted that the OU-specific sections do not address long term stewardship nor current compliance. Each provides only a summary of the IC restrictions that apply. The OU-specific ICs, as well as current compliance and OU-specific details regarding LTS should be included in each of the OU-specific sections.
>
> **US Army Response (May 15, 2015):** A reference will be included in 5.1.3.8 that indicates specific details of ICs for each OU are provided in the individual section for each site. The OU-specific ICs, status of current compliance, and site-specific details regarding LTS will included in each specific section.

USEPA Comment 17, Page 6-30, Section 6.3.9, Issues: Please clarify whether or not any of these issues affect the long- term protectiveness of the remedy? If any do affect long term protectiveness, please revise the protectiveness statement and make the appropriate revisions in the Executive Summary, FYR Summary Form, Section 7.

> **US Army Response (March 20, 2015):** These issues do not affect long-term protectiveness.

USEPA Comment 18, Page 6-82, Section 6.4.9, Issues: Please clarify which issues affect the long-term protectiveness of the remedy and which do not. See similar comment for GRU1 issues.

> **US Army Response (March 20, 2015):** All issues do not affect long-term protectiveness except the new toxicology data for 2-NT that indicates the RG should be changed from 5,100 µg/L to 1.3 µg/L. The presentation will be reformatted to include

two separate tables, 1) O&M Concerns That Do Not Affect Protectiveness and 2) Issues That Affect Protectiveness.

USEPA Response (May 7, 2015): Comments 17 & 18 request clarification as to which issues affect long term protectiveness of the remedy. The referenced sections should be revised to specify those issues that affect the protectiveness of the remedy. Issues which may affect current and/or future protectiveness of the remedy are identified and recommended actions are included in Tables 7-1 and 7-2, and also in the FYR Summary Form and the appropriate protectiveness statements.

For issues which do not affect current nor long term protectiveness of the remedy, they should be removed from the Tables 7-1 and 7-2, as well as from the corresponding portions of the FYR Summary Form and the protectiveness statements. Such recommendations (which do not affect the current nor future protectiveness of the remedy) can be included as a separate narrative but are not included in Tables 7-1 and 7-2, the FYR Summary Form, nor the protectiveness statements. The issues and recommended actions identified in each of the OU-specific sections, in Tables 7-1 and 7-2, in the FYR Summary Form, and the protectiveness statements should be consistent.

US Army Response (May 15, 2015): The referenced sections will be revised to specify those issues that affect protectiveness of the remedy. Issues that may affect current and/or future protectiveness and recommended actions will be provided in Table 7-1, Table 7-2, and in the FYR Summary form. The protectiveness statements in each location will be consistent.

Comments by EPA Region 5 Office of Regional Counsel

USEPA Comment 8, Page 5-51, Section 5.6.5.2, Question B: This paragraph discusses the portion of the JOAAP lands to become part of the MNTP, but does not discuss the portion of the lands the Army will retain. This is also confusing, since, according to 5.6.1, part of the property is already owned by the MNTP. Please address both parts of the Site, clarify who currently owns which part and answer question B for both parts of site L5.

US Army Response (March 20, 2015): The text in Section 5.6.5.2 could be edited to include the following information: Ecological RGs developed in 2000 and presented in the 2004 ROD were more stringent for every constituent, with the exception of DNTs and PAHs. The 2004 ROD does indicate that the RGs for these organic compounds, although designed for protection of human health, are also protective of ecological receptors. Section 7.1 of the 2004 ROD states, "The RGs (Tables 6-1 and 6-2) developed by the JOAAP Management Team provide an acceptable level of risk for human health (i.e. less than $1x10^{-6}$ for carcinogens and Hazard Index less than 1 for noncarcinogens) and do not pose a risk to populations of plants or animals or individual endangered or threatened species."

USEPA Response (May 7, 2015): Page 5-51, Section 5.6.5.2, Question B, L5 – The Army provided a response, but did not indicate if it applied to the portion of L5 owned by the Army. Also the Army needs to state what portion of L5 it still owns.

US Army Response (May 15, 2015): PCBs at Site L5 were cleaned up to ARAR-based RGs identified in the 1998 ROD. Organic and metal contaminants at Site L5 were remediated to the risk-based RGs identified in the 2004 ROD. The assessment of RGs provided in 5.6.5.2 pertains to both portions of the site. The discussion will be revised to clarify this.

USEPA Comment 8, Page 5-179, Section 5.26.5.2, Question B, Paragraph 1, last line: It is stated that the RGs may not be protective of the environment. The next paragraph states that, although the COC concentrations in the post-excavation samples were compared to the 1998 ROD RGs for protection of human health, most of the organic COCs were not detected or detected at low levels. The explanation needs to address all the COCs.

US Army Response (March 20, 2015): Concur, the answer to Question B provided in Section 5.26.5.2 will be edited for consistency with the edits provided for Site M11 in Attachment 8, as per the response to General Comment #13 above.

USEPA Response (May 7, 2015): Page 5-179, Section 5.26.5.2, Question B, Paragraph 1, last line, M11 – The Army responded in regard to M16 and not M11. There is no reference to M11 in Attachment 8. Please respond to comment 12 in regard to M11.

US Army Response (May 15, 2015): The following revisions will be made in 5.26.5.2 and Attachment 8 regarding M11 (bold type used to identify edits).

"The Remedy in Place Report for this site was reviewed (MKM 2009a). After excavation of the southern and northeastern debris areas in Site M11, both the bioremediated soil and the off-site soil selected for backfill were evaluated to determine whether or not they were suitable for use as backfill in the excavated areas. Although the COC concentrations in those soils were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels ***below the ecological RGs*** *(primarily* ***individual*** *PAHs* ***at up to 0.015 mg/kg each*** *but also low levels of DNT and TNT in the bioremediated soils,* ***up to 4.6 mg/kg****) and all of the metals were detected below ecological RGs established in the 2004 ROD (Tables 3-6 and 3-7 of MKM 2009a). Finally, there were several soil samples obtained in the limits of the excavation (sidewalls, bottoms). Although the COC concentrations in those post-excavation samples were compared to the 1998 ROD RGs, most of the organic COCs were not detected or detected at low levels* ***well below the RGs*** *(****average*** *DNTs* ***detected less than 2.2 mg/kg****, TNT* ***up to 2.4 mg/kg , individual*** *PAHs* ***up to 0.48 mg/kg****, PCBs* ***– Aroclors up to 0.33 mg/kg****). All of the metals were detected below ecological RGs from the 2004 ROD (Table 3-8, MKM 2009a). Therefore, the excavation and backfilling of the southern and northeastern debris areas at M11 is protective of both human health and the environment."*

USEPA Comment 22, Attachment 12, Questionnaires: JADA says that map label D33 is not JADA property and that part of A05 was transferred to FJGCO, LLC. Please verify that these statements are correct. If they are correct, please correct the map label. Also make sure the deed restrictions have been transferred to FJGCO, LLC.

US Army Response (March 20, 2015): As contained in the final report, Figure 2.1 Parcel Ownership shows D33 being a dark-gray shade and therefore owned by Elwood Maple Hill Cemetery.

Figure 2-1 is an updated figure that is different from the one sent with the ownership verification letters. The ownership verification response by JADA was used to update the parcel ownership information in the compliance questionnaire packet, which included Figure 2-1. The parcel IDs changed at that time, so the parcel referred to as "A05" in their response is actually "A08" and "A09" on Figure 2-1, which are indicated correctly as owned by JADA and FJGCO, LLC, respectively.

USEPA Response (May 7, 2015): Attachment 12, Questionnaires, A05 - Part of the comment was answered, but the Army did not address the question whether the deed restrictions were transferred to FJGCO, LLC when part of the property was transferred to it.

US Army Response (June 2, 2015): Yes, deed restrictions were transferred to FJGCO, LLC.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

July 27, 2015

REPLY TO THE ATTENTION OF: SR-6J

Mr. Arthur Holz
Site Manager/Commander's Representative
Joliet Army Ammunition Plant
29401 South Route 53
Wilmington, IL 60481-8879

Subject: **U.S. EPA Region 5 Review of Responses to Follow-up Comments on the Draft Third Five-Year Review Report for Joliet Army Ammunition Plant (JOAAP), Wilmington, IL**

Dear Mr. Holz:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army's (Army) June 2, 2015 responses to EPA's May 7, 2015 follow-up comments on the Draft Third Five-Year Review Report for the Joliet Army Ammunition Plant Superfund Site. The responses to EPA's follow-up comments are acceptable. Please provide a copy of the final Five-Year Review Report for EPA concurrence/approval.

If you have any questions, or require additional information, please feel free to contact me by phone at (312) 353-5577 or by e-mail (barounis.thomas@epa.gov).

Sincerely,

Tom Barounis
Remedial Project Manager

cc: Andrew Maly, US Army Environmental Command
James Stachowski, USACE
Robin Paul, USACE
Nefertiti DiCosmo, RRB2/Section 7

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