FMC Idaho LLC, Pocatello, Idaho

FMC OU - SOIL REMEDIAL ACTION

DRAFT REMEDIAL ACTION WORK PLAN

January 2015

Table of Contents

Page

SECTION 1 Introduction 1-1
Section 1.1 Project Summary 1-1
Section 1.2 Scope of the Soil remedial Action 1-1
Section 1.2.1 Scope of the Site Wide Grading Phase 1-1
Section 1.2.2 Scope of the Capping Phase 1-2
Section 1.3 Scope of The Remedial Action Work Plan 1-3
Section 1.4 Contractor Selection 1-4
Section 1.5 Work Plan Organization 1-6
Section 2 Remedial Action Team Organization 2-1
Section 2.1 U.S. Environmental Protection Agency 2-1
Section 2.2 FMC Corporation 2-1
Section 2.3 MWH Americas, Inc. 2-1
Section 2.4 Parsons 2-2
Section 2.5 Chicago Bridge and Iron Company 2-2
Section 2.6 Bison Engineering, Inc. 2-2
Section 3 Site-Wide Grading Phase Construction Activities 3-1
Section 3.1 Site Access, Mobilization and Staging Area 3-1
Section 3.1.1 Site Access 3-1
Section 3.1.2 Mobilization 3-1
Section 3.1.3 Equipment Staging 3-2
Section 3.2 Site-Wide Grading Phase Construction 3-3
Section 3.2.1 Site Clearance and Integration of RCRA Pond Monitoring Systems 3-3
Section 3.2.2 Earthwork for Site-Wide Grading 3-3
Section 3.2.3 Earthwork for Stormwater Retention Ponds 3-4
Section 3.2.4 Stormwater Pipe Cleaning in RA-A 3-4
Section 3.2.5 Excavation of Surface Soil at RA-J 3-4
Section 4 Capping Phase Construction Activities 4-1
Section 4.1 Planning for the Capping Phase 4-1

Section 4.2 Excavation of Soils in the Western Undeveloped Area for Cap Construction .. 4-2
Section 4.3 Earthwork for Construction of ET and Gamma Caps 4-2
Section 4.3.1 Construction of ET Caps 4-2
Section 4.3.2 Construction of Gamma Caps 4-3
Section 4.4 Construction of the Site-Stormwater Conveyance Systems (channels) 4-3
Section 4.5 Demobilization 4-3
Section 4.6 Notice of Construction Completion 4-4
Section 5 Monitoring, Mitigation and Response Actions 5-1
Section 5.1 Construction Quality Assurance and Quality Control 5-1
Section 5.2 Emergency Response Plan and Spill Control and Countermeasures Plan 5-1
Section 5.3 Equipment Decontamination and Transportation and Off-Site Disposal Plan... 5-2
Section 5.4 Dust Control and Air Monitoring Plan 5-3
Section 5.5 Stormwater Pollution Prevention Plan 5-4
Section 5.6 Materials Management and Water Management Plans 5-4
Section 5.7 Emissions Reduction Plan 5-5
Section 5.8 Performance Standards Verification Plan 5-5
Section 5.9 Operation, Monitoring and Maintenance Plan 5-6
Section 6 Health and Safety Plan 6-1
Section 7 Soil Remedy RD/RA Schedule 7-1
Section 8 References 8-1

TABLES

Table 1.1 UAO/RAWP Cross-Reference Table 1-5

Table 3.1 List of Anticipated and Utilized Construction Equipment 3-2

Table 7.1 Schedule for RD/RA Deliverables to EPA, Construction Schedule for the Site-Wide Grading Phase and Preliminary Construction Schedule for the Capping Phase 6-1

FIGURES

(Figures follow Sections)

Figure 1-1 FMC Operable Unit Vicinity Plan
Figure 1-2 FMC Operable Unit Site Plan

Figure 2-1 Site-Wide Grading Phase Remedial Action Team

Figure 3-1 Location of Equipment and Facilities Staging Area
Figure 3-2 Overall Site-Wide Grading
Figure 3-3 Remediation Areas Specified for ET Caps
Figure 3-4 Stormwater Piping Access Points

Figure 4-1 Western Undeveloped Area Soil Borrow Source
Figure 4-2 Remediation Areas Specified for ET and Gamma Caps

Figure 7-1 Project Overview Bar Chart for Site-Wide Grading Phase

APPENDICIES

Appendix A Contractor's Construction Plan and List of Permits

Appendix B Contractor's Construction Quality Control Plan

Appendix C Dust Control and Air Monitoring Plan

Appendix D Contractor's Stormwater Pollution Prevention Plan

Appendix E Contractor's Materials Management Plan

Appendix F Contractor's Water Management Plan

Appendix G Contractor's Emissions Reduction Plan

Appendix H Contractor's Health and Safety Plan

LIST OF ACRONYMS

CB&I	Chicago Bridge and Iron Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQAP	Construction Quality Assurance Plan
CQCP	Construction Quality Control Plan
EPA	United States Environmental Protection Agency
EMF	Eastern Michaud Flats
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	emergency response plan
ET	evapotranspirative
FMC	FMC Corporation
FMC OU	FMC Operable Unit
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IDEQ	Idaho Department of Environmental Quality
IRODA	Interim Record of Decision Amendment
MWH	MWH Americas, Inc.
OM&M	operations, monitoring and maintenance
OSHA	Occupational Safety and Health Administration
OSWER	EPA Office of Solid Waste and Emergency Response
OU	Operable Unit
P4	elemental phosphorus
PE	Professional Engineer
PSVP	Performance Standards Verification Plan
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RA	Remedial Action
RA-“letter”	Remediation Area
RAWP	Remedial Action Work Plan

RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDR	Remedial Design Report
RDWP	Remedial Design Work Plan
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
SUA	southern undeveloped area
SWHASP	Site-Wide Health and Health and Safety Plan
SWP	stormwater pipe (or piping)
TODP	Transportation and Off-Site Disposal Plan
UAO	Unilateral Administrative Order
WUA	western undeveloped area

SECTION 1 INTRODUCTION

SECTION 1.1 PROJECT SUMMARY

This Draft Remedial Action Work Plan (RAWP) has been prepared on behalf of FMC Corporation (FMC) and presents the plan for implementing the soil remedy for the FMC Plant Operable Unit (FMC OU) of the Eastern Michaud Flats (EMF) Superfund Site. The FMC OU is located in Power County in Idaho, approximately 2.5 miles northwest of Pocatello (see Figures 1-1 and 1-2). The EMF Site includes two adjacent production facilities, the former FMC Corporation elemental phosphorus (P4) processing plant that ceased operation in 2001 and a phosphate fertilizer processing facility currently operated by the J.R. Simplot Company. The EMF Site is shown on Figure 1-1 and encompasses both the FMC and Simplot plants and surrounding areas (Off-Plant OU) affected by releases from these facilities.

The FMC OU, consisting of the FMC Plant Site and other FMC-owned properties at the EMF Site, is on privately-owned fee land, most of which is located within the exterior boundaries of the Fort Hall Indian Reservation. As shown on Figure 1-2, the FMC Plant OU consists of the FMC Plant Site (i.e., the former operating facility located south of Highway 30), the Southern and Western Undeveloped Areas (SUA and WUA) that are also located to the south of Highway 30, and FMC-owned Northern Properties located to the north of Highway 30. The easternmost portions of the FMC OU are located outside the reservation boundary.

This RAWP is one of the work elements being conducted pursuant to the remedial actions set forth in the Interim Amendment to the Record of Decision for the EMF Superfund Site FMC Operable Unit (IRODA; Environmental Protection Agency [EPA], 2012) and a Remedial Design/Remedial Action (RD/RA) Unilateral Administrative Order (UAO) issued by the EPA on June 10, 2013 which became effective on June 20, 2013. This RAWP describes specific activities that are necessary to implement the selected soil remedy identified in the IRODA and the UAO.

SECTION 1.2 SCOPE OF THE SOIL REMEDIAL ACTION

Section 1.2.1 Scope of the Site Wide Grading Phase

The Site-Wide Grading phase of the soil remedy includes the following tasks:

1. Re-grading Remediation Areas (RAs) B, C, D, E, F, G, H and K to the design subgrade elevations shown on the soil remedial design drawings.
2. Clearance of above-grade items that remain within the areas to be re-graded, abandonment of groundwater monitoring wells and integration of RCRA pond monitoring systems as specified in Specification 02050 Site Clearance and 02051 Integration of RCRA Monitoring Systems.

3. Placement of the capillary break component of the ET caps above the subgrade at RAs B, C, D, E, F-1, F-2, H and K. The specification for the capillary break material is defined in Specification 02222 - Earthwork and Grading.
4. Construction of the retention basins specified in the soil remedial design drawings and Site-Wide Stormwater Management Design Report.
5. Cleaning of the stormwater piping in RA-A and verification of achievement of the performance standards followed by plugging and abandonment per Specification 02080 – Pipe Abandonment.
6. Excavation of surface soil at RA-J, consolidation of the excavated soil into the subgrade at RA-F, and verification of achievement of the performance standards.
7. Implementation of the supporting documents and plans relevant to the Site-Wide Grading (SWG) phase of the soil remedial action:

    - Contractors Construction Plan (Appendix A of the RAWP for SWG phase [MWH, 2014b])
    - Contractors Construction Quality Control Plan (Appendix B of the RAWP for SWG phase);
    - Emergency Response Plan and Spill Control and Countermeasures Plan (Supporting Document);
    - Transportation and Off-Site Disposal Plan (Supporting Document);
    - Dust Control and Air Monitoring Plan (Rev 2.0) (Appendix C of this RAWP);
    - Stormwater Pollution Prevention Plan (Appendix D of the RAWP for SWG phase);
    - Materials Management and Water Management Plans (Appendices E and F of the RAWP for SWG phase);
    - Emissions Reduction Plan (Appendix G of the RAWP for SWG phase);
    - Performance Standards Verification Plan for RA-J and Stormwater Pipe Cleaning in RA-A Appendix H of the RAWP for SWG phase);
    - Cap Delineation Work Plan (Appendix I of the RAWP for SWG phase); and
    - CB&I Health and Safety Plan, Rev 3 (Appendix H of this RAWP).

Section 1.2.2 Scope of the Capping Phase

The Capping phase of the soil remedy includes the following tasks:

1. Excavation of soils in the Western Undeveloped Area (WUA) for cap construction;
2. Construction of the gamma caps specified for RAs A, F (not including F-1 and F-2) and G;
3. Construction of the soil layer components of the ET caps specified for B, C, D, E, F-1, F-2 H and K;

4. Integration of the ET and gamma caps and integration of the ET or gamma caps with the adjacent existing RCRA pond or Calciner Pond caps;
5. Construction of the site-stormwater conveyance systems (channels); and
6. Implementation of the supporting documents and plans relevant to the Capping phase of the soil remedial action:

    - Contractors Construction Plan (Appendix A of this RAWP)
    - Contractors Construction Quality Control Plan (Appendix B of this RAWP);
    - Emergency Response Plan and Spill Control and Countermeasures Plan (Supporting Document);
    - Transportation and Off-Site Disposal Plan (Supporting Document);
    - Dust Control and Air Monitoring Plan (Rev 2.0) (Appendix C of this RAWP);
    - Stormwater Pollution Prevention Plan (Appendix D of this RAWP);
    - Materials Management and Water Management Plans (Appendices E and F of this RAWP);
    - Emissions Reduction Plan (Appendix G of this RAWP);
    - Performance Standards Verification Plan (Supporting Document); and
    - CB&I Health and Safety Plan, Rev 3 (Appendix H of this RAWP).

The scope of the Site-Wide Grading and Capping phases do **NOT** include:

1. Post-soil remedial action operation, monitoring and maintenance (OM&M); and
2. Any elements of the groundwater remedial action for the FMC OU.

SECTION 1.3 SCOPE OF THE REMEDIAL ACTION WORK PLAN

As stated in Paragraph 31a of the RDRA UAO, the Remedial Action Work Plan shall provide for construction and implementation of the remedy set forth in the Interim ROD Amendment and achievement of the Performance Standards in accordance with this Order, including the Interim ROD Amendment and the design plans and specifications developed in accordance with the RDWP and approved by EPA. As stated in Paragraph 31b of the RDRA UAO, the Remedial Action Work Plan shall include the following:

1) A schedule for completion of the Remedial Action;
2) The method for selection of the contractor;
3) A schedule for developing and submitting other required Remedial Action plans;
4) A Final CERCLA Groundwater Monitoring Plan;
5) Methods for satisfying access requirements;
6) Methodology for implementing the Operation and Maintenance Plan (OM&MP);
7) Methodology for implementing the Emergency Response Plan (ERP);
8) A tentative formulation of the Remedial Action team;

9) The Construction Quality Control Plan (CQCP by the construction contractor);
10) The Performance Standards Verification Plan (PSVP); and
11) Procedures and plans for the decontamination of equipment and the disposal of contaminated materials.

The Remedial Action Work Plan also shall include the methodology for implementing the CQCP (see Section 4.1) and a schedule for implementing all Remedial Action tasks identified in the final design submission (see Section 6 for Site-Wide Grading phase schedule) and shall identify the initial formulation of Respondent's Remedial Action project team (including, but not limited to, the Supervising Contractor) (see Section 2).

As this RAWP is only for the soil remedy for the FMC OU, not all of the above listed elements are included herein. Table 1.1 presents cross references for the elements included in this RAWP. The elements not included in this document will be addressed in a future RAWP.

SECTION 1.4 CONTRACTOR SELECTION

The overall strategy is to deliver the RD efficiently, cost-effectively, and in a manner that satisfies the concepts and requirements described in the UAO. As stated in the Remedial Design Work Plan, the FMC OU RD/RA will be a traditional design-bid-build project delivery.

The design team prepared the design and bid documents for the Site-Wide Grading phase in accordance with the RD Work Plan and based on the Pre-Final RD Engineering Design Submittal for the Site-Wide Grading phase submitted to EPA on March 3, 2014. The Site-Wide Grading phase design/bid documents were used to solicit bids from qualified remediation contractors. FMC completed a detailed evaluation of the bids and selected Chicago Bridge and Iron Company (CB&I) as the remediation contractor. CB&I prepared the Contractor documents and plans listed in Section 3.1.2 (and as required by the Technical Specifications) and are performing the construction activities for the Site-Wide Grading phase of the RA. During the RA, the FMC remedial design team or other qualified engineering or construction-manager entity(ies) have and will continue to review the progress of the work and confirm that the Site-Wide Grading phase of the soil RA is performed in accordance with the approved design.

Based on the current project schedule (Section 7), significant efficiency will be achieved by retaining the Site-Wide Grading phase remediation contractor to perform the capping phase of the soil remedial action. This approach would eliminate the need for a demobilization / mobilization cycle and associated personnel training. The schedule and retention of CB&I is predicated on EPA approval of the final design and approval to proceed prior to completion of the Site-Wide Grading phase construction and demobilization. In the event that the project schedule or other circumstances dictate, FMC may elect to competitively bid the Capping phase as is tentatively shown on the project schedule (Table 7.1).

TABLE 1.1 UAO/RAWP Cross-Reference Table

UAO Element	Included in This RAWP?	Included in Future RAWP?
1. Schedule for completion of the RA	Yes (Section 7)	Yes, Final RAWP for Groundwater Remedy
2. Method for selection of the contractor	Yes (Section 1.4)	Yes, Final RAWP for Groundwater Remedy
3. Schedule for developing and submitting other required Remedial Action plans	Yes (Section 7)	Yes, Final RAWP for Groundwater Remedy
4. Final CERCLA Groundwater Monitoring Plan	No, not in scope of the Soil Remedy	Yes, Final RAWP for Groundwater Remedy
5. Methods for satisfying access requirements	Yes (Section 3.1)	Yes, Final RAWP for Groundwater Remedy
6. Methodology for implementing the OM&MP	Yes (Section 5.9)	Yes, Final RAWP for Groundwater Remedy
7. Methodology for implementing the ERP	Yes (Section 5.2)	Yes, Final RAWP for Groundwater Remedy
8. Tentative formulation of the RA team	Yes (Section 2)	Yes, Final RAWP for Groundwater Remedy
9. CQCP and methodology for implementation	Yes (Section 5.1)	Yes, Final RAWP for Groundwater Remedy
10. PSVP	Yes (Section 5.8)	Yes, Final RAWP for Groundwater Remedy
11. Procedures and plans for the decontamination of equipment and the disposal of contaminated materials	Yes (Section 5.3)	Yes, Final RAWP for Groundwater Remedy

SECTION 1.5 WORK PLAN ORGANIZATION

This RAWP consists of:

Section 1 – Introduction: presents background information on the Site-Wide Grading phase project.

Section 2 – Remedial Action Team Organization: presents the tentative formulation of the RA team for the project.

Section 3 - Site-Wide Grading Phase Construction: identifies the major construction activities including pre-construction access, mobilization and equipment staging.

Section 4 – Capping Phase Construction: identifies the major construction activities including pre-construction planning.

Section 5 - Monitoring, Mitigation and Response Actions: summarizes the construction quality control plan and numerous environmental controls and plans applicable to the project.

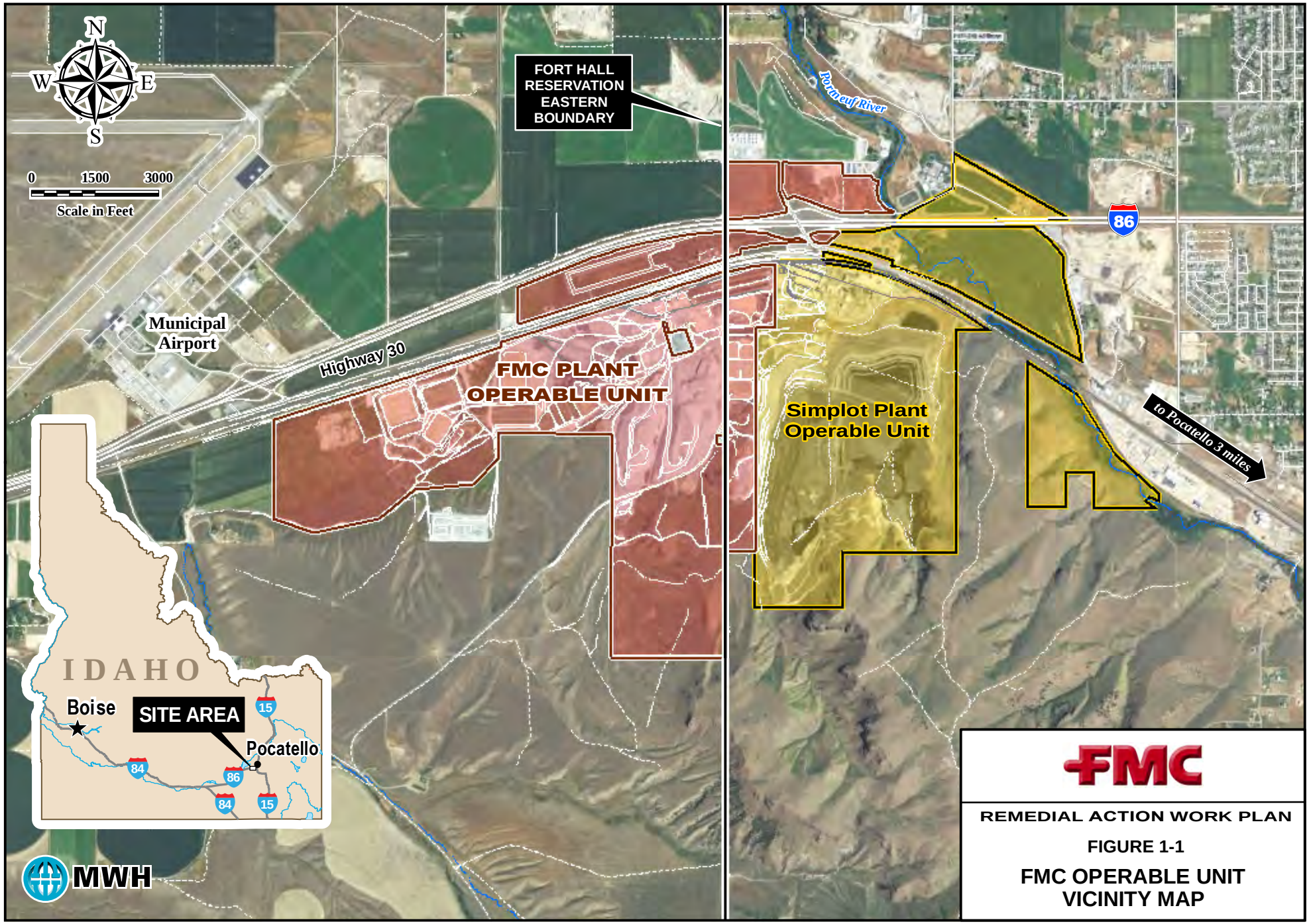
Section 6 – Health and Safety Plan: describes the health and safety framework, site-wide health and safety plan (HASP) and Contractor's HASP for the project.

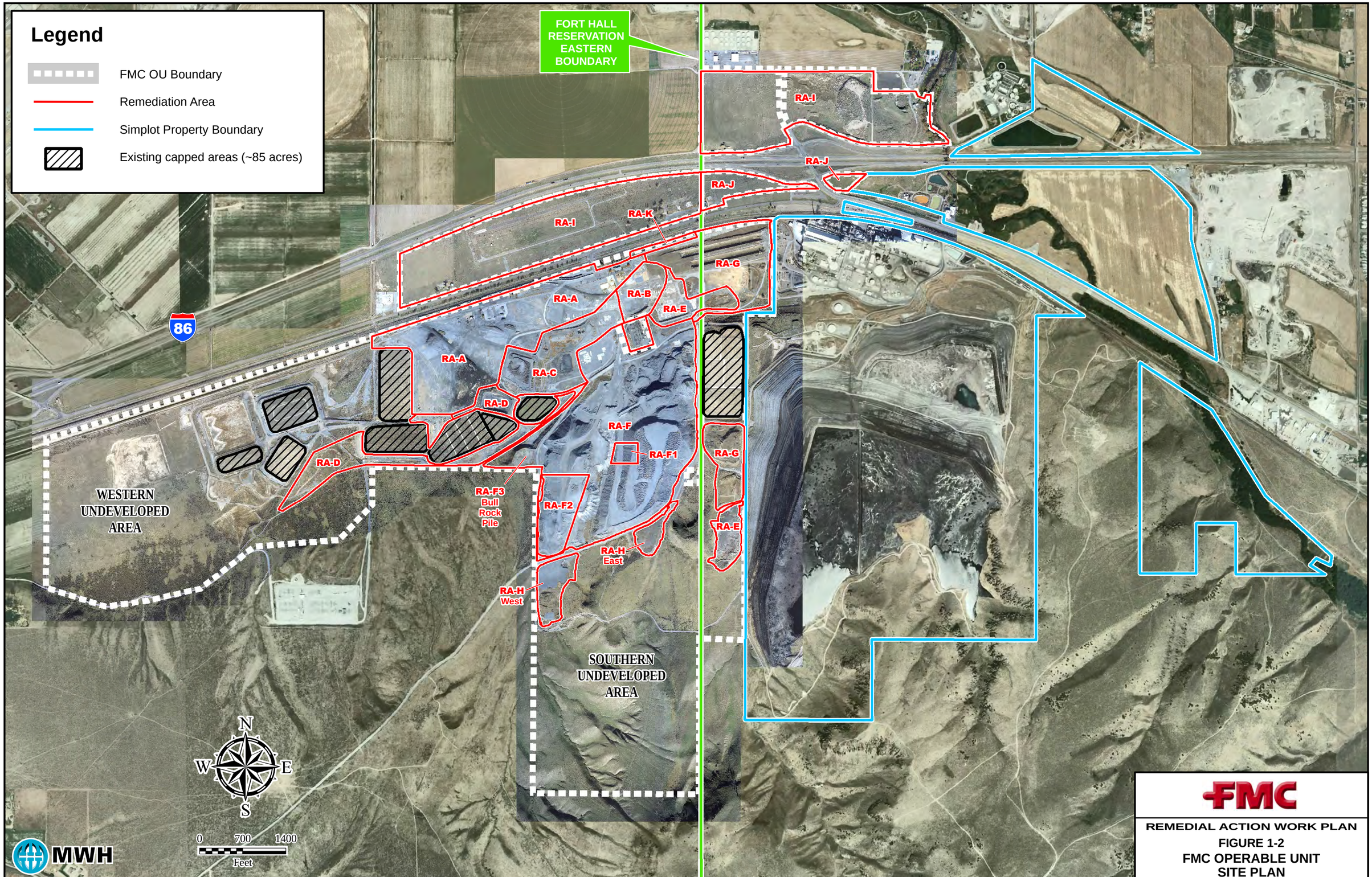
Section 7 – Soil Remedial Action Schedule: provides the current schedule for the Site-Wide Grading phase and a preliminary schedule for the Capping phase of the project.

Section 8 provides references.

Throughout the RAWP, the Remedial Design Report, Technical Specifications and Design Drawings, collectively termed the Engineering Design Submittal, are referenced for specific information on the design and requirements for the soil remedy. This RAWP and the RDR, specifications and drawings collectively form the basis for this work.

FILE: I:\projects\FMCidaho\REMEDIAL DESIGN WP_2013\FIGURES\Fig 1-1_FMC_VicinityMap_waerial_June2013.mxd DATE: 2 July 2013





DRAWN BY D. Severson

2 July 2013

I:\projects\FMCIdaho\FMC_REMEDIAL ACTION WORK PLAN\FIGURES\Fig 1-2_FMC OU Site Plan_May2014.mxd

SECTION 2 REMEDIAL ACTION TEAM ORGANIZATION

This section presents the remedial action team for the Site-Wide Grading phase project. The remedial action team organization is shown on Figure 2-1. FMC anticipates the remedial action team for the Site-Wide Grading phase will be retained to perform the Capping phase.

SECTION 2.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

EPA is the lead agency governing the remediation of the FMC OU. EPA issued the IRODA and UAO, and is responsible for approving all plans and reports related to implementing the Selected Remedy. The EPA Remedial Project Manager is Mr. Jonathan Williams.

SECTION 2.2 FMC CORPORATION

As the responsible party, FMC is implementing the Selected Remedy in accordance with the UAO. FMC has overall responsibility for procuring consultants and contractors to perform the work, budgeting and securing the necessary funds, and assuring that the requirements of the UAO are met. The FMC Project Coordinator is Dr. Marguerite Carpenter and the Alternate FMC Project Coordinator is Mr. Robert Forbes. FMC's Corporate Engineering Services (CES) Project Manager is Mr. Mike Steiner.

SECTION 2.3 MWH AMERICAS, INC.

MWH Americas, Inc. (MWH) is the Supervising Contractor for work performed under the UAO. MWH is a global technical consulting, engineering, and construction firm. The various technical issues that will be involved with the FMC OU RD/RA work require access to personnel with experience in specific technical areas. Many of the MWH team have worked together on other projects, and several have worked on FMC Pocatello projects for over 15 years. The specific individuals involved in the remedial design for the soil remedy and their respective roles are as follows:

Project Director. Mr. Marc Bowman is the MWH Project Director. He will be responsible for the contractual commitments and for ensuring that the necessary resources are dedicated to the project. He also will assure the technical, budget, and schedule requirements are met.

RD Manager. Mr. Rob Hartman will serve as the MWH Remedial Design Manager. Mr. Hartman will be responsible for day-to-day communication with the FMC Project Coordinator as well as with the MWH staff assigned to perform the various project tasks. As MWH RD Manager, he will define and clarify the scope of work and objectives for each major activity.

Engineering Manager. Mr. Chad Tomlinson will serve as the MWH Engineering Manager and the primary design interface to the MWH RD Manager. He will be responsible for coordinating the necessary resources to accomplish the design of the various elements and to complete the soil

remedy RD phase. He will ensure that the various plans and design submittals meet the requirements of the UAO and SOW. Mr. Tomlinson is a registered professional (civil) engineer (registered PE in Idaho) with a technical specialty in geotechnical engineering.

Construction Quality Assurance Technicians: Mr. Aaron Pettley and Mr. Brent Dicou will serve as MWH's field Construction Quality Assurance Technicians under the supervision of the MWH Engineering Manager. They will ensure the project is performed in accordance with the Construction Quality Assurance Plan (CQAP) and the remedial action Contractor adheres to the construction quality control requirements in the CQAP and in the Contractors Construction Quality Control Plan.

SECTION 2.4 PARSONS

FMC has retained Parsons to perform program management, construction management and on-site health and safety management services for the Site-Wide Grading phase of the soil remedial action. Parsons is a global technical consulting, engineering, and construction firm. The specific individuals involved in the remedial action for the soil remedy and their respective roles are as follows:

Construction Manager: Mr. Doug Dumont and Ms. Jonetta Everano will serve as the Parsons Construction Managers on-site at the FMC OU. They will be responsible for day to day management of the project, primarily managing the remedial action contractor's planned sequence of work, adherence to the project scope and environmental controls, productivity, and schedule.

Health and Safety Officer: Mr. Greg Cunningham will serve as the Parsons Health and Safety Officer. He will be responsible for implementation of Parsons HASP for the project as well as oversight of the remedial action Contractor's health and safety program.

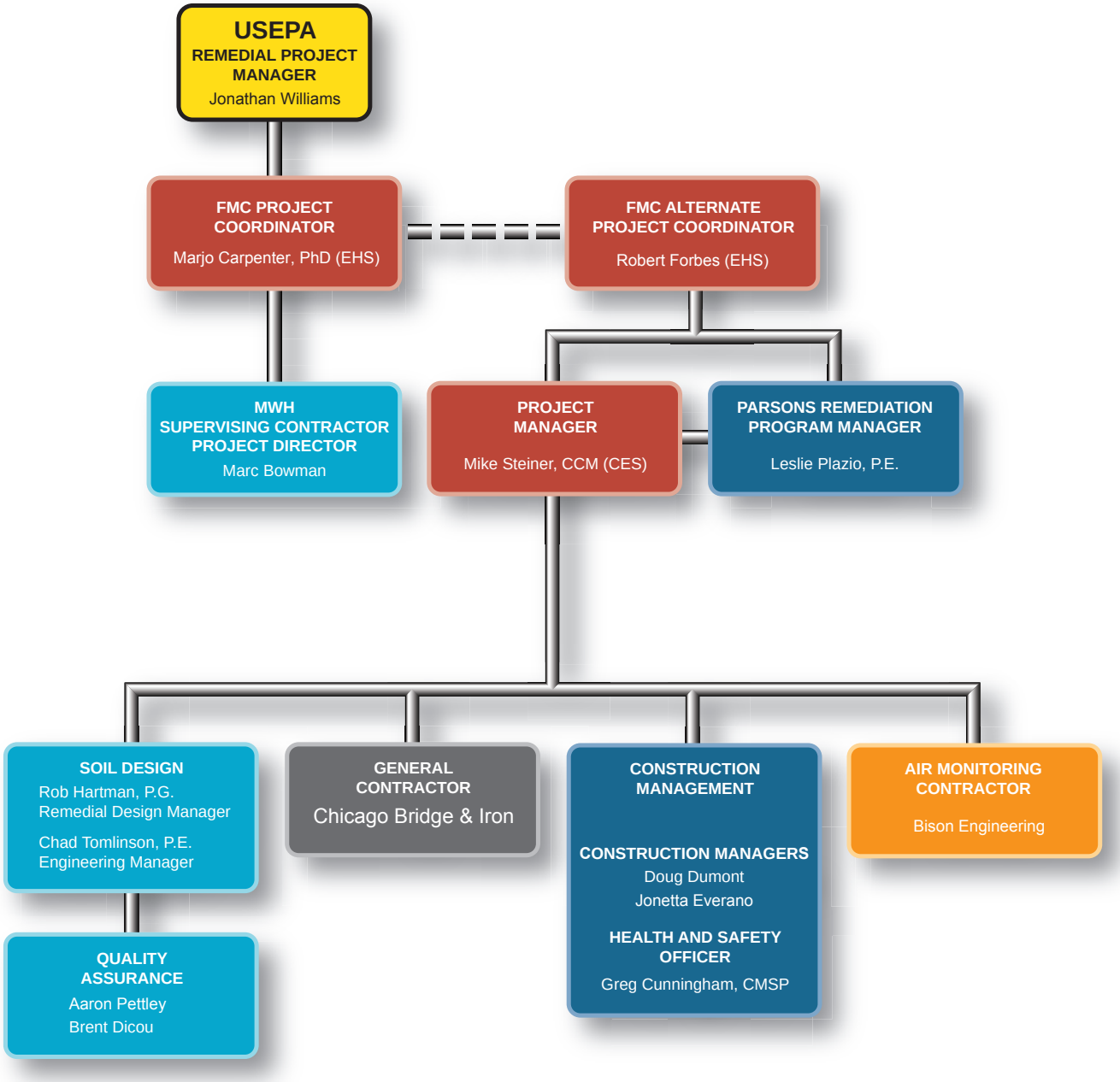
SECTION 2.5 CHICAGO BRIDGE AND IRON COMPANY

FMC has retained CB&I as the remediation contractor to perform the construction activities for the Site-Wide Grading phase of the RA. CB&I is a global design, engineering, construction, fabrication, maintenance and environmental services company with 125 years of experience and the expertise of approximately 55,000 employees.

SECTION 2.6 BISON ENGINEERING, INC.

FMC has retained Bison Engineering, Inc. (Bison) to perform the air monitoring specified in the Dust Control and Air Monitoring Plan. Bison Engineering provides professional environmental consulting in the area of air quality permitting stack testing and ambient air monitoring including

the air monitoring for the Point Ruston Development and Occupancy Plan at the EPA Region 10 Commencement Bay Nearshore / Tideflats Superfund Site.



REMEDIAL ACTION WORK PLAN

FIGURE 2-1

SITE-WIDE GRADING PHASE REMEDIAL ACTION TEAM

DRAWN BY D. Severson

07 Jan 2015

FILE: Fig 2-1_FMC_SSite-Wide Grading Phase Rem Action Team.ai

SECTION 3 SITE-WIDE GRADING PHASE CONSTRUCTION ACTIVITIES

This section summarizes the major construction activities including pre-construction access, mobilization and equipment staging.

SECTION 3.1 SITE ACCESS, MOBILIZATION AND STAGING AREA

Section 3.1.1 Site Access

As defined in the IRODA, the FMC OU consists of the FMC-owned properties that include the former operational areas ("FMC Plant Site"), the Southern and Western Undeveloped Areas, and the Northern Properties (including RA-J).

The Site-Wide Grading phase work for the FMC OU has been and will be implemented exclusively on property owned by FMC so no special provisions for access are required. The FMC Plant Site has and will be accessed through the existing main gate located across the crossing-arm equipped at-grade crossing of the Union Pacific Railroad tracks off of Highway 30. Remediation Area-J was and will continue to be accessed directly off of Highway 30.

Section 3.1.2 Mobilization

The mobilization involved the following two phases:

- Planning Phase– Consisted of the preparation of the following documents that were contained in the RAWP for Site-Wide Grading Phase (MWH, 2014b), as indicated below:
    - Contractor Health and Safety Plan;
    - Stormwater Pollution Prevention Plan;
    - Materials Management Plan;
    - Emissions Reduction Plan;
    - Water Management Plan;
    - List of Permits;
    - Construction Plan; and
    - Project Overview Bar Chart
- Mobilization Phase – Consisted of the actual mobilization of equipment, personnel, and support facilities.

The mobilization phase occurred following EPA approval of the required documentation and approval to commence construction activities on September 5, 2014. The construction manager and health and safety officer, and Contractor's site superintendents mobilized for the Site-Wide

Grading phase and began coordination of the arrival of the site facilities (e.g. field offices, decontamination trailer, sanitary facilities, waste dumpsters, and temporary utilities), site vehicles, field work materials such as personal protective equipment (PPE), and heavy equipment.

The pre-construction inspection and meeting was held on September 9, 2014 with EPA (IDEQ and the Shoshone-Bannock Tribes were invited but did not attend), FMC, MWH, Parsons and CB&I. The meeting agenda included discussion of health and safety requirements for the project, site security, general construction sequence and dust control and monitoring.

Section 3.1.3 Equipment Staging

The location and extent of the equipment and facilities staging area is shown in Figure 3-1. The location of the staging area was selected due to the proximity to existing power and construction water supplies. In addition to the site facilities, the staging area provides sufficient room for all heavy equipment. A list of the construction equipment anticipated and utilized for the Site-Wide Grading phase of the project is presented in Table 3.1.

Table 3.1 List of Anticipated and Utilized Construction Equipment

Equipment	Number of Units	Use
CAT 426C Backhoe	1	General Support Equipment
CAT D6N Dozer	2	Earthwork
CAT D8T Dozer	2	Earthwork
CAT D10R Dozer	2	Earthwork
CAT 740B Truck	6	Earthwork
Volvo A35G Truck	3	Earthwork
CAT 365 Excavator	2	Earthwork
CAT 349 Excavator	2	Earthwork
CAT 980 Loader	1	Earthwork
CAT CS56 Compactor	1	Earthwork
CAT 140M Motor Grader	1	Grading and Road Maintenance
Light Towers	5	General Support Equipment
Crusher with Portable Screens and Conveyors	1	Slag Crushing/Screening
Trash Pumps	2	Water Management
5,000 Gallon Off-Road Water Trucks	3	Dust Suppression
8,000 Gallon CAT 769	1	Dust Suppression
10,000 Gallon Water Tanks	2	Dust Suppression

As part of the equipment staging area set-up, all erosion and stormwater control measures specified in the SWPPP (Appendix D of the RAWP for SWG phase submitted to EPA on September 15, 2014 [MWH, 2014b]) were installed in this area.

SECTION 3.2 SITE-WIDE GRADING PHASE CONSTRUCTION

This section summarizes the major elements of the Site-Wide Grading phase of the soil remedial action at the FMC OU. The Contractor prepared a project-specific Construction Plan and List of Permits for the project is contained in Appendix A of the RAWP for Site-Wide Grading Phase (MWH, 2014b).

Section 3.2.1 Site Clearance and Integration of RCRA Pond Monitoring Systems

One of the first components of work that occurred was the site clearance activities and integration of RCRA Pond Monitoring Systems as set forth in the following specifications:

- Section 02050 – Site Clearance; and
- Section 02051 – Integration of RCRA Monitoring Systems.

As described in Specification 02050 – Site Clearance, concrete debris generated from the site clearance activities was sized on-site to a maximum of 24 inches and utilized within the general slag fill. Structural steel and other metals were and will be transported off-site for recycling. Debris from site clearance activities was and will be placed in dumpsters and transported and disposed at an approved facility as specified in the Transportation and Off-Site Disposal Plan (TODP).

Section 3.2.2 Earthwork for Site-Wide Grading

Prior to commencing earthworks, a pre-construction survey was performed at the site to confirm the earthwork quantities specified in the bid documentation.

To the extent possible, material has been and will be pushed by a dozer to meet the lines and grades while remaining within the RA. Where necessary, excess slag/fill from RA-F, RA-F3, RA-G (North) and RA-H (East) has been and will be transported to other RAs where additional fill material is required. The overall site grading plan is shown on Figure 3-2. The site-wide grading and cut/fill for specific RAs are detailed in the Design Drawings contained in Appendix A of the Pre-Final RDR.

After the lines and grades of the general slag/fill layer for those RAs that will receive an ET cap are met, placement of the capillary break and screened slag material will commence, as specified in Specification 02222 – Earthworks. As indicated on Figure 3-3, a 12-inch layer of both the capillary break and screened fill will be placed at RAs B, C, D, E, F1, F2, H and K in advance of the construction of the soil layer component of the ET caps for these RAs.

Section 3.2.3 Earthwork for Stormwater Retention Ponds

Another source of excess fill material will be from the excavation of the six detention ponds (Pond 1, Pond 2, Pond 3, Pond 4, Pond 5, and Pond 7) that will comprise the overall stormwater management system for the FMC OU. Approximately 82,000 cubic yards of material that will be used as fill in other RAs will be generated during the excavation of the six detention ponds. The detention ponds are detailed in the Design Drawings contained in the Pre-Final RDR (Appendix A).

Section 3.2.4 Stormwater Pipe Cleaning in RA-A

The stormwater pipe (SWP) cleaning and abandonment will be conducted on approximately 840 feet of 8' steel and 16' concrete pipe. This component of work will begin by locating all of the required access points to the pipe as shown on Figure 3-4. The contractor will then clean the pipe with a jetting system and collect the water and sediment downstream using a vacuum truck to achieve the goal of a zero discharge system. Wash water will be containerized (e.g., baker or frac tanks) and solids will be allowed to settle prior to characterization sampling by FMC. Both the water and sediment will be sampled for waste characterization purposes. Based on the results of the sampling, the water and sediment will be disposed per the Transportation and Off-Site Disposal Plan for the FMC OU Soil RA. Following cleaning and prior to abandonment, a video survey will be performed and supplied to FMC, EPA and MWH for acceptance as described in the Performance Standard Verification Plan (PSVP) for RA-J and SWP in RA-A contained in Appendix H of the RAWP for Site-Wide Grading Phase (MWH, 2014b). Once accepted, the pipe inlets will be abandoned by plugging with cement grout. The methods and procedures to be followed during the stormwater piping cleaning and abandonment are detailed in Specification 02080 – Pipe Cleaning and Abandonment presented the Pre-Final RDR (Appendix C).

Section 3.2.5 Excavation of Surface Soil at RA-J

The top 6 inches of soil in RA-J has been excavated and transported across Highway 30 to the main FMC property and consolidated within RA-B as subgrade fill material. Note that the soil removed from RA-J will not be used in the soil layer of the ET or gamma caps. Following excavation of the top 6 inches of soil at RA-J, soil sampling was performed in accordance with the PSVP for RA-J and SWP in RA-A contained in Appendix H of the RAWP for Site-Wide Grading Phase (MWH, 2014b). Depending on the results of the analytical data, additional soil will be removed from RA-J to meet IRODA remedial action requirements. Following verification of achievement of the performance standard, RA-J will be re-vegetated with the seed mix specified in Specification 02930 - Seeding. Seeding of RA-J will be performed using a drill seed method. Seeding is anticipated for the spring of 2015. Storm water pollution controls and dust controls will remain in place and/or be implemented as necessary until vegetation is re-established.

12/7/2010 10:20 AM

WOOLSERN

C:\pwworkdir\dms05210\10503434-STAGING

REV	DATE	BY	DESCRIPTION
B	06-02-2014	JTV	90/95% SUBMITTAL
A	03-03-2014	RNW	30% SUBMITTAL

SCALE: AS NOTED

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED J DIXON
DRAWN R WOOLSEY
CHECKED C TOMLINSON

PRELIMINARY DESIGN PHASE - 06-02-2014

NOT FOR CONSTRUCTION

This document is an interim document and not suitable for construction. As an interim document, it may contain data that is potentially inaccurate or incomplete and is not to be relied upon without the express written consent of the preparer.

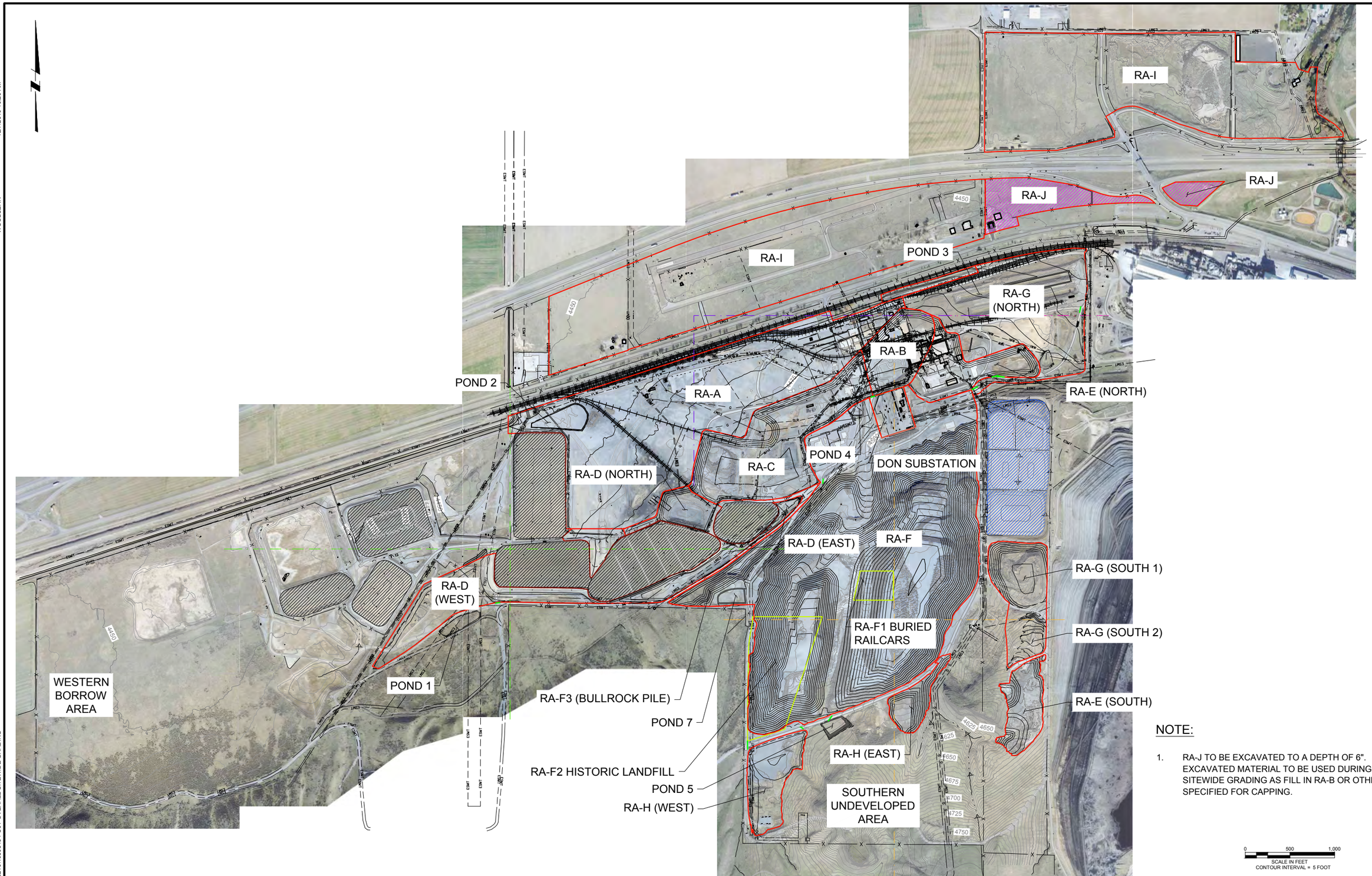
MWH

FMC

PROJECT LOCATION: POCATELLO, IDAHO

FMC OU REMEDIAL ACTION WORK PLAN
LOCATION OF EQUIPMENT AND
FACILITIES STAGING AREA

FIGURE 3-1



NOTE:

1. RA-J TO BE EXCAVATED TO A DEPTH OF 6". EXCAVATED MATERIAL TO BE USED DURING SITEWIDE GRADING AS FILL IN RA-B OR OTHER RA SPECIFIED FOR CAPPING.

0 500 1,000
SCALE IN FEET
CONTOUR INTERVAL = 5 FOOT

REV	DATE	BY	DESCRIPTION
B	06-02-2014	RNW	90/95% SUBMITTAL
A	03-03-2014	JTV	30% SUBMITTAL

SCALE: AS NOTED

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED J. DIXON
DRAWN J VERNER
CHECKED C TOMLINSON

PRELIMINARY DESIGN PHASE - 06-02-2014

NOT FOR CONSTRUCTION
This document is an interim document and not suitable for construction. As an interim document, it may contain data that is potentially inaccurate or incomplete and is not to be relied upon without the express written consent of the preparer.

MWH

FMC

PROJECT LOCATION: POCATELLO, IDAHO

FMC OU REMEDIAL ACTION WORK PLAN
OVERALL SITEWIDE GRADING

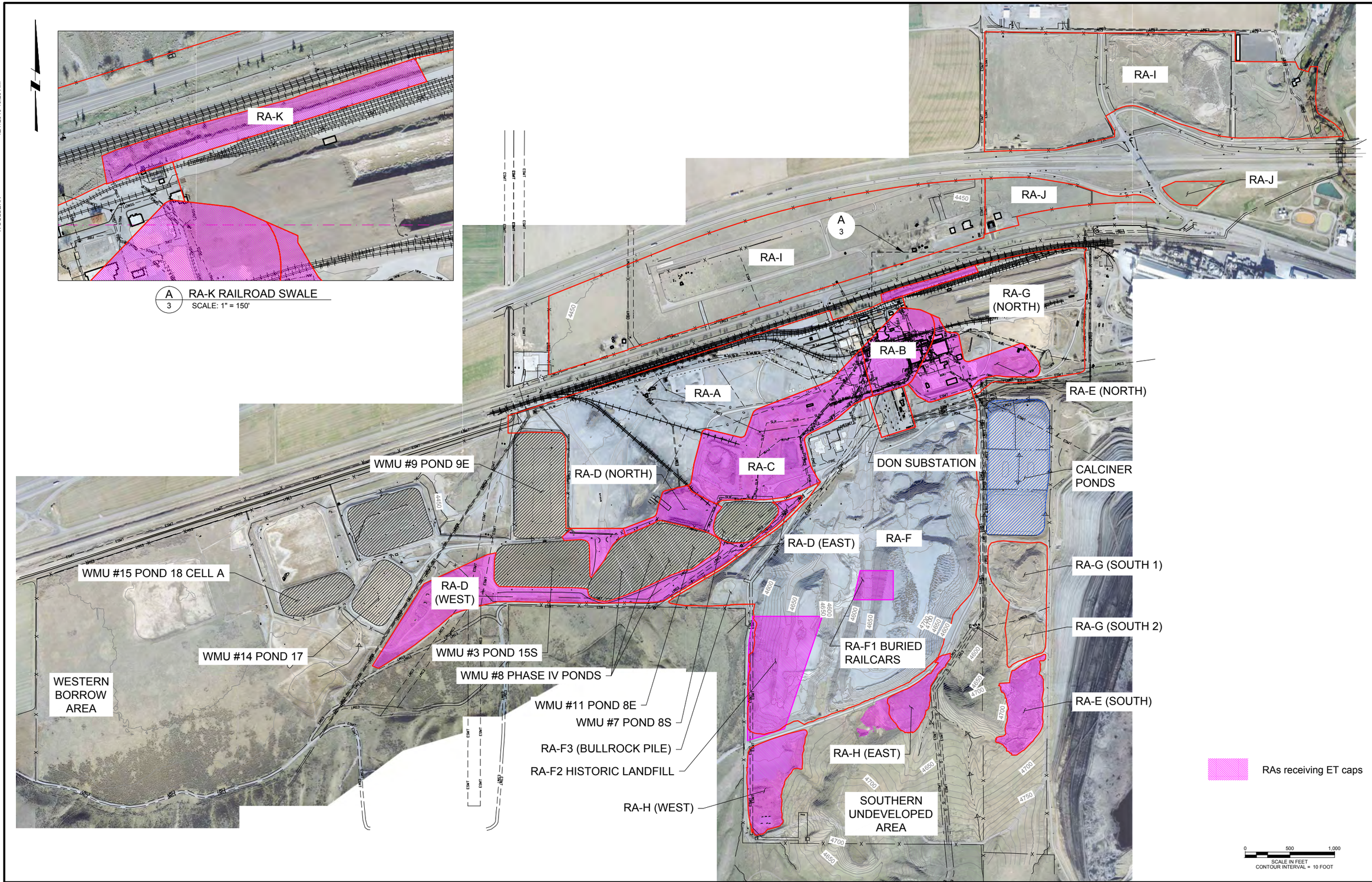
FIGURE 3-2

12/7/2010 10:20 AM
WOOLSERN
C:\pwworkdir\dms05210\10503434-C01-OVERALL SITEWIDE GRADING

12/7/2010 10:20 AM

WOOLSERN

A 3 RA-K RAILROAD SWALE
SCALE: 1" = 150'



REV	DATE	BY	DESCRIPTION
B	06-02-2014	JTV	90/95% SUBMITTAL
A	03-03-2014	JTV	30% SUBMITTAL

SCALE: AS NOTED

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED J DIXON
DRAWN J VERNER
CHECKED C TOMLINSON

PRELIMINARY DESIGN PHASE - 06-02-2014

NOT FOR CONSTRUCTION

This document is an interim document and not suitable for construction. As an interim document, it may contain data that is potentially inaccurate or incomplete and is not to be relied upon without the express written consent of the preparer.

MWH

FMC

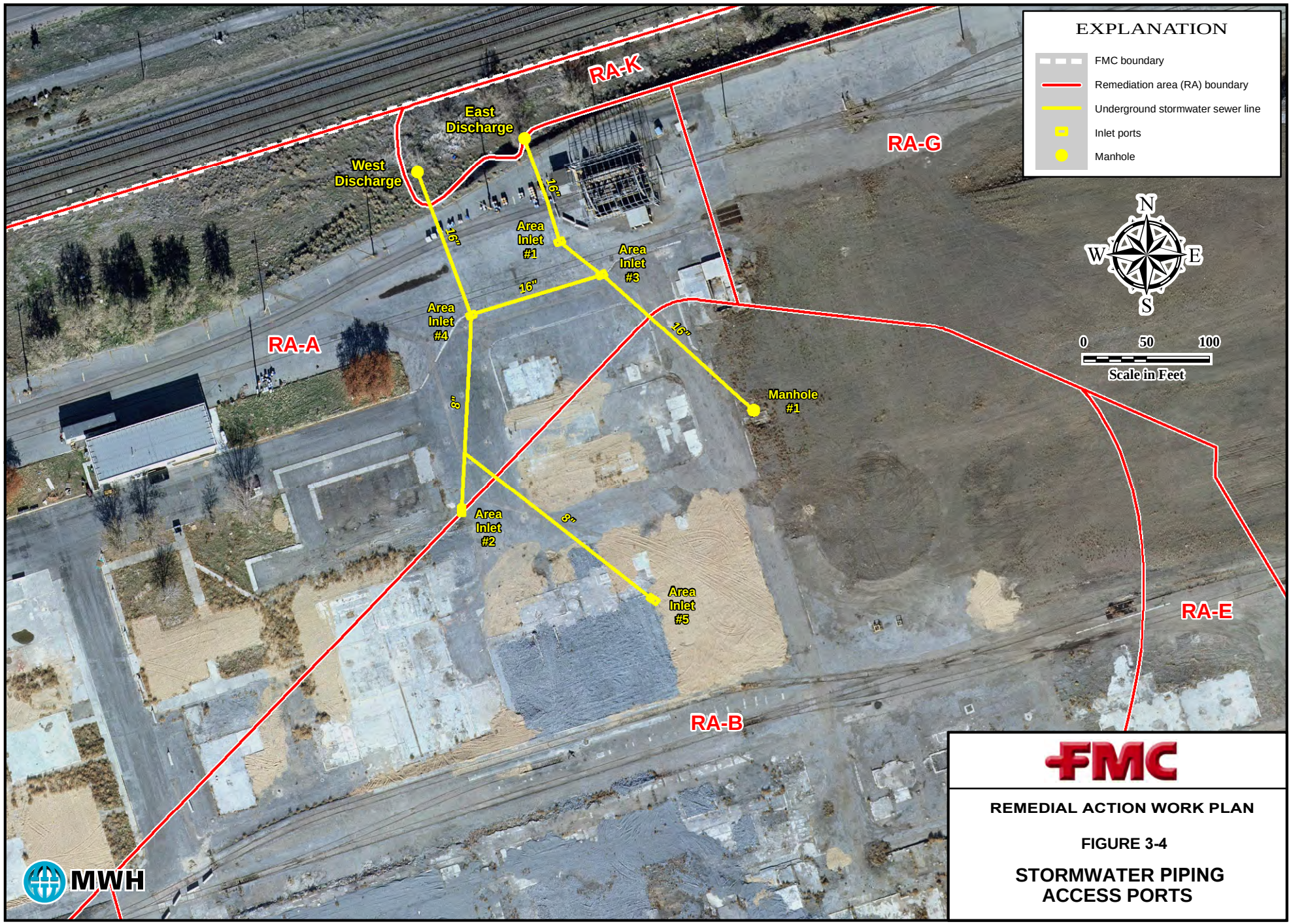
PROJECT LOCATION: POCATELLO, IDAHO

FMC OU REMEDIAL ACTION WORK PLAN
REMEDIATION AREAS SPECIFIED FOR ET CAPS

FIGURE 3-3

Fig 3-3_Remediation Areas Specified for ET Caps.ai

FILE: I:\projects\FMCidaho\FMC_PreDraft Perf Stand Verif Plan\FIGURES\Fig 6_Stormwater Sewer Access Ports_Feb2014.mxd DATE: 13 Feb 2014



FMC

REMEDIAL ACTION WORK PLAN

FIGURE 3-4

STORMWATER PIPING ACCESS PORTS

SECTION 4 CAPPING PHASE CONSTRUCTION ACTIVITIES

This section summarizes the major elements of the Capping phase of the soil remedial action at the FMC OU. As described in Section 1.4, the current project schedule (Section 7) is predicated on EPA approval of the final design and approval to proceed with the Capping phase prior to completion of the Site-Wide Grading phase construction and demobilization.

SECTION 4.1 PLANNING FOR THE CAPPING PHASE

As described in 3.1.2, CB&I prepared the "Contractor" documents that were contained in the RAWP for Site-Wide Grading Phase (MWH, 2014b). Prior to initiating the Capping phase, the Contractor will prepare documents specific to the Capping phase or review and revise, as appropriate, the Site-Wide Grading phase documents:

Documents specific to the Capping phase:

- Construction Plan; and
- Project Overview Bar Chart

Site-Wide Grading phase documents that will be reviewed and revised, as appropriate, for the Capping Phase:

- Contractor Health and Safety Plan;
- Stormwater Pollution Prevention Plan;
- Materials Management Plan;
- Emissions Reduction Plan;
- Water Management Plan; and
- List of Permits.

The Contractor-prepared (or reviewed/revised) documents will be provided in Appendices A, B and D through H of the Final Remedial Action Plan.

In the event that the Site-Wide Grading phase is completed and demobilized prior to EPA approval of the final design and approval to proceed with the Capping phase, the Contractor will mobilize in a manner similar to the mobilization for the Site-Wide Grading phase as described in Section 3.1.2. In addition a Capping phase pre-construction inspection and meeting will be convened prior to commencement of construction.

The equipment list for the Capping phase is expected to be very similar to the list for the Site-Wide grading phase (Table 3.1).

SECTION 4.2 EXCAVATION OF SOILS IN THE WESTERN UNDEVELOPED AREA FOR CAP CONSTRUCTION

There are approximately 2.4 million CY of soil (silt) available in the Western Undeveloped Area (WUA) of the FMC OU for use in constructing the ET and Gamma soil covers. The preliminary required soil volume based on a 12-inch gamma cap and 30-inch ET cover is approximately 1.3 million CY. Therefore, there is ample volume of soil in the WUA to support the RA.

The approximate areal extent of the WUA borrow area is shown on Figure 4-1. The WUA borrow area will be grubbed per Specification 02212 - Grubbing, Stripping, and Stockpiling Topsoil prior to excavation and transport of borrow soil (silt) for construction of the caps. Following removal of the soil required to complete construction of the caps, the borrow area will be reclaimed in accordance with Specification 02935 – Reclamation of Disturbed Areas with the exception of that portion of the borrow area that will be utilized as a percolation basin for the groundwater remedy (refer to Figure 4-1).

SECTION 4.3 EARTHWORK FOR CONSTRUCTION OF ET AND GAMMA CAPS

Prior to full-scale construction of the ET and Gamma covers, the Contractor will construct a fill placement trial plot to determine the appropriate placement and compaction methods for achieving the required densities and thicknesses for the ET and Gamma covers as detailed in Specification 02222 - Earthworks. The main objectives of the trial plots will be to determine the loose lift thickness and number of passes of the low pressure dozer to achieve the required cover thickness and density.

Section 4.3.1 Construction of ET Caps

The ET soil caps will be constructed at RA-B, RA-C, RA-D, RA-E, RA-F1, RA-F2, RA-H, and RA-K after surveying of the surface of the capillary break layer confirms that design grades have been achieved (capillary break layer placement is described above in Section 3.2.2) at each of the RAs. The RAs designated for ET caps are shown on Figure 4-2. The ET soil cap consists of a cover soil layer that has a compacted thickness of 24 inches and an overlying top soil layer that has a compacted thickness of 6 inches, for a total compacted soil cap thickness of 30 inches. The ET soil cap placement, compaction and density are provided in Specification 02222 - Earthworks. The finished grade and integration of the ET caps into adjacent capped areas (e.g., RCRA ponds or gamma caps) are detailed in the Design Drawings contained in the Pre-Final RDR (Appendix A).

The ET cap surfaces will be re-vegetated per Specification 02930 - Seeding. Seeding will take place in the fall or early spring.

Section 4.3.2 Construction of Gamma Caps

The gamma caps will be constructed at RA-A, RA-F (excluding RAs F-1 and F-2 that receive ET caps), and RA-G after surveying of the surface of the general fill confirms that design grades have been achieved at each of the RAs. The RAs designated for gamma caps are shown on Figure 4-2. The preliminary design of the gamma caps is a soil layer that has a compacted thickness of 12 inches. A gamma cap addendum study to be performed pursuant to the Gamma Cap Work Plan Addendum (MWH, 2014c) is expected to allow for the finalization of the design thickness of the gamma caps. The gamma cap placement, compaction and density are provided in Specification 02222 – Earthworks (subject to finalization per the gamma cap addendum study). The finished grade and integration of the gamma caps into adjacent capped areas (e.g., RCRA ponds, ET caps) are detailed in the Design Drawings contained in the Pre-Final RDR (Appendix A).

The gamma cap surfaces will be re-vegetated per Specification 02930 - Seeding. Seeding will take place in the fall or early spring.

SECTION 4.4 CONSTRUCTION OF THE SITE-STORMWATER CONVEYANCE SYSTEMS (CHANNELS)

The stormwater conveyance systems that will be installed during the Capping phase of the project include the following components:

- Unlined ditches will convey stormwater along areas receiving gamma caps and will be constructed following final grading of gamma caps.
- Concrete-lined ditches will convey stormwater along areas receiving an ET caps and will be constructed following final grading of ET caps.
- Culverts to convey stormwater under existing roads will be constructed following construction of the unlined and concrete-lined ditches to ensure that they daylight.

The updated draft final stormwater management design for the site is presented in the Site-Wide Stormwater Management Design Report contained in Appendix E of the Pre-Final RDR. The locations, alignments and details of the conveyance systems are shown on the drawings contained in Appendix A of the Pre-Final RDR. Minor field adjustments may be necessary to meet the designed alignment in order to address issues not foreseen during design activities.

SECTION 4.5 DEMOBILIZATION

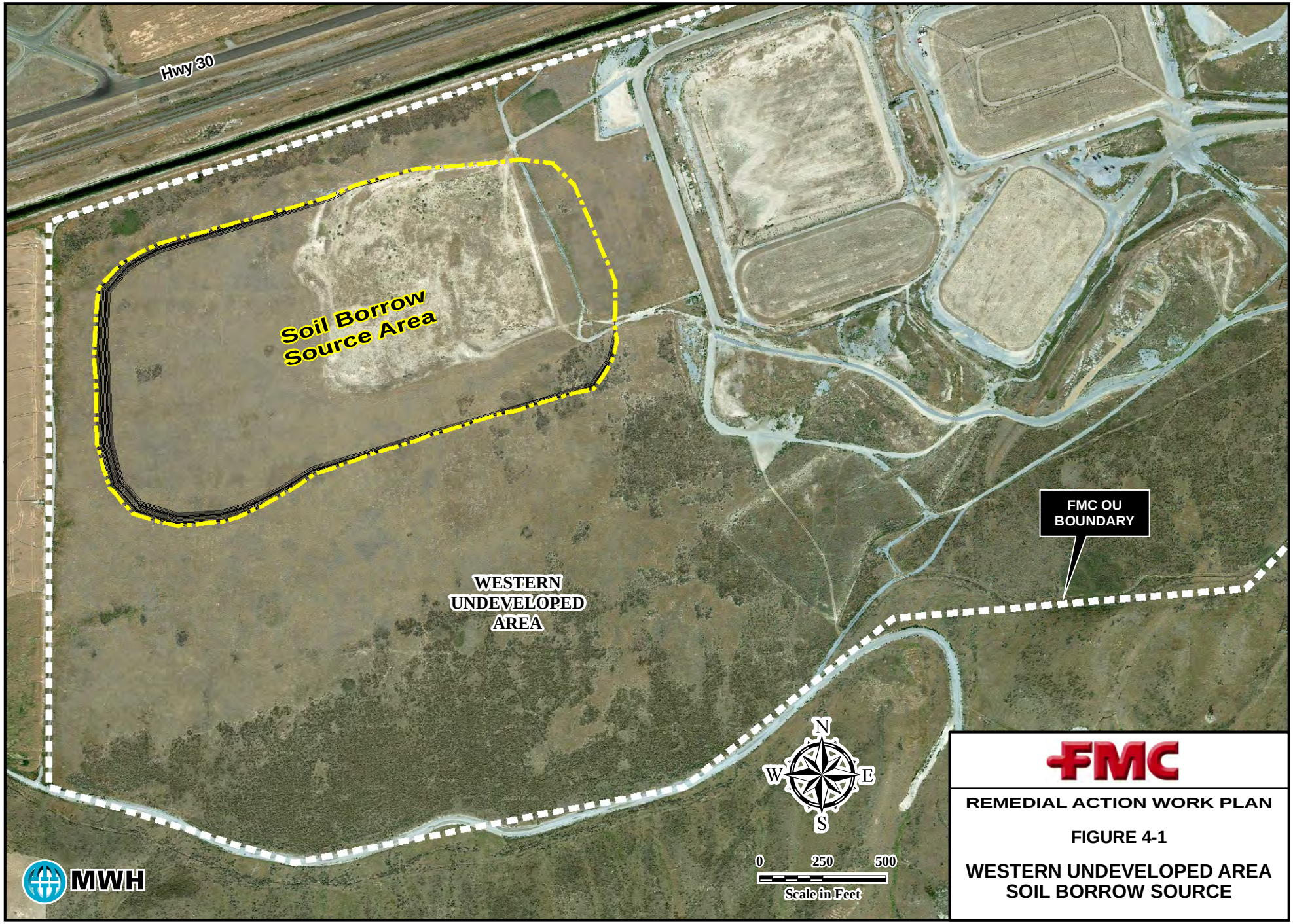
Following substantial completion of the Capping phase, the Contractor will begin demobilization and cleanup in accordance with Specification 01700 – Project Closeout. However, the

Contractor will retain appropriate resources to attend the EPA inspection described below and to perform any additional activities identified during that and any EPA re-inspection(s).

Per Paragraph 73 of the UAO (Completion of the Construction of the Interim Remedial Action), within 30 days after FMC concludes that the soil remedial action construction elements of the Interim Remedial Action have been constructed, FMC will schedule and conduct an inspection to be attended by FMC (and its Contractors) and EPA. EPA will invite Tribal and State representatives to attend. If EPA determines that construction of the soil remedial action construction elements of the Interim Remedial Action is not complete, EPA will so notify FMC. EPA's notice will include a description of the activities that FMC must perform for Construction Completion of the soil remedial action construction elements of the Interim Remedial Action and a schedule for such activities, or will require that FMC submit a schedule for EPA approval. A re-inspection will be conducted if requested by EPA. FMC will submit a pre-final inspection report that describes the activities required by EPA and documents their completion.

SECTION 4.6 NOTICE OF CONSTRUCTION COMPLETION

After the initial pre-notice inspection or subsequent re-inspection, if necessary, FMC will submit a written report requesting issuance of Notice of Construction Completion of the soil remedial action construction elements of the Remedial Action to EPA for approval within 60 days after the inspection. In the report, a registered professional engineer and FMC's Project Coordinator will state that the soil remedial action construction elements of the Interim Remedial Action have been constructed in full satisfaction of the requirements of IRODA and UAO. The report will be prepared in accordance with EPA's Close Out Procedures for NPL Sites (May 2011). The written report will include as-built drawings signed and stamped by a professional engineer.



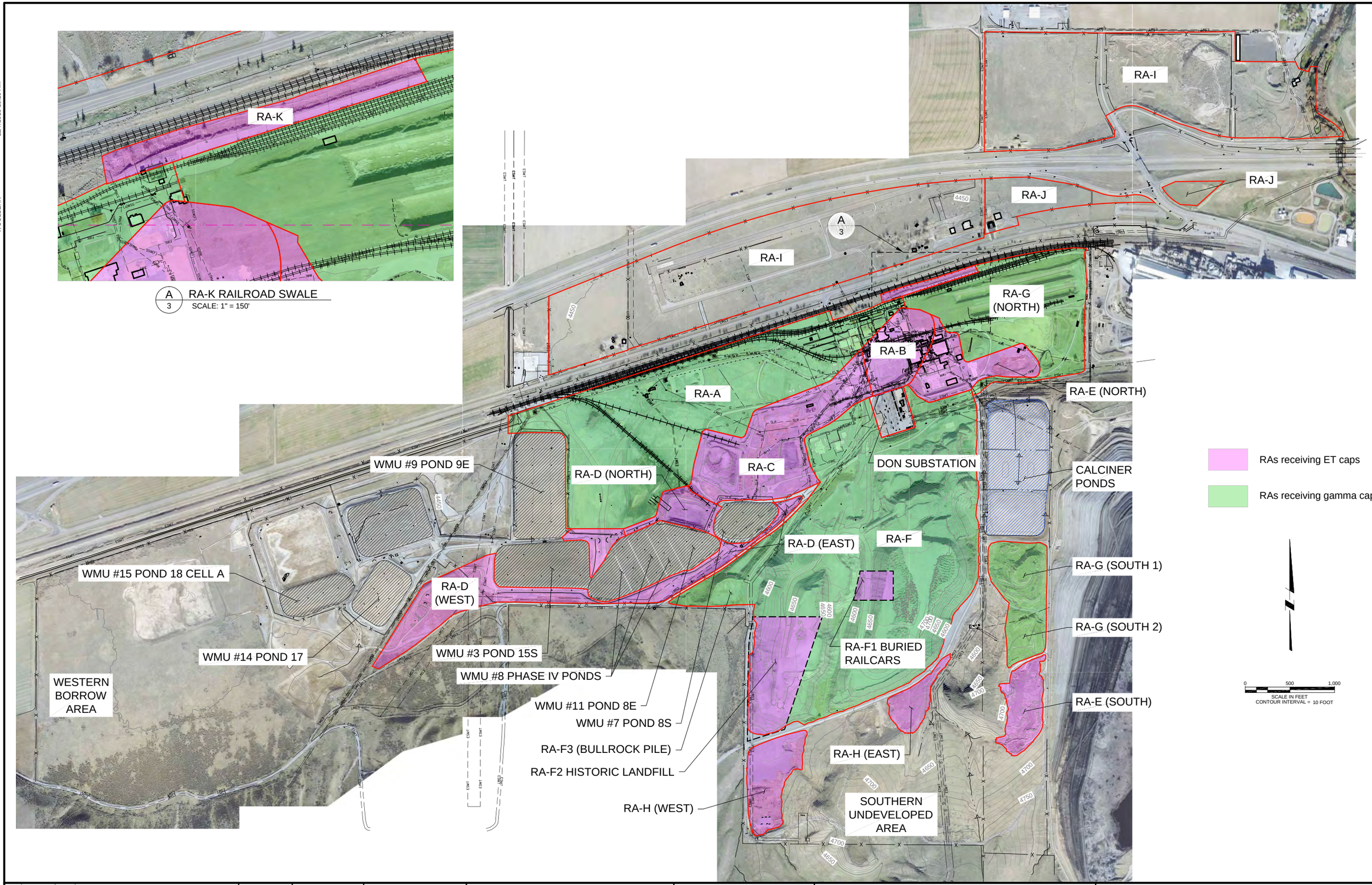
FMC

REMEDIAL ACTION WORK PLAN

FIGURE 4-1

WESTERN UNDEVELOPED AREA SOIL BORROW SOURCE

A 3 RA-K RAILROAD SWALE
SCALE: 1" = 150'



12/7/2010 10:20 AM
WOOLSERN
I:\projects\FMCidaho\FMC_REMEDIAL ACTION WORK PLAN\FIGURES\Fig 4-2_Remediation Areas Specified for ET and Gamma Caps_Jan2015.ai

REV	DATE	BY	DESCRIPTION
B	06-02-2014	JTV	90/95% SUBMITTAL
A	03-03-2014	JTV	30% SUBMITTAL

SCALE: AS NOTED

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED J DIXON
DRAWN J VERNER
CHECKED C TOMLINSON

PRELIMINARY DESIGN PHASE - 06-02-2014

NOT FOR CONSTRUCTION
This document is an interim document and not suitable for construction. As an interim document, it may contain data that is potentially inaccurate or incomplete and is not to be relied upon without the express written consent of the preparer.

MWH

FMC

PROJECT LOCATION: POCATELLO, IDAHO
FMC OU REMEDIAL ACTION WORK PLAN
REMEDIATION AREAS SPECIFIED FOR ET AND GAMMA CAPS

FIGURE 4-2

SECTION 5 MONITORING, MITIGATION AND RESPONSE ACTIONS

This section summarizes the construction quality assurance and quality control plans and the numerous plans that specify environmental controls, monitoring and actions applicable to the project.

SECTION 5.1 CONSTRUCTION QUALITY ASSURANCE AND QUALITY CONTROL

The RA construction quality assurance plan (CQAP) is included in Appendix D of the Pre-Final RDR. The CQAP describes the site-specific components of the QA program to ensure the completed RA meets or exceeds all RD criteria, plans, and specifications. The Contractor-prepared Construction Quality Control Plan (CQC Plan) for the Site-Wide Grading phase is contained in Appendix B the RAWP for Site-Wide Grading Phase (MWH, 2014b).

The Contractor will prepare a Construction Quality Control Plan (CQC Plan) for the Capping phase that will be contained in Appendix B of the Final RAWP. The Contractor's CQC Plan will at a minimum include the quality control requirements specified in the CQA (e.g., frequency and methods for QC testing and reporting).

SECTION 5.2 EMERGENCY RESPONSE PLAN AND SPILL CONTROL AND COUNTERMEASURES PLAN

The ERP describes the procedures that have been and will be used in the event of an accident or emergency at the FMC OU (for example, power outages, slope failure, etc) during remedial action activities associated with implementation of the soil remedy. The ERP includes the following:

- Name of the person(s) or entity(ies) responsible for responding in the event of an emergency incident;
- Plan and date(s) for meeting(s) with all appropriate authorities under the circumstances, including emergency response personnel and hospitals if relevant;
- Spill Prevention, Control, and Countermeasures (SPCC) Plan, as required
- Notification activities in accordance with Paragraph 57 of the UAO in the event of a hazardous substance release requiring reporting under Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act ("EPCRA"), 42 U.S.C. § 11004; and
- A description of all necessary actions to ensure compliance with Section XXI (Emergency Response) of the UAO in the event of an occurrence during the

performance of the Work that causes or threatens a release of waste material from the FMC OU that constitutes an emergency or may present an immediate threat to public health or welfare or the environment.

The ERP was developed to a level that supported proceeding with the soil remedy and specifically the site-wide grading, stormwater piping cleanout and soil excavation at RA-J. On August 25, 2014, FMC distributed copies of the ERP (and updated RCRA Contingency Plan) to the local emergency response agencies listed in the ERP and a meeting(s) was scheduled with those agencies. On September 4, 2014, FMC conducted a site familiarization tour for local emergency response organizations. The emergency response organizations that were invited included:

- *Chubbuck Fire Department*
- *Fort Hall Fire Department*
- *Pocatello Fire Department*
- *Fort Hall Police Department*
- *Idaho State Police*
- Power County Sheriff Department
- Portneuf Medical Center

Those organizations listed above in *italics* participated in the September 4, 2014 site familiarization meeting and tour.

The ERP has been updated to include undocumented subgrade conditions encountered at RA-H west (asbestos-containing materials) and revised to include activities associated with construction of the groundwater remedial action so that there is a single ERP for the FMC OU remedial action. The ERP, Revised January 2015 (and SPCC Plan contained in the ERP), is contained in the Supporting Documents submitted with the Pre-Final RDR.

SECTION 5.3 EQUIPMENT DECONTAMINATION AND TRANSPORTATION AND OFF-SITE DISPOSAL PLAN

Construction equipment used during the Site-Wide Grading phase that comes into contact with on-site fill materials (e.g., ore, slag) and/or soil mixed with fill materials has been and will be decontaminated prior to demobilizing (leaving) the FMC Plant Site. The decontamination procedures are detailed in Specification 01900 – Equipment Decontamination which is contained in the Pre-Final RDR (Appendix C). All decontamination materials (e.g., decontamination water and/or solids) to be transported off-site have been and will be managed per the Transportation and Off-Site Disposal Plan (TODP) for the project.

The TODP describes the measures FMC has and will take to ensure compliance with Paragraph 35 (Off-Site Shipments of Waste Material) of the UAO. The TODP includes the following:

- Proposed locations and routes for off-site shipment of waste material;
- Identification of communities affected by shipment of waste material; and
- Description of plans to minimize impacts on affected communities.

The TODP has been updated to include undocumented subgrade conditions encountered at RA-H west (asbestos-containing materials) and revised to include activities associated with construction of the groundwater remedial action so that there is a single TODP for the FMC OU remedial action. The TODP, Revised January 2015, is contained in the Supporting Documents submitted with the Pre-Final RDR.

SECTION 5.4 DUST CONTROL AND AIR MONITORING PLAN

The soil remedial action construction includes large-scale earthwork that has the potential to generate fugitive dust. Per Specification 01111 – Prevention of Water Pollution, Abatement of Air Pollution and Abatement of Noise, the Dust Control and Air Monitoring Plan sets forth an overall project goal of "zero visible emissions," specifies reasonable precautions to minimize fugitive dust, and specifies the air monitoring program and triggers for additional actions to control dust. The Dust Control and Air Monitoring Plan (DCAMP) contained in Appendix C of the RAWP for Site-Wide Grading Phase (MWH, 2014b) was approved by EPA and implemented during site-wide grading construction work performed during the period September 25 (start of earthwork) through December 19, 2014 (when earthwork construction ceased for a winter construction break).

On October 4, 2014, FMC submitted to EPA a revised DCAMP (Rev 1.0) that included provisions for slag crushing and screening that CB&I has determined will be necessary to produce material for the ET screened slag and cap capillary break layers. Based on comments received by FMC on the DCAMP (Rev 1.0), the DCAMP was further revised (Rev 2.0) and submitted to EPA for review and approval on December 19, 2014. Pending EPA approval of the DCAMP (Rev 2.0), CB&I plans to mobilize a crushing/screening plant and begin slag crushing and screening on or about March 2, 2015 for the resumption of construction / crushing and screening operation after the winter construction break. The DCAMP (Rev 2.0) is contained in Appendix C of this Draft RAWP.

In addition, as described in the Federal Air Rule for Indian Reservations in Idaho, Oregon, and Washington set forth at 40 C.F.R. Part 49 (FARR, 2005), the DCAMP is intended to supplement the FARR Plan required for the FMC OU during the period of remedial construction activities planned for 2014-2015. The FARR rules require the owner or operator of any source of fugitive particulate matter emissions located on Indian lands to take reasonable precautions to prevent fugitive particulate matter emissions and to maintain and operate the source to minimize these emissions. Facilities subject to the FARR rules are required to have a written plan describing the

reasonable precautions that will be taken to prevent fugitive particulate matter emissions, including appropriate monitoring and recordkeeping, and then to implement that plan.

SECTION 5.5 STORMWATER POLLUTION PREVENTION PLAN

All construction activities have been and will be conducted in compliance with the Stormwater Pollution Prevention Plan (SWPPP) and the measures identified therein. Specification 01570 - Stormwater Pollution Prevention Plan provides the minimum standard and requirement for the Contractor to develop and implement the measures identified in the SWPPP. The SWPPP for the Site-Wide Grading phase was developed with the intent to prevent the release of contaminated material from the site as well as the release of sediments from uncontaminated areas. The SWPPP addresses all areas of disturbance associated with the Site-Wide Grading phase of the project and will demonstrate that the facility will remain a zero discharge system, i.e., there will be no surface water discharges outside the FMC OU boundary, under normal precipitation events. The SWPPP was developed in accordance with the following guidance and regulatory documents:

> EPA guidebook, "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices" (EPA publication number 823-R-92-005, September 1992).

After review and revision, if needed, of the SWPPP for the Site-Wide Grading phase, the Contractor's SWPPP for Site-Wide Grading and Capping phases will be contained in Appendix D of the Final RAWP.

SECTION 5.6 MATERIALS MANAGEMENT AND WATER MANAGEMENT PLANS

Pursuant to Specification 01585 - Green and Sustainable Practices, the Contractor prepared a Materials Management Plan for the Site-Wide Grading phase that included plans to maximize use of an electronic format for communications and submittals, and minimize paper uses (i.e., provide double-sided prints). The document includes recycling plans for collection of plastics, paper, cardboard, and aluminum.

Pursuant to Specification 01585 - Green and Sustainable Practices, the Contractor prepared a Water Management Plan for the Site-Wide Grading phase. To the extent possible construction practices have and will continue to optimize water use. The Water Management Plan addresses the potential use of effluent water, including types of uses, schedule for use, estimated volume, location of water truck filling stations, effluent/pipeline diversion details, water treatment details as appropriate to allow for re-use, and deviation criteria (e.g., criteria when treatment plant effluent will not be used).

After review and revision, if needed, of the plans for the Site-Wide Grading phase, the Contractor's Materials Management Plan and Water Management Plan will be contained in Appendices E and F, respectively, of the Final RAWP.

SECTION 5.7 EMISSIONS REDUCTION PLAN

Pursuant to Specification 01585 - Green and Sustainable Practices, the Contractor prepared an Emissions Reduction Plan for the Site-Wide Grading phase. The plan includes provisions for the Contractor to explore the existence of a local low-sulfur diesel supplier for all vehicles and equipment used; provide a worker transportation plan, include carpool or rideshare parking area(s) in centralized location(s); and no-idle and speed limit policies. The plan outlines an emissions reduction education plan for workers, including information to site workers regarding benefits of minimizing idling of internal combustion equipment. The plan also includes procedures and guidelines for optimizing the use of temporary generator sets for heating, lighting, tools, and equipment and includes guidelines for reducing internal combustion engine idling time, following manufacturer's recommended maintenance and engine warm-up and cool-down times, and optimizing generator size given anticipated needs. After review and revision, if needed, of the plan for the Site-Wide Grading phase, the Contractor's Emissions Reduction Plan will be contained in Appendix G of the Final RAWP.

SECTION 5.8 PERFORMANCE STANDARDS VERIFICATION PLAN

The Performance Standards Verification Plan (PSVP) for RA-J and Stormwater Pipe Cleaning in RA-A presents a detailed description of the post-remedial action verification activities for the stormwater pipe cleaning within RA-A and verification ("confirmation sampling") following the soil excavation and removal at RA-J, including a QAPP and FSP. The PSVP for RA-J and Stormwater Pipe Cleaning in RA-A is contained in the Supporting Documents submitted on September 15, 2014 (MWH, 2014b).

The Draft PSVP describes the performance standards and plan for demonstrating the soil remedy components (except for verification activities for the stormwater pipe cleaning within RA-A and verification sampling following the soil excavation and removal at RA-J) meet the performance standards. The Draft PSVP describes the observations, measurements and monitoring of the ET and gamma caps and site-wide stormwater management systems and how the results of those activities will be evaluated / compared to the performance standards. However, note that the specific field procedures for the observations, measurements and monitoring are presented in the Operation, Maintenance and Monitoring (OM&M) Plan, which includes the Field Sampling Plan and Quality Assurance Project Plan. The Draft PSVP is contained in the Supporting Documents submitted with the Pre-Final RDR.

SECTION 5.9 OPERATION, MONITORING AND MAINTENANCE PLAN

The Draft OM&M Plan details the visual inspections, measurements and monitoring of the ET and gamma caps and site-wide stormwater management systems and engineering controls to ensure that their integrity is maintained. The OM&M Plan describes the individual monitoring tasks, schedule, monitoring criteria, and possible maintenance activities that will be performed to evaluate / assure that the soil remedy continues to meet the performance standards. The OM&M Plan includes the Field Sampling Plan and Quality Assurance Project Plan for the inspections, measurements and monitoring activities. The Draft OM&M Plan is contained in the Supporting Documents submitted with the Pre-Final RDR.

SECTION 6 HEALTH AND SAFETY PLAN

Consistent with FMC's Worldwide Policy on Health, Safety, Security and the Environment, FMC fully accepts its responsibility to protect the environment, the public, and the health, safety and security of its employees, their families, the communities where the company operates as a core value of its business sustainability. Transparently promoting health, safety, security and environment (HSSE) is the responsibility of all FMC employees around the world. One of the company's guiding principles is striving to eliminate all accidents and injuries, with the objective of achieving injury-free workplaces. Implementation of the HSSE is achieved through management and employee engagement, allocation of sufficient human and capital resources, and rigorous measurement, review and corrective action systems.

The FMC Site-Wide Health and Safety Plan (SWHASP, FMC, 2013) was initially transmitted to EPA on July 15, 2013 pursuant to the requirements of the RD/RA UOA. An updated SWHASP was provided to EPA on December 27, 2013. Any future updates to the SWHASP will be provided to EPA at the time of revision. A copy of the December 2013 SWHASP, which is the current version, is not included with this RAWP. The SWHASP was prepared in accordance with EPA guidance and the Occupational Safety and Health Administration (OSHA) requirements outlined in 29 CFR 1920. Addenda and/or Job Safety Analyses (JSAs) will be prepared as necessary during the RA process to address task-specific health and safety procedures. The SWHASP presents the minimum requirements for all site workers and on-site contractors involved with the RA. The RA Contractor(s) has prepared a task-specific health and safety plans that are at least as stringent as those specified in the SWHASP. The Contractor's HASP, Rev 3 for the project is contained in Appendix H of this RAWP.

SECTION 7 SOIL REMEDY RD/RA SCHEDULE

Table 7.1 presents a schedule for submittal and EPA approval of the RD deliverables and the RAWP that supported beginning the Site-Wide Grading phase in September 2014 and supports initiation of the Capping phase in June 2015 prior to completion / demobilization of the Site-Wide Grading Phase. The schedule also includes a preliminary construction schedule for the Capping Phase. Actual milestone dates are shown in **bold** font.

The schedule for submittal of the Final RD Package and Final RAWP on April 10, 2015 is predicated on EPA approval of the *Gamma Cap Work Plan Addendum* (Revision 1) (MWH, 2014c) and acceptable weather and surface conditions allowing the field work to be performed and completed in March 2015. The results of the Gamma Cap Addendum Study are necessary to finalize the design thickness of the gamma cap and select the equipment and procedures for performance demonstration measurements that will be detailed in the Final PSVP for the soil remedy. If the schedule for implementation / completion of the Gamma Cap Addendum Study slips beyond March, the schedule for submittal of the Final RD Package and Final RAWP and the sequential deliverables / work elements through the start of construction of the Capping phase likely will slip to the same extent.

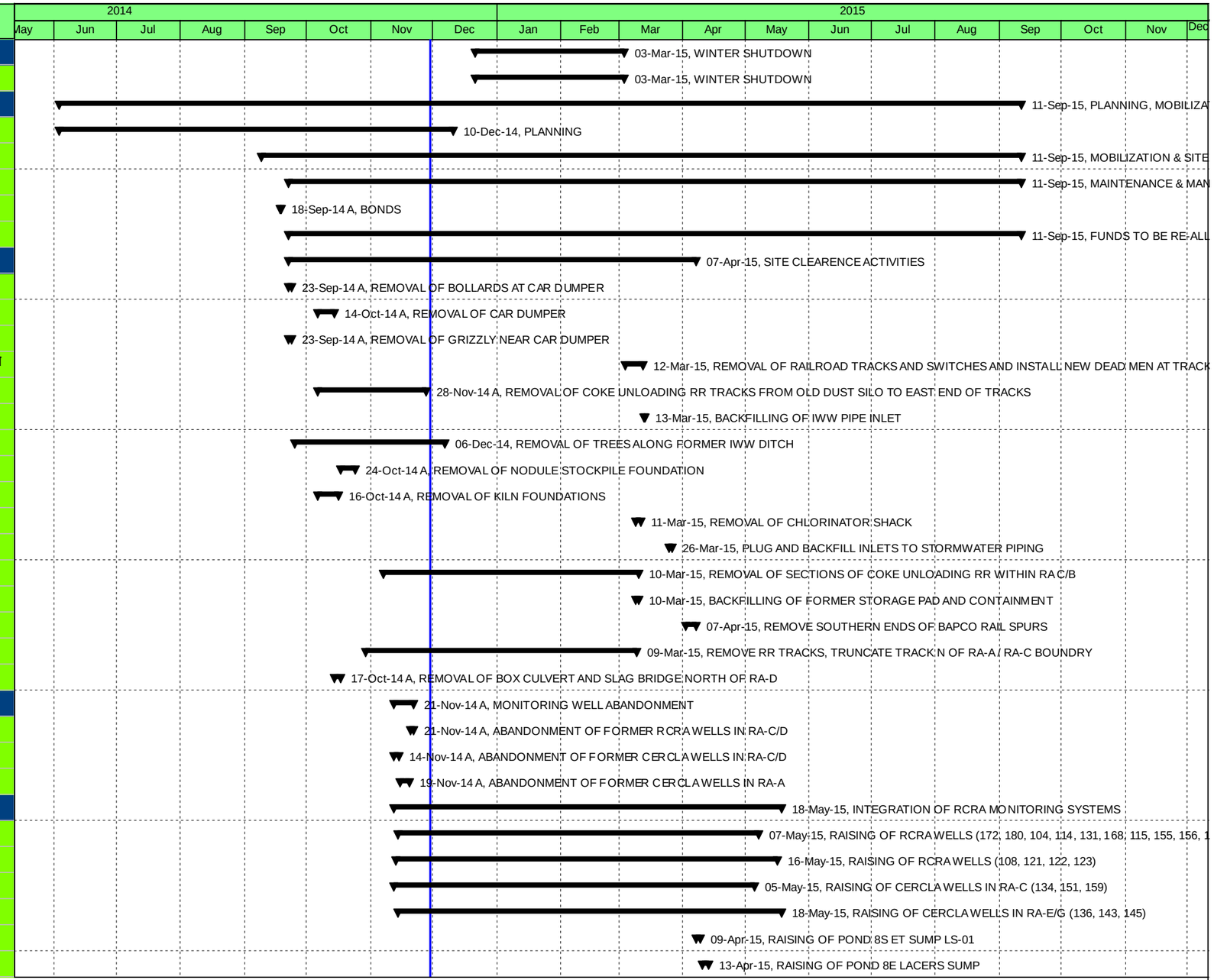
Table 7.1 Schedule for RD/RA Deliverables to EPA, Construction Schedule for the Site-Wide Grading Phase and Preliminary Construction Schedule for the Capping Phase

RD Deliverable / Work Element	Date
Submit Soil Remedy - Design Package; Site-Wide Grading and Stormwater Design and Plans submitted at the Pre-final (90%) RD level	**March 3, 2014**
EPA Comments on RD Package and Site-Wide Grading and Stormwater Design and Plans at the Pre-final (90%) RD level	**May 2, 2014**
Submit Final (100%) RD Package and Draft Remedial Action Work Plan for Site-Wide Grading phase	**June 2, 2014**
EPA review of FMC response to comments on Site-Wide Grading phase Design, Plans, Specifications and Supporting Documents, and EPA Comments on Draft Remedial Action Work Plan for Site-Wide Grading phase	**July 10, 2014**
Submit Final Site-Wide Grading Phase Design, Plans, Specifications and Supporting Documents, and Submit revised Remedial Action Work Plan for Site-Wide Grading phase with Contractor prepared plans	**July 18, 2014**
Distribute final ERP to response agencies and schedule meeting(s)	**August 25, 2014**

RD Deliverable / Work Element	Date
EPA approval of Site-Wide Grading Phase Design, Plans, Specifications and Supporting Documents and Remedial Action Work Plan for Site-Wide Grading phase	**September 5, 2014**
Pre-Construction Inspection and Meeting	**September 9, 2014**
Start of Site-Wide Grading Construction	**September 22, 2014**
Completion of Site-Wide Grading Construction (per Project Overview Bar Chart – 12/10/14 update)	September 11, 2015
Submit Soil Remedy Pre-Final RD Package for Gamma and ET Caps and Draft RAWP	**January 21, 2015**
EPA Comments on Soil Remedy Pre-Final RD Package and Draft RAWP	March 20, 2015
Submit Soil Remedy Final RD Package and Final RAWP	April 10, 2015
Bid Package Preparation	April 10, 2015
Evaluate Bids/Recommendation	May 15, 2015
EPA Approval of Soil Remedy Final RD and RAWP	June 5, 2015
Award Contract for Capping Phase	June 5, 2015
Pre-Construction Inspection and Meetings	June 10, 2015
Start of Construction – Capping Phase	June 11, 2015
Completion of Capping phase Construction	August 2016

CB&I's Project Overview Bar Chart for the Site-Wide Grading phase, updated on December 10, 2014 and provided as Figure 7-1 shows the current site-wide grading phase construction schedule. The preliminary scheduled duration of the Capping phase from June 2015 to August 2016 is based on a six (6) day per week construction schedule, an average placement of 5,000 CY of soil per day, and a winter construction break commencing in November 2015 and ending in March 2016.

Activity ID	Activity Name	Original Duration	Start	Finish
WINTER SHUTDOWN				
WINTER SHUTDOWN				
PLANNING, MOBILIZATION & SITE PREPARATION				
PLANNING				
MOBILIZATION & SITE PREPARATION				
MAINTENANCE & MANAGEMENT OF COMPANY AND CONTRACTOR FACILTIES				
BONDS				
FUNDS TO BE RE-ALLOCATED				
SITE CLEARENCE ACTIVITIES				
REMOVAL OF BOLLARDS AT CAR DUMPER				
REMOVAL OF CAR DUMPER				
REMOVAL OF GRIZZLY NEAR CAR DUMPER				
REMOVAL OF RAILROAD TRACKS AND SWITCHES AND INSTALL NEW DEAD MEN AT				
REMOVAL OF COKE UNLOADING RR TRACKS FROM OLD DUST SILO TO EAST END				
BACKFILLING OF IWW PIPE INLET				
REMOVAL OF TREES ALONG FORMER IWW DITCH				
REMOVAL OF NODULE STOCKPILE FOUNDATION				
REMOVAL OF KILN FOUNDATIONS				
REMOVAL OF CHLORINATOR SHACK				
PLUG AND BACKFILL INLETS TO STORMWATER PIPING				
REMOVAL OF SECTIONS OF COKE UNLOADING RR WITHIN RA C/B				
BACKFILLING OF FORMER STORAGE PAD AND CONTAINMENT				
REMOVE SOUTHERN ENDS OF BAPCO RAIL SPURS				
REMOVE RR TRACKS, TRUNCATE TRACK N OF RA-A / RA-C BOUNDRY				
REMOVAL OF BOX CULVERT AND SLAG BRIDGE NORTH OF RA-D				
MONITORING WELL ABANDONMENT				
ABANDONMENT OF FORMER RCRA WELLS IN RA-C/D				
ABANDONMENT OF FORMER CERCLA WELLS IN RA-C/D				
ABANDONMENT OF FORMER CERCLA WELLS IN RA-A				
INTEGRATION OF RCRA MONITORING SYSTEMS				
RAISING OF RCRA WELLS (172, 180, 104, 114, 131, 168, 115, 155, 156, 157)				
RAISING OF RCRA WELLS (108, 121, 122, 123)				
RAISING OF CERCLA WELLS IN RA-C (134, 151, 159)				
RAISING OF CERCLA WELLS IN RA-E/G (136, 143, 145)				
RAISING OF POND 8S ET SUMP LS-01				
RAISING OF POND 8E LACERS SUMP				



- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Milestone
- Summary

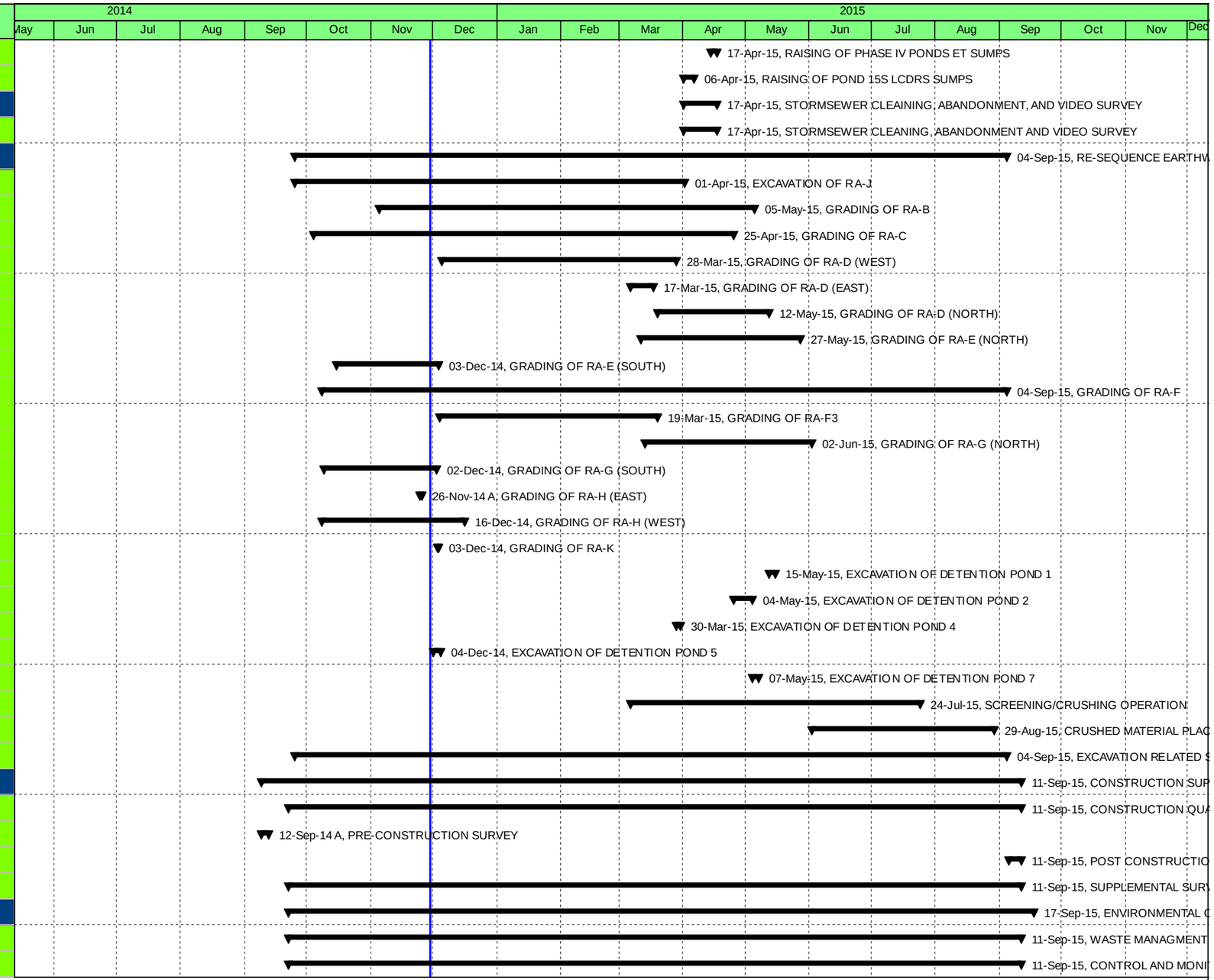
152356- EPA SUM 3

Draft Remedial Action Work Plan

Figure 7.1

Project Overview Bar Chart for SWG Phase - 12/10/14

Activity ID	Activity Name	Original Duration	Start	Finish
	RAISING OF PHASE IV PONDS ET SUMPS			
	RAISING OF POND 15S LCDRS SUMPS			
	STORMSEWER CLEAINING, ABANDONMENT, AND VIDEO SURVEY			
	STORMSEWER CLEANING, ABANDONMENT AND VIDEO SURVEY			
	RE-SEQUENCE EARTHWORK			
	EXCAVATION OF RA-J			
	GRADING OF RA-B			
	GRADING OF RA-C			
	GRADING OF RA-D (WEST)			
	GRADING OF RA-D (EAST)			
	GRADING OF RA-D (NORTH)			
	GRADING OF RA-E (NORTH)			
	GRADING OF RA-E (SOUTH)			
	GRADING OF RA-F			
	GRADING OF RA-F3			
	GRADING OF RA-G (NORTH)			
	GRADING OF RA-G (SOUTH)			
	GRADING OF RA-H (EAST)			
	GRADING OF RA-H (WEST)			
	GRADING OF RA-K			
	EXCAVATION OF DETENTION POND 1			
	EXCAVATION OF DETENTION POND 2			
	EXCAVATION OF DETENTION POND 4			
	EXCAVATION OF DETENTION POND 5			
	EXCAVATION OF DETENTION POND 7			
	SCREENING/CRUSHING OPERATION			
	CRUSHED MATERIAL PLACEMENT			
	EXCAVATION RELATED SPREADABLES			
	CONSTRUCTION SUPPORT ACTIVITIES			
	CONSTRUCTION QUALITY CONTROL			
	PRE-CONSTRUCTION SURVEY			
	POST CONSTRUCTION SURVEY			
	SUPPLEMENTAL SURVEY SUPPORT			
	ENVIRONMENTAL CONTROLS, MONITORING, AND REPORTING			
	WASTE MANAGMENT			
	CONTROL AND MONITORING OF HAZ SUBSTANCES MITIGATION			



- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Milestone
- Summary

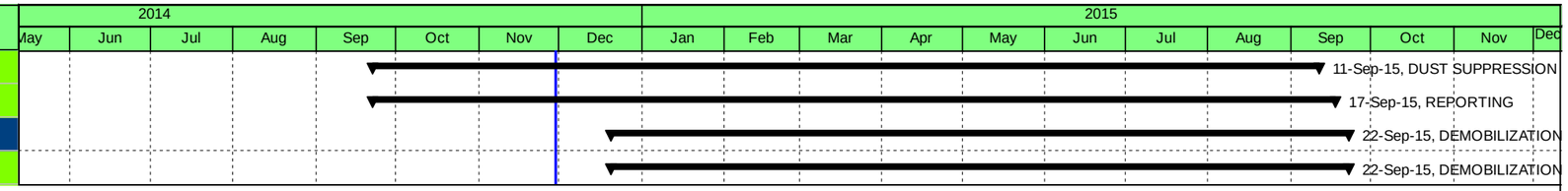
152356- EPA SUM 3

Draft Remedial Action Work Plan

Figure 7.1

Project Overview Bar Chart for SWG Phase - 12/10/14

Activity ID	Activity Name	Original Duration	Start	Finish
	DUST SUPPRESSION			
	REPORTING			
DEMOBILIZATION				
	DEMOBILIZATION			



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Milestone
Summary

152356- EPA SUM 3

Draft Remedial Action Work Plan

Figure 7.1

Project Overview Bar Chart for SWG Phase - 12/10/14

SECTION 8 REFERENCES

EPA, 1986. Superfund Remedial Design and Remedial Action Guidance. OSWER Directive 9355.0-4A. June.

EPA, 2001. Close Out Procedures for National Priorities List Sites. OSWER Directive 9320.2-22. May.

EPA, 2009. Principles for Greener Cleanups. OSWER. http://www.epa.gov/oswer/greenercleanups/pdfs/oswer_greencleanup_principles.pdf

EPA 2012. Interim Amendment to the Record of Decision for the EMF Superfund Site - FMC Operable Unit - Pocatello, Idaho, September 27, 2012.

EPA, 2013. Unilateral Administrative Order for Remedial Design and Remedial Action, EPA Docket No. CERCLA-10-2013-0116, June 10, 2013.

MWH, 2013a Remedial Design Work Plan for the FMC OU, December 2013.

FMC, 2013b. Site-Wide Health and Safety Plan, July 2013; RCRA Area Work Rules Updated December 17th, 2013.

MWH, 2014a Soil Remedial Action – Draft Remedial Design Report, March 2014, Revised June 2014.

MWH, 2014b Soil Remedial Action – Engineering Design Submittal, Supporting Documents and Remedial Action Work Plan for Site-Wide Grading Phase, September 2014.

MWH, 2014c Gamma Cap Work Plan Addendum, August 2014, Revised December 2014.

APPENDIX A

CONTRACTOR'S CONSTRUCTION PLAN AND LIST OF PERMITS

(PLAN AND LIST FOR SWG PHASE INCLUDED IN RAWP FOR SWG PHASE [SEP 2015])

(PLAN AND LIST FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

APPENDIX B

CONTRACTOR'S CONSTRUCTION QUALITY CONTROL PLAN

(CQAP FOR SWG PHASE INCLUDED IN RAWP FOR SWG PHASE [SEP 2015])

(CQAP FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

APPENDIX C

DUST CONTROL AND AIR MONITORING PLAN (REV2)

FMC Idaho LLC, Pocatello, Idaho

FMC OU REMEDIAL ACTION

DUST CONTROL AND AIR MONITORING PLAN

Revision 2.0

October 2014

Revised December 2014

MWH

Hydrometrics, Inc.

Bison Engineering

FMC OU

DUST CONTROL AND AIR MONITORING PLAN

Eastern Michaud Flats Site

Power County, ID

Revision 2.0

Prepared for:

MWH Americas, Inc.
2890 East Cottonwood Parkway, Suite 300
Salt Lake City, UT 84121

Prepared by:

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

Bison Engineering
1400 11th Avenue
Helena, MT 59601

December 2014

TABLE OF CONTENTS

LIST OF TABLES iii
LIST OF FIGURES iii
LIST OF APPENDICES iv
1.0 REGULATORY REQUIREMENTS 1-1
2.0 DUST SUPPRESSION MEASURES 2-1
2.1 DUST SUPPRESSION 2-1
2.1.1 Excavation and Grading 2-2
2.1.2 Haul Roads 2-6
2.1.3 Dumping and Placement 2-6
2.1.4 Slag and Stock Piles 2-8
2.1.5 Slag Crushing, Screening and Conveying 2-8
2.1.6 Inclement Weather 2-15
3.0 AIR QUALITY MONITORING 3-1
3.1 OFF-SITE MONITORING 3-1
3.1.1 Air Quality Impacts from Off-Site Sources 3-2
3.2 ON-SITE AIR QUALITY MONITORING 3-2
3.2.1 Historical Ambient Monitoring Data 3-3
3.2.2 Current Ambient Monitoring 3-9
3.2.3 Soil and Waste Analyses 3-10
3.2.4 Determination of Particulate Trigger Levels 3-12
3.2.5 Identify Haz. Airborne Concentrations for Each Significant COC 3-12
3.2.6 Calculate Maximum COC-to-Particulate Ratios for Each COC 3-15
3.2.7 Calculate PM_{10} and TSP Trigger Levels 3-16
3.3 AIR QUALITY OVERSIGHT 3-18
3.4 RATIONALE FOR USE OF TSP MEASUREMENTS 3-19
3.5 DESIGN AND IMPLEMENT REAL-TIME MONITORING NETWORK. 3-20
3.5.1 Real Time Particulate Monitoring 3-20
3.5.2 Real Time Meteorological Monitoring 3-24
3.5.3 Networking and Data Accessibility of the Monitoring System 3-24

3.5.4 Real Time Alarm When Trigger Levels Are Exceeded.....3-24
3.6 RATIONALE FOR USE OF MET ONE E-SAMPLERS 3-25
3.7 REAL-TIME MONITORING SCHEDULE 3-28
3.8 QUALITY ASSURANCE 3-28
3.9 DATA REPORTING 3-29
4.0 REFERENCES 4-1

LIST OF TABLES

TABLE 2.1. TACKIFIER USAGE.....2-5
TABLE 2.2. RELATIVE EMISSION RATE RATIOS OF CRUSHING AND SCREENING EQUIPMENT 2-9
TABLE 2.3. RING SIZE, NUMBER OF NOZZLES, AND WATER USAGE 2-11
TABLE 3.1. EMF AIR MONITORING PROGRAM MATRIX (1993 – 1994).....3-7
TABLE 3.2. EPA COC SCREENING LEVELS (HISTORICAL) 3-7
TABLE 3.3. METALS AND RADIONUCLIDES ANALYZED FROM TSP AND PM_{10} FILTERS (1993 – 1994) 3-8
TABLE 3.4. EPA METALS / INORGANICS SCREENING LEVELS (CURRENT).....3-9
TABLE 3.5. SUMMARY OF SOIL AND WASTE MATERIAL ANALYSES 3-10
TABLE 3.6. COC SCREENING LEVELS USED FOR TRIGGER LEVEL ANALYSIS 3-14
TABLE 3.7. SUMMARY OF COC-TO-PARTICULATE RATIOS 3-16
TABLE 3.8. CALCULATED PARTICULATE TRIGGER LEVELS FOR COCS .3-18
TABLE 3.9. RADIONUCLIDE CONCENTRATIONS CORRESPONDING TO TSP TRIGGER LEVEL OF 152 µG/M3 3-18

LIST OF FIGURES

FIGURE 2-1. TRUCK CLEANING/DECONTAMINATION LOCATIONS.....2-7
FIGURE 3-1. FMC LOCATION AND BOUNDARY.....3-5
FIGURE 3-2. 2013 WINDROSE FROM NATIONAL WEATHER SERVICE STATIONS: POCATELLO, IDAHO.....3-22

FIGURE 3-3. PLACEMENT OF FIXED AIR SAMPLERS 3-23
FIGURE 3-4. PHOTOS OF MET ONE E-SAMPLER 3-25

APPENDICES

APPENDIX A - INFORMATION ON DUST CONTROL TACKIFIERS

FMC OU

DUST CONTROL AND AIR MONITORING PLAN

Eastern Michaud Flats Site

Power County, ID

1.0 REGULATORY REQUIREMENTS

This *Dust Control and Air Monitoring Plan* has been prepared on behalf of FMC Corporation (FMC) and presents the procedures that will be used to prevent, monitor, and respond to dust generation during soil remedial action activities at the FMC Operable Unit (FMC OU) of the Eastern Michaud Flats (EMF) Superfund Site (Site). The FMC OU is located in Power County in Idaho, approximately 2.5 miles northwest of Pocatello. The EMF Site includes two adjacent production facilities, the former FMC Corporation elemental phosphorus (P4) processing plant that ceased operation in 2001 and a phosphate fertilizer processing facility currently operated by the J.R. Simplot Company. The EMF Site is shown on Figure 3-1 and encompasses both the FMC and Simplot plants and surrounding areas (Off-Plant OU) affected by releases from these facilities.

This *Dust Control and Air Monitoring Plan* is one of many work elements that have been developed and implemented pursuant to the remedial actions set forth in the Interim Amendment to the Record of Decision (IRODA) for the EMF Superfund Site FMC Operable Unit (IRODA; Environmental Protection Agency [EPA], 2012) and a Remedial Design/Remedial Action (RD/RA) Unilateral Administrative Order (UAO, EPA, 2013a) issued by EPA on June 10, 2013 which became effective on June 20, 2013. This *Dust Control and Air Monitoring Plan* has been prepared for use during the implementation of the remedial construction components (initial site grading and cover construction) of the soil remedy. The selected soil remedy includes placement of soil covers ("capping") over fill materials and soil mixed with fill materials at the FMC OU, removal and treatment of residual wastes in specified storm water piping and removal of surficial soil at Remediation Area (RA) J, and requires long-term monitoring and land use controls. A more detailed

description of the selected remedy for the FMC OU is presented in Section 2.4.2 of the *Final Remedial Design Work Plan* (MWH, 2013).

In addition, as described in the Federal Air Rule for Indian Reservations in Idaho, Oregon, and Washington set forth at 40 C.F.R. Part 49 (FARR, 2005), this *Dust Control and Air Monitoring Plan* is intended to supplement the FARR Plan required for the FMC site during the period of remedial construction activities planned for 2014-2015. The FARR rules require the owner or operator of any source of fugitive particulate matter emissions located on Indian lands to take reasonable precautions to prevent fugitive particulate matter emissions and to maintain and operate the source to minimize these emissions. Facilities subject to the FARR rules are required to have a written plan describing the reasonable precautions that will be taken to prevent fugitive particulate matter emissions, including appropriate monitoring and recordkeeping, and then to implement that plan.

2.0 DUST SUPPRESSION MEASURES

2.1 DUST SUPPRESSION

Dust generation is a primary concern during site earthwork, which includes excavation, hauling, screening (and potentially crushing), and placement of fill materials (e.g., slag) as part of the site-wide grading to achieve the designed sub-grade elevation and soil during placement of the soil covers (caps). During this work, the Site is to be maintained to EPA-directed standards. The EPA-directed goal at the FMC Pocatello site during the soil remedy construction is "No Visible Emissions." Therefore, dust control measures will be taken proactively to mitigate the potential sources of the dust as described in this Plan. Generally, the dust control measures include:

1. Watering to moisten large areas that will be disturbed by equipment such as graders and scrapers.
2. Water sprays at point of soil excavation or deposit by equipment such as excavators or dump trucks.
3. Watering of unpaved haul roads and reduced vehicle speeds.
4. Spraying of exposed non-slag waste soils with water prior to relatively short periods of inactivity and with tackifier prior to extended periods of inactivity.

If dust is observed during remedial activity, these measures will immediately be increased in frequency and/or intensity to mitigate dust at the source areas. In addition, these measures will be re-evaluated if the actionable trigger levels established in Section 3 are exceeded based on onsite real time monitoring or if visual observation suggests that dust control is not effective. Operator logs will be used to record water applications. The operator logs will be maintained to indicate how many truckloads are used for dust suppression and when water/tackifier is applied.

Based upon need and effectiveness, the general, prioritized strategy for dust control will be:

1. Application of water using water trucks;
2. Application of water using stationary sprays;
3. Application of tackifiers; and
4. Localized control, e.g., application of small water sprays on conveyor transfer points, screening/crushing equipment.

Further discussion of specific dust control measures are provided in the following subsections.

2.1.1 Excavation and Grading

A significant area of the site is covered with slag, which exhibits cementation properties that naturally control dust when it is left exposed and undisturbed. Even when disturbed by excavation or grading, because slag is a coarse, dense, vitrified material it produces little dust. Historically, there has been no need for dust control on the undisturbed slag surfaces of the site. However, water trucks and/or water sprays will be available and ready for dust control, if needed, whenever earthwork is occurring. Significant excavation is planned only in Remedial Areas RA-F, RA-G, RA-J, and in the Western Undeveloped Area (the source of the capping soil), but grading will occur in all remedial areas. In addition to using water trucks to control dust in these areas, stationary water spraying systems, e.g., an irrigation sprinkler, will be ready for use if needed.

Typically, a water truck will be used to apply water for dust control on roadways, stockpiles, and areas of active excavation or placement of site materials. However, stationary water

spray systems may be applied in areas where it is impractical to use a water truck and/or stationary water sprays are more effective. While stationary water sprays may be used at any location on the site, examples of where stationary spray systems may be used are:

- Areas where access by a water truck is limited or unsafe, such as the surface or sides of the slag pile;
- Large surface areas of disturbance such as RA-J, RA-G, or the Western Undeveloped Area during and after excavation; and
- Areas where soil excavation/placement equipment traffic is high such that use of a stationary spray system is safer than using mobile water trucks.

The stationary spray systems will typically consist of irrigation piping (or other comparable piping system) connecting the FMC production wells on the site to one or more stationary irrigation spray nozzles. The pumps at the production wells will typically supply the volume and pressure needed. However, some instances may require placement of portable tanks and pumps which will be supplied by the water trucks filled from the FMC production wells, e.g., if stationary water sprays are deemed necessary during and after excavation of RA-J. There are no plans to use any off-site source of water to be used for dust control.

A tackifier will be applied as necessary to control dust if an area is to be left exposed and undisturbed for an extended period of time (e.g., seven days or more) and which use of a water truck is deemed impractical or less efficient. FMC and site contractors have successfully used tackifiers for dust control at the Pocatello and other remediation sites. Although other tackfiers may be found and used which are more effective, the types of tackifiers that are planned for use, concentrations and application rates are provided in Table 2.1.

At the end of each workday, exposed soils in excavation areas that are not composed primarily of slag will be inspected to determine whether they are sufficiently moist to leave overnight, i.e., if the surface appears thoroughly wetted. If not, additional water will be applied until the surface is thoroughly wetted while avoiding any pooling on or runoff from the surface. If disturbed soils are to be left in work areas over an extended period of time, a sprinkler system or other means of dust control such as tackifier will be used as deemed necessary to suppress dust. For example, an area of disturbed soil will be wetted with the water truck as needed to control dust. If the area is to be inactive for seven (7) days or more (i.e., no active disturbance of the area soil), an evaluation will be made whether to continue use of the water truck for dust control or if application of a sprinkler system or tackifier would be more efficient. In cases where the disturbed soil is stable and is not creating visible dust and air monitoring indicates that total suspended particulate loading in the air is below trigger levels as discussed in Section 3.0, then no further dust control measures will be used until such time the area becomes actively disturbed.

TABLE 2.1. TACKIFIER USAGE

Note that Manufacturer Specification Sheets, Product Descriptions, and Safety Data Sheets for each of these tackifiers are provided in Appendix A.

Tackifier Name	Primary Active Ingredient	Primary Usage	Active Ingredient Concentration at Application	Application Rate [1]
Dust Guard Liquid®	Magnesium Chloride	Dust control on unpaved roads, stockpiles, and disturbed soils.	30%	1/2 gal/yd^2, split in two 1/4 gal/yd^2 applications.
Road Oyl®	Pine Resin and Pitch Emulsion	Dust control on unpaved roads.	5 to 10%	Wet the road surface, approximately 1/2 gal/yd^2.
Soiltac/Gorilla Snot®	Vinyl Co-Polymer	Dust control on unpaved roads, stockpiles, and disturbed soils.	20 to 60%	0.01 gal/yd^2 for disturbed soils. 0.15 gal/yd^2 for unpaved roads.

[1] Application rates may vary significantly based upon site conditions, weather, traffic use, and steepness of grade.

2.1.2 Haul Roads

Unpaved haul roads will be treated as necessary to control dust with magnesium chloride (per the application rates provided in Table 2-1), which has worked well at the site , or an equivalent tackifier, and water trucks will be used to apply additional dust control water spray to unpaved haul roads prior to their use. Additional magnesium chloride will be applied on an as-needed basis to control dust on haul roads. In addition, vehicle speeds will be kept below 20 mph and as low as necessary to prevent dust. Signs will be posted on each major segment of designated haul roads to remind drivers of the "No Dust" rule.

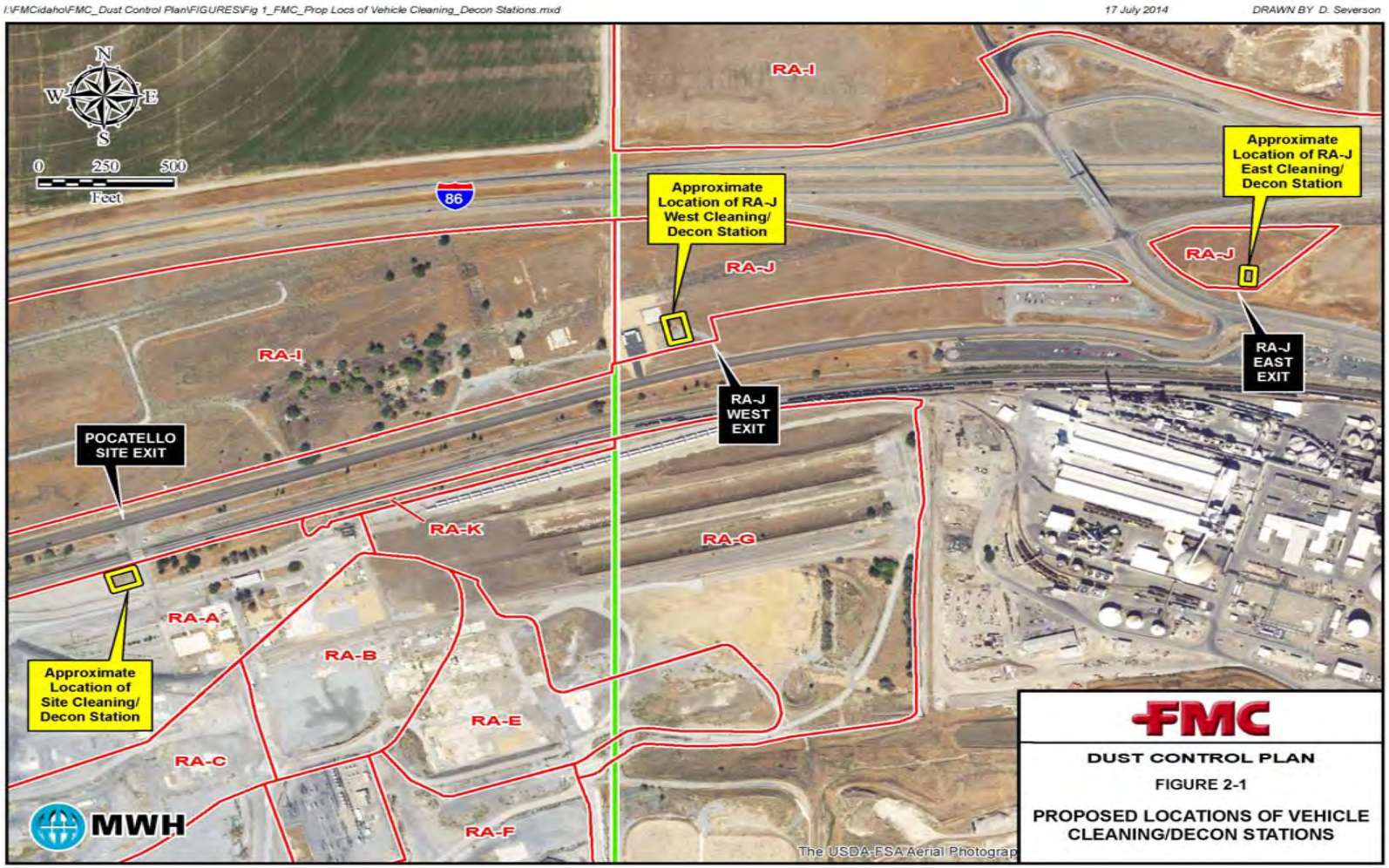
Paved roadways within the site will be maintained using a regenerative or vacuum type street sweeper that will be available as needed for cleaning these roadways. Hauling on public paved roads is planned only for limited excavation associated with RA-J and at the end of the project for the project close out. Trucks leaving the site will be swept or mechanically cleaned at identified decontamination sites prior to entering public roadways. Cleaning will be conducted to prevent tracking dust from the site. These cleaning/decontamination station locations are shown on Figure 2-1. While these stations will be located near the entrance/exits, the exact location may not be determined until site mobilization and will likely have to be moved during the remedial actions.

Loading of trucks will be carefully monitored and water spray may be applied as needed to knock down dust generated during loading. If the haul load includes fine-grained soil, the contents of the truck will be wetted prior to haul or the load will be covered if deemed necessary to control dust.

2.1.3 Dumping and Placement

Unloading of trucks will be carefully monitored and water spray will be applied as needed to knock down dust generated during unloading or dumping. Truck drivers will be trained on the need for care during unloading of trucks in order to prevent dust generation.

FIGURE 2-1. CLEANING/DECON STATION LOCATIONS



2.1.4 Slag and Stock Piles

Movement or handling of slag at the slag pile (RA-F) will be nearly continuous during operating hours for the Site-wide Grading phase of site remedial activities. Because of the slag pile elevation and nearly continual disturbance during construction hours, activities at the slag pile may pose a greater dust hazard than the rest of the slag-covered areas on site. The movement of slag on the slag pile will be managed in order to prevent fugitive dust. Dust from the slag pile will be controlled through use of water trucks, water sprays, and/or manned water hoses.

If deemed necessary, dust from stockpiles of other soils will be controlled through the use of water sprays when the stockpile is in use and tackifier when it is left undisturbed for an extended period of time.

2.1.5 Slag Crushing, Screening, and Conveying

Mineral crushing and screening operations can be major sources of airborne dust due to the inherent nature of size reduction and segregation processes. Control of dust generated by these operations can be achieved with proper analysis of the sources, identification of appropriate control technologies, and consistent application and maintenance of selected controls (NIOSH, 2012). Therefore, prevention of dust generation will be a primary focus during the slag crushing, screening, and conveying operation and dust control measures will be taken proactively to minimize the potential generation of dust. While Section 121(e)(1) of CERCLA provides that no Federal, State, or local permit is required for any removal or remedial action taken on-site, this Plan provides the substantive requirements consistent with a federally-enforceable air permit for the portable rock crushing equipment to be used for slag crushing, screening, and conveying operations.

Wet dust control systems can be very effective and are relatively low cost to install and operate (NIOSH, 2012). As shown in Table 2.2 below (EPA, 2003), wet processes generate significantly less dust than dry processes. Due to characteristics of the slag and the method of crushing and screening, wet dust control is possible for this application and should be very effective in controlling dust. However, because these operations are in a northern climate, freeze protection is necessary during cold weather (see Section 2.1.6).

TABLE 2.2. RELATIVE EMISSION RATE RATIOS OF CRUSHING AND SCREENING EQUIPMENT

Equipment	Relative Emission Rate Ratio
Primary crusher	1
Tertiary crusher (dry)	51
Tertiary crusher (wet)	2
Screen (dry)	214
Screen (wet)	12

The use of water to control dust may be classified into prevention applications and suppression applications. Prevention is the application of water to prevent dust from becoming airborne. Suppression is the use of water to wet dust particles which have already become airborne, increasing their mass and causing them to settle more rapidly. In general, prevention is more effective than suppression (NIOSH 2003; USBM 1978). Consistent with this Plan, reasonable precautions involving both prevention and suppression applications, such as focused sprays or covers, will be used to prevent dust generation during the crushing, screening, conveying, and stockpiling of slag so as to achieve the site goal of no visible emissions.

Wet dust control measures to be used by the remedial construction contractor for the prevention of dust during slag crushing and screening operations at the Site include:

1. Watering the area (within RA-F and elsewhere as needed) with water trucks associated with the slag crushing and screening operation that will be disturbed by equipment such as bull dozers, excavators, haul trucks and graders.

2. Pre-wetting the feed material will occur. It is anticipated that this will be the most effective and primary dust control method for the crushing and screening material. One or more spray bar manifolds that are mounted above the feed conveyor (or at the crusher) will be utilized. If necessary, a water truck will be used to pre-wet the feed material.

3. Water trucks will be used at points of soil excavation or deposition by equipment such as excavators or dump trucks.

If wetted material will be subjected to further size reduction, such as in crushing operations, effective prevention requires application of additional water to the dry—and larger—surface area of the material exposed by the size reduction process. Wet dust control measures for the suppression of dust that will be used include:

1. Fixed water sprays associated with the crusher and screener (spray bars) will be used. Spray bars can be mounted at various locations on the process equipment and spray or misting nozzles will be adjusted as needed. The dust suppressant rings will be mounted on the stacking conveyor, cone crusher, and jaw crusher discharge belts as needed. Water hoses can connect directly to NPT male threads on the ring, and be supplied by one or more 1,000 gallon portable tank with pumps. Portable tanks will be filled by water trucks.

2. Misting nozzles will provide droplet sizes of 50-200 microns. Typical ring sizes including the estimated number of nozzles and estimated flow rates are included in Table 2.3 below. The photograph below demonstrates their use.

TABLE 2.3. RING SIZE, NUMBER OF NOZZLES, AND WATER USAGE

Ring Size	Nozzles	Water Usage
17″	30	3.25 GPM (12.30 LPM)
23.5″	18	11.34 GPM (42.93 LPM)
26″	30	18.90 GPM (71.54 LPM)
30″	30	18.90 GPM (71.54 LPM)
42″	30	18.90 GPM (71.54 LPM)
48″	30	18.90 GPM (71.54 LPM)
54″	30	18.90 GPM (71.54 LPM)
72″	38	23.94 GPM (90.62 LPM)
100″	82	52.95 GPM (200.44 LPM)

If dust is observed during remedial activity, implementation and/or intensification (i.e. increase in frequency or intensity) of appropriate prevention or suppression applications will occur to minimize dust at the source areas. In addition, these measures will be re-evaluated if the action levels established in this Plan are exceeded based on onsite real time monitoring or if visible dust emissions are observed.

2.1.5.1 Slag Handling

A significant area of the site is covered with slag, which exhibits cementatious properties that naturally control dust when it is left exposed and undisturbed. Even when disturbed by excavation or handling, because slag is a coarse, dense, vitrified material it produces little

dust. Historically, there has been no need for dust control on the undisturbed slag surfaces of the site. However, water trucks and/or water sprays will be available and ready for dust control, if needed, whenever crushing and screening is occurring. Slag that is scheduled for crushing will be sprayed with water prior to crushing if necessary. In addition to using water trucks to control dust in these areas, stationary spraying systems (spray bars) will be used with the crusher and screener during operation, if necessary.

2.1.5.2 Transporting Screened Slag

Unpaved areas adjacent to the crushing and screening operation will be treated as necessary with water spray to control dust. Water trucks will be used to apply dust control spray to unpaved areas adjacent to the crushing and screening operation so the screened slag can be transported to its final destination without creating visible dust. In addition, vehicle speeds will be kept as low as necessary in the area adjacent to the crushing and screening operation to control dust.

Loading of trucks will be carefully monitored and water spray may be applied as needed to knock down dust generated during loading. If the haul load includes fine-grained materials, the contents of the truck will be wetted prior to haul if deemed necessary to control dust.

2.1.5.3 Dumping and Placement

Unloading of trucks will be carefully monitored and water spray will be applied as needed to knock down dust generated during unloading or dumping of unprocessed slag at the slag crushing and screening area. Water trucks will be used to spray water during unloading or dumping of the processed slag if necessary. Truck drivers will be trained on the need for care during unloading of trucks in order to minimize dust generation.

2.1.5.4 Slag Crushing, Screening, and Conveying Equipment

The following equipment is anticipated to be used in the crushing and screening operation by the slag crushing/screening contractor:

- Caterpillar 980H 7.5 cy Wheel Loader
- Caterpillar 1,000 kW Generator Set
- Cedarrapids 3042 Jaw Crusher
- Variable Speed Grizzly Feeder
- Cedarrapids MVP 450 Cone Crusher
- Cedarrapids 54" RCII Cone Crusher
- Cedarrapids 8 x 20 Triple Deck Screen
- KPI-JCI 145' Telescoping Stacker
- 40' Control/Electrical Van

The remedial construction contractor will employ the following equipment to support the slag crushing and screening contractor during the crushing and screening operation:

- Caterpillar 980 Wheel Loader
- Caterpillar D8 Dozer
- Volvo and/or Caterpillar Off Road Articulating Dump Trucks (40 ton capacity)
- Water trucks
- Portable tanks

2.1.5.5 Slag Screening and Conveying

Reasonable precautions such as focused sprays, pre-wetting of slag to be crushed, and/or spray bars attached to the crushing and screening equipment will be used to minimize dust generation during the handling, screening, conveying, and stockpiling of slag so as to achieve the site goal of no visible emissions.

The anticipated rate of the slag crushing and screening operation is 275 cubic yards per hour (one crushing and screening operation). At this rate it will take approximately 1,662 hours to crush and screen the estimated 460,000 cubic yards of slag necessary for cap construction. These volumes are estimates and will be adjusted based upon the final design.

2.1.5.6 Slag Crushing

Methods to obtain appropriately sized slag for the capillary break layer of the ET caps will be determined during the test run by the remedial construction contractor and the slag crushing/screening contractor. Generally, the previously mentioned equipment (see Section 2.1.5.4) will be employed but additional equipment may be necessary after the test run has been evaluated. The remedial construction contractor plans to implement a screening operation(s) that will be setup in or near RA-F in an approximate 200' x 100' flat and stable work area to allow for the plant equipment layout. This is shown approximately on Drawing 5 of the "FMC OU Remedial Design 30% Design Submittal March 2014" included with this plan. Initially, the raw material will be loaded into an impact crusher with a horizontal screen plant that will produce the 1" minus material. The impact crusher will be equipped with an internal water sprayer for dust suppression. Once material is processed it will be stockpiled and placed by remedial construction contractor equipment and personnel. The impact crusher discharge will also be equipped with a water spray bar manifold for dust suppression as shown in the photograph below. Water will be made available to handle dust suppression activities at the crushing location.

2.1.5.7 Slag Crushing, Screening, and Conveying Monitoring

The following monitoring shall be performed for the portable rock crushing plant:

- Monitor and record the hours of operation of the slag crushing, screening, and/or conveying equipment on a monthly basis.
- Monitor and record the total throughput of slag to the crushing facility in tons per day (T/day) and tons per year (T/yr).
- Monitor and record in a log, during operation, the periodic method(s) used to reasonably control fugitive emissions from the slag crushing, screening, and conveying operation. The log shall include the type of control used (e.g., water, chemical dust suppressants, spray bars, etc.) as well as the circumstances under which no controls are used.

In addition to this monitoring, the air monitoring provisions outlined in Section 3.0 of this Plan will also be met. Figure 3-3 shows the proposed location of the slag crushing/screening equipment and the proposed location of one of the floating E-samplers (as described in Section 3.5.1) which will be positioned and operated downwind during periods when the slag crushing/screening equipment is in operation.

2.1.5.8 Slag Crushing, Screening, and Conveying Training

Once the slag crushing, screening, and conveying equipment is placed and the system is operational, training for all slag screening and conveying operators will be provided. This training will take place initially during slag crushing and screening contractor mobilization at the site and will be re-enforced during daily, morning tailgate safety meetings.

2.1.6 Inclement Weather

Remedial activities at the site are planned to occur from February 15th to December 15th each year and will be suspended during the coldest winter period. There will be a contractor on site during these inactive periods to conduct a daily visual inspection for fugitive dust generation, however, site activities associated with the remedial activities in the winter months will be very limited and dust issues are not anticipated. Freezing temperatures may still be encountered during active periods (i.e, October, November, December, February,

March and/or April). Because of freezing temperatures, typical dust control may not be practical in the in colder months. Application of water could actually create unsafe conditions. Therefore, application of water for dust control may need to be suspended when the average daily temperatures fall below freezing and application of water becomes impracticable. Generally, water application for dust control during colder months will be performed unless one or more of the following conditions exist:

- Water trucks cannot be filled due to freezing of the water lines filling the trucks;
- Water trucks cannot apply the water due to freezing of the spray nozzles;
- Water being applied to the ground surface freezes upon contact creating a hazardous condition for equipment or site workers; and/or
- Water piping feeding stationary spray equipment or the stationary spray equipment freezes.

Experience at the site has shown that dusting is generally not a problem during sub-freezing temperatures. However, if water application is not possible for one or more of the reasons listed above and remedial activities create visible dust or air monitoring indicates total suspended particulate loading in the air to be above trigger levels as discussed in Section 3.0, then the remedial activities will have to be suspended until such time that the dust can be controlled.

There may be other times when water application for dust control is suspended. During periods of rain when the ground is saturated, application of additional water could create muddy conditions that are not compatible with the work that is taking place. Therefore, water application for dust control may be suspended when the ground is saturated or other conditions exist such that remediation activities are not creating visible dust and air monitoring indicates that total suspended particulate loading in the air is below trigger levels.

3.0 AIR QUALITY MONITORING

Air monitoring will be employed during remedial activities and will be conducted by a Site Air Quality Control (SAQC) contractor. As described in this Section 3.0, the existing air monitoring at the off-site location will be augmented by a system of real-time air monitors around the site, including downwind of active construction. The approximate locations of these real-time monitoring sites are described in this Section and exact locations will be developed for each phase or geographic area of RA, once the remedial construction contractor is selected and the sequence of work is established.

3.1 OFF-SITE MONITORING

The existing ambient air quality monitoring system (e.g., IDEQ air monitoring station at the Pocatello Water Pollution Control ["STP"]), which is located near Site 1 on Figure 3-1, will continue to be used for monitoring ambient air quality in the prevailing downwind direction from the FMC and Simplot OUs. Deployment of additional off-site monitoring is not feasible as a means of monitoring the effectiveness of FMC's dust control plan due to the confounding effects of proximate sources of dust emissions that cause air quality concerns. The on-site monitoring program discussed in the balance of this section is sufficiently robust to obviate the need for additional and non-determinative off-site monitoring.

3.1.1 Air Quality Impacts from Off-Site Sources

The FMC OU is bounded on the east by Simplot and on the north of the main plant site by an active railroad line. FMC's Northern Properties, which include RA-J are bounded by an interstate highway and active agricultural fields. Off-site sources of particulate emissions have previously and have the future potential to impact Site air quality. Emissions from Simplot's stacks and dust from their gypsum stack, particularly during the current significant remedial construction activities on the gypsum stack to support their remedial action to install liners on the stack, place particulate in the air that may be seen by on-site (as well as off-site) monitors. Similarly, emissions from trains and dust from the railroad line, highways and agricultural have the potential to affect Site air quality within the FMC property south of Highway 30 and RA-J. The SAQC contractor will need to be prepared to quickly document instances when they determine that off-site sources are triggering the on-site air monitors.

3.2 ON-SITE AIR QUALITY MONITORING

There are several reasons for monitoring the ambient air quality on the site during remediation activities. These include:

1. Protecting the health and welfare of on-site workers.
2. Protecting the health and welfare of the surrounding population.
3. Minimizing the off-site transport of airborne contaminants.
4. Evaluating the effectiveness of the on-site dust control procedures.

The purpose of this plan is to define on-site air quality monitoring to accomplish these four objectives. In this plan, a greater emphasis is being placed on item 4, evaluating the effectiveness of the on-site dust control procedures, for the reason that if the on-site dust control procedures are adequate, items 1 through 3 will be effectively addressed. This on-site air quality monitoring program has been developed using the following process.

Existing data (including both historical air monitoring data and site soil and fill material analyses) was evaluated to determine potential maximum concentrations of contaminants of concern (COCs) in airborne particulate matter. Using these maximum concentrations of

individual COCs, threshold concentrations of airborne particulates that would correspond to COC levels of potential concern were calculated to develop action level triggers for onsite particulate monitoring. Section 3.2.7 of this Plan details these calculations. To provide an additional margin of safety, each initial trigger level calculation was subsequently divided by 10; the adjusted PM_{10} and TSP trigger levels derived are 105 $\mu g/m^3$ and 152 $\mu g/m^3$ which provide assurance that the COC constituents within that dust are protective of human health.

In order to ensure that dust control measures are effective in maintaining air borne dust below these levels, a network of real-time monitors to continuously monitor hourly ambient concentrations of particulates will be installed.

An automated alarming system to alert FMC representatives to potentially hazardous ambient dust and/or COC concentrations will be developed to enable FMC to take appropriate actions.

3.2.1 Historical Ambient Monitoring Data

Extensive air quality monitoring has been performed in the area surrounding the FMC and Simplot facilities pursuant to the EMF Superfund Site Remedial Investigation/Feasibility Study (RI/FS). Ambient air quality monitoring continues today under the Clean Air Act (CAA). That CAA monitoring focuses on airborne particulates and is conducted to evaluate compliance with National Ambient Air Quality Standards (NAAQS) for particulates. A review of summarized historical data indicates this CAA monitoring was focused on total particulates (whether TSP or PM_{10}), and not on their composition.

One objective of this monitoring program is to ensure that dust control measures implemented during the remedial action are protective of the surrounding population. Beyond characterizing general ambient conditions, airborne particulate data alone is of little value to this effort to define particulate trigger levels that are indicative of hazardous COC concentrations. However, an intensive sampling campaign was conducted from October 1993 through October 1994 around the FMC and Simplot facilities, when over 3,600 air quality samples were collected by FMC and Simplot as part of the EMF RI/FS. That

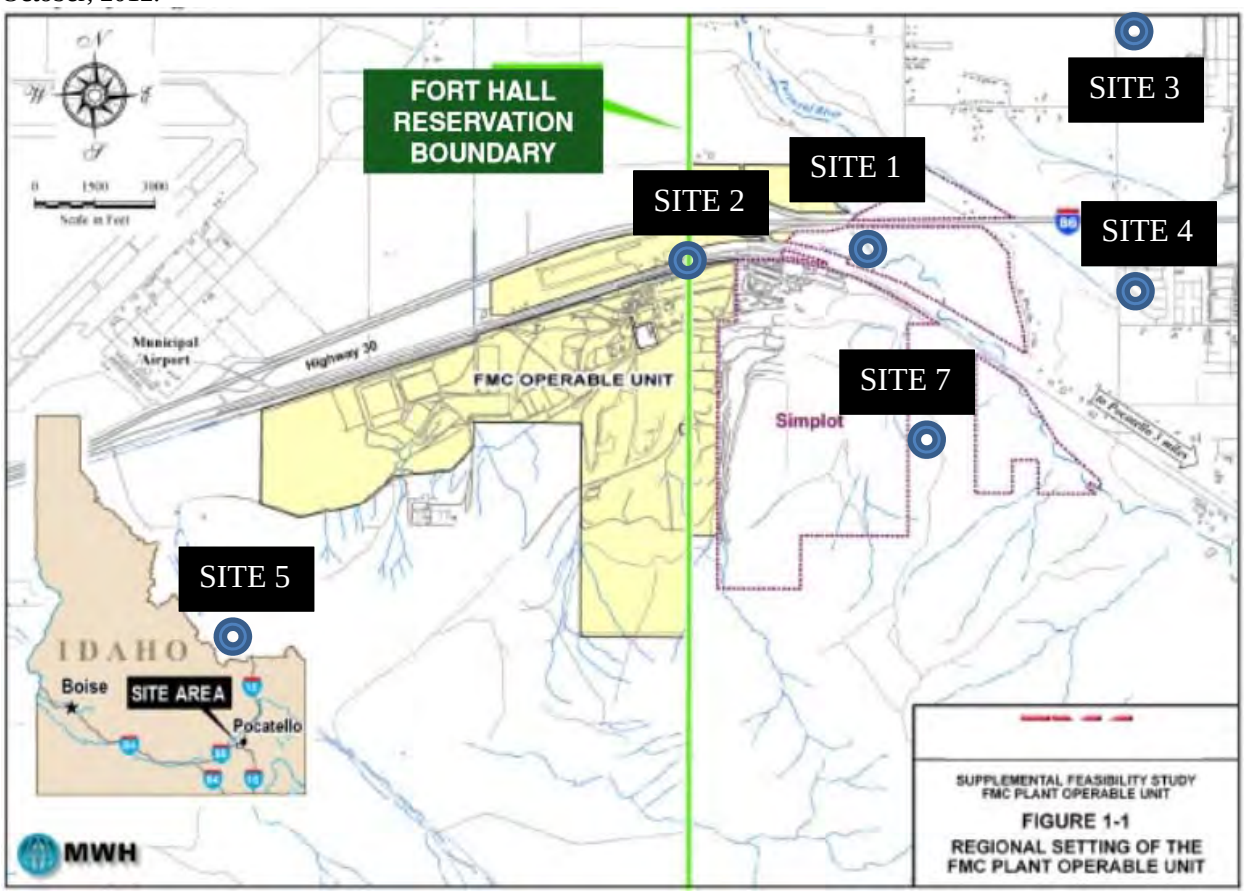
sampling included numerous analyses of exposed filters for specific COCs. The purpose of that study was to characterize impacts on ambient air quality by air emissions from the two facilities and to obtain data to evaluate an atmospheric dispersion model of emissions from the facilities. Results are documented in the *Remedial Investigation for the Eastern Michaud Flats Site: Part III, Air Quality Characterization / Air Monitoring Report* (Bechtel, 1995). That report included statistical analyses relating ambient particulate levels to airborne COC concentrations, and will be a primary resource for establishing ambient particulate concentration trigger levels. Figure 3-1 depicts six historical monitoring locations near the FMC site, while Table 3-1 summarizes the types of monitoring performed at each site. Data also were collected at an upwind site designated as Site 6, and located approximately 13 miles to the west-southwest of the FMC site.

Types of sampling included:

- Meteorological monitoring at Sites 1 and 7, including wind speed and direction, temperature, humidity, and wind direction standard deviation.
- Total suspended particulate (TSP) high-volume monitoring at all seven sites, consisting of 24-hour samples collected on quartz fiber filters. Initially, the filters were analyzed for total phosphorus, particulate fluorides and thirteen metals. After February 5, 1994, analysis for seven of the thirteen metals was discontinued because of results that were consistently non-detectable and/or well below EPA-prescribed residential air screening levels in effect at that time (summarized in Table 3-2).
- Inhalable particulate (PM_{10}) high-volume monitoring at all seven sites, also consisting of 24-hour samples collected on quartz fiber filters. Initially those filters also were analyzed for thirteen metals, plus seven radionuclides and phosphorus. After February 5, 1994, analysis for seven metals and two radionuclides was discontinued because of consistently non-detectable and/or very low results.

FIGURE 3-1. FMC LOCATION AND BOUNDARY WITH HISTORICAL MONITORING SITES

Taken from EPA Fact Sheet, "Plan to address pollution at the former FMC phosphorus processing plant," October, 2012.



- Low-volume (Lo-Vol) particulate monitoring at Sites 3, 4, 5 and 6, consisting of 30-day samples collected on smaller filters. Those samples were analyzed for 13 metals and seven radionuclides for the duration of the monitoring program.
- Sampling for crystalline silica and fluorides at Sites 1, 2 6, and 7, discontinued after April 1994 because of consistently non-detectable or very low analytical results.

Table 3-3 summarizes the metals and radionuclides that were analyzed initially from particulate samples, and those that were subsequently discontinued as discussed above. Note that the fact that a given contaminant was eliminated from further consideration in 1994 does not mean it was automatically excluded from the current analysis. Each metal or inorganic

occurring at levels at or above the ***current*** EPA residential air screening levels (EPA, 2013b) was considered for the analysis presented herein. Although a screening level for elemental phosphorus was included in the historical data, EPA (2013b) currently lists no screening level for it. Because phosphorus oxidizes so quickly when in contact with air, it is not likely to be a contaminant of concern for this remediation effort.

Section 3.2 discusses how the results of this sampling campaign will be used to establish ambient particulate trigger levels, based on the COC fractions in the particulate samples. While recognizing that the concentration data are approximately 20 years old, FMC believes their use is scientifically sound and appropriate for the "trigger level" analysis presented in Section 3.3 because:

- Those data were collected when both FMC and Simplot were in full operation, so overall emissions were higher than at present – and those data may in fact ***overstate*** current COC concentrations in airborne particulates because they include process emission sources as well as fugitive dust sources;
- The remediation will involve excavation of historical process materials that were the same materials being handled when the 1993-1994 monitoring was conducted. It is unlikely that COC concentrations in that material have increased over the past 20 years; if anything, leaching of COCs from precipitation, snowmelt etc., may have decreased their concentrations in the near-surface material;
- There is no practical alternative to using those data, which required an intensive yearlong sampling campaign to collect. The historical sampling program was sufficiently robust in coverage and duration to reliably capture worst-case conditions. The alternative is to begin sampling anew with the objective of precisely defining current conditions. However, a short-term effort would risk not capturing worst-case conditions and thereby calculating insufficiently protective trigger levels. Alternatively, such an effort could be conducted during the remediation, but would delay development of trigger levels for a prolonged period of time during construction and be further confounded with interference from off-site sources.

TABLE 3.1. EMF AIR MONITORING PROGRAM MATRIX (1993 – 1994)

Parameter	Sites						
	1	2	3	4	5	6	7
Meteorological	X						X
TSP	X	X	X	X	X	X	X
PM_{10}	X	X	X	X	X	X	X
Lo-Vol			X	X	X	X	
Crystalline Silica	X	X				X	X
Gaseous and Particulate Fluoride	X	X				X	X

TABLE 3.2. EPA COC SCREENING LEVELS (HISTORICAL)

Metals[1]		**Other Non-Rad Inorganics[1]**	
Parameter	***Screen Level (µg/m³)***	***Parameter***	***Screen Level (µg/m³)***
Aluminum	33	Fluorides	8.3
Arsenic	0.00057	Phosphorus	0.3
Barium	0.52	Crystalline Silica	Not specified
Beryllium	0.001	**Radioactive Isotopes[2]**	
Cadmium	0.0014	***Parameter***	***Screen Level (pCi/m³)***
Total Chromium	0.0002	Lead-210	0.0012
Manganese	0.42	Polonium-210	0.0018
Nickel	0.01	Radium-226	0.0016
Selenium	0.7	Radium-228	0.0069
Thallium	0.3	Thorium-230 & 232	0.0002
Vanadium	0.17	Uranium-234 & 235	0.0002
Zinc	Not specified	Uranium-238	0.0001

[1]Screening levels were originally developed by EPA Region 9, and used by EPA Region 10 for the 1993-1994 sampling program.
[2]Screening levels used by EPA Region 10 for the 1993-1994 sampling program. Original source not cited in Remedial Investigation document.

TABLE 3.3. METALS AND RADIONUCLIDES ANALYZED FROM TSP AND PM_{10} FILTERS (1993 – 1994)

COC Name	COC Symbol	Analyzed from October 1993 to February 5, 1994	Analyzed After February 5, 1994
Metals (from TSP and PM_{10} samples)[1]			
Aluminum[2]	Al	X	
Arsenic	As	X	X
Barium	Ba	X	
Beryllium	Be	X	
Cadmium	Cd	X	X
Chromium (total)	Cr	X	X
Manganese[2]	Mn	X	
Nickel	Ni	X	X
Selenium	Se	X	
Silver	Ag	X	
Thallium	Tl	X	
Vanadium	V	X	X
Zinc	Zn	X	X
Radionuclides (from PM_{10} samples only)[1]			
Lead-210	Pb-210	X	X
Polonium-210	Po-210	X	X
Radium-226	Ra-226	X	X
Radium-228	Ra-228	X	
Thorium-230	Th-230	X	
Thorium-232	Th-232	X	X
Uranium (total; species derived by assumed composition)	U-234 U-235 U-238	X	X

[1]Lo-vol samples were also analyzed for all metals and radionuclides for the duration of the sampling campaign. However, trigger level analysis was performed using analyses of COCs from TSP and PM_{10} filters since they are more representative of maximum short-term (24-hour) concentrations.
[2]Denotes that the analyte's maximum concentration was below the screening levels used to evaluate the 1993-1994 data, but greater than the EPA RSLs published in November 2013.

TABLE 3.4. EPA METALS / INORGANICS SCREENING LEVELS (CURRENT)

Metals[1]		Metals[1]	
Parameter	***Screen Level (µg/m³)***	***Parameter***	***Screen Level (µg/m³)***
Aluminum	0.52	Selenium	2.1
Arsenic	0.00057	Thallium	Not specified
Barium	0.052	Vanadium	0.01
Beryllium	0.001	Zinc	Not specified
Cadmium	0.001[2]	**Other Inorganics[1]**	
Total Chromium	Not specified[3]	Fluorides	1.4
Manganese	0.0052	Phosphorus	Not specified[4]
Nickel	0.0015	Crystalline Silica	0.31

[1]Source: EPA Regional Screening Level Summary Table, EPA Region 9, November 2013.
These levels are based on residential air and were used ***solely*** to eliminate sampled parameters from further consideration. These levels were not used for trigger level calculations, as explained in Section 3.2.1.
[2]This value is for cadmium inhaled in water. No level is given for airborne inhalation.
[3]A value of 0.000011 is given for chromium VI. However, historical sampling at FMC was for total chromium.
[4]While EPA used a screening value of 0.3 µg/m3 for historical sampling at FMC, (EPA, 2013b) shows no value for phosphorus.

3.2.2 Current Ambient Monitoring

The usefulness of more recent (and current) particulate monitoring data, as shown on Table 3-4, for establishing ambient particulate trigger levels also was investigated, including:

- The Idaho Department of Environmental Quality (IDEQ) real-time PM_{10} particulate monitor at the corner of Garrett and Gould in the city of Pocatello, approximately 4.5 miles southeast of FMC.
- The Shoshone-Bannock Tribe's Ballard Road site approximately 10 miles to the north of FMC at Fort Hall, Idaho.

During 2013, the Garrett / Gould site showed an average 24-hour PM_{10} concentration of 21µg/m^3 and the Ballard Road site an average 24-hour PM_{10} concentration of 23 µg/m^3.

Both sites use real-time monitors that measure hourly average particulate readings but not metals concentrations. Furthermore, the monitors do not generate an exposed filter suitable for subsequent metals analysis. Finally, it must be emphasized that the monitors are located considerably farther off-site than historical monitoring sites 1, 2 and 7; even if the desired

data were available, data from those locations would likely ***not*** be representative of worst-case worker exposure to the COCs.

3.2.3 Soil and Waste Analyses

In addition to the ambient monitoring discussed above, soil and fill samples collected during the remedial investigation at FMC have been analyzed for numerous metals, nonmetals and radionuclides, including most of the COCs discussed in Section 3.1.1. The material types which are expected to be representative of the material that will be disturbed, moved and otherwise could potentially become airborne as dust during remediation are phosphorus ore, slag and native soil. The soil and fill data used for this evaluation are summarized in Table 3-5.

TABLE 3.5. SUMMARY OF SOIL AND WASTE MATERIAL ANALYSES

	Maximum Concentration by Material Type			Overall Maximum	Maximum Cumulative Effect
COC	***Background Soil***	***Phosphorus Ore***	***Slag***		
Metals (mg/kg)					
Aluminum	13,900	12,400	26,900	26,900	NA
Arsenic	10.4	14.6	No Data	14.6	NA
Cadmium	0.72	77.8	103	103	NA
Chromium (total)	13.9	822	290	822	NA
Manganese	710	122	205	710	NA
Nickel	15.5	126	11.9	126	NA
Vanadium	19.6	996	250	996	NA
Zinc	66.5	991	450	991	NA
Other Non-Radioactive Inorganics (mg/kg)					
Fluorides	302	13,200	17,800	17,800	NA
Phosphorus[1]	672	65,900	5,680	65,900	NA
Radioactive Isotopes (pCi/g)					
Lead-210	2.0	31.9	16.7	31.9	33.9
Polonium-210	3.58	25.2	23.7	25.2	28.78
Radium-226	0.95	53.0	40.0	53.0	53.95
Thorium-232	No Data	0.516	0.730	0.730	0.730
Uranium-238	0.88	26.0	30.7	30.7	31.58

[1]There is no OSHA PEL for ***total*** phosphorus to directly compare with historical monitoring data. However, OSHA PELs are given for airborne phosphorus compounds including yellow phosphorus, phosphorus pentachloride, phosphorus pentasulfide and phosphorus trichloride. For conservatism, the lowest of those limits (0.1 mg/m^3 or 100 µg/m^3, for yellow phosphorus) was used for this evaluation.

Data sources include: EMF Remedial Investigation Report (Bechtel, 1996), Remedial Investigation Update Memo (Bechtel, 2004), SRI Work Plan (MWH, 2007), and Supplemental Remedial Investigation Addendum (MWH, 2008).

The analytical results presented in Table 3-5 were used to determine the potential fraction of COCs that could be present in airborne dust resulting from the disturbance of soil, ore and slag materials. Those results then are used in Section 3.2 of this plan (along with historical air monitoring data) to calculate airborne particulate concentrations that could indicate unacceptably high concentrations of those COCs. It should be noted that hazardous threshold concentrations for a given COC vary depending upon the route of exposure. For example, the hazardous threshold level for direct contact or ingestion may differ markedly from that associated with inhalation of airborne material. This Air Quality Monitoring Plan addresses only exposure to COCs via inhalation; it is assumed that other exposure routes will be addressed via personnel monitoring, use of appropriate PPE and other measures taken pursuant to the site specific health and safety plans.

3.2.4 Determination of Particulate Trigger Levels

The basic process used to determine particulate trigger levels is summarized below. Details of each step are provided in Sections 3.2.5 through 3.2.7.

1. Identify the significant COCs and an appropriate hazardous ambient concentration threshold for each.
2. For each significant COC, calculate the overall COC-to-particulate ratio at each historical monitoring site (for both PM_{10} and TSP, as applicable). For non-radioactive substances, this ratio is a dimensionless number represented as [COC]/[PM_{10}] or [COC]/[TSP], as appropriate. It represents the fraction of the airborne dust that consists of the COC in question. For radioactive isotopes, the ratio is represented in the same way, but in units of picocuries per gram. Additional COC-to-particulate ratios were calculated using the soil and waste analyses discussed in Section 3.1.3.
3. For each COC, use the highest ratio obtained among the seven air monitoring sites (and the soils/wastes) for subsequent trigger level determinations; e.g., the highest [COC]/[PM_{10}] ratio for arsenic was obtained at Site 1, so that value was used for the subsequent PM_{10} trigger value calculation associated with arsenic.
4. For each COC, divide its hazardous concentration threshold by its maximum [COC]/[PM_{10}] and/or [COC]/[TSP] ratio to determine the PM_{10} and/or TSP trigger levels that indicate potentially hazardous airborne concentrations of that COC. Then apply a safety factor of 10 to each of those results to provide an added margin of safety to both onsite workers and offsite communities.
5. The lowest PM_{10} and TSP values obtained in Step 4 were defined as the trigger levels.

3.2.5 Identify Hazardous Airborne Concentrations for Each Significant COC

The first step in this process was to identify potentially significant COCs. As noted in Section 3.1.1, the EPA screening levels used to identify contaminants as insignificant in the 1994 RI Document have since been revised. Therefore, any contaminant with monitored concentrations (or activity levels in the case of radionuclides) greater than <u>either</u> the 1994 <u>or</u> 2013 residential screening levels was evaluated as a potentially significant COC.

The second step of this process was to identify a hazardous airborne concentration threshold for each potentially significant COC. Both the original (Table 3-2) and updated (Table 3-4) EPA screening values were based on ***residential*** air concentrations, and are therefore very conservative – and inappropriate for evaluating ***onsite*** air quality at industrial locations during remediation activities. If those residential standards were applied to onsite airborne concentrations, remediation activities would not be possible. Because the first objective of this monitoring program is to ensure onsite workplace safety, the following standards are considered more appropriate:

- For the non-radioactive inorganic compounds (including metals) it is appropriate to use Occupational Safety and Health Administration (OSHA) Personnel Exposure Limits (PELs), which are based on an 8-hour time-weighted average (TWA) exposure limit.
- For radioactive compounds it is appropriate to use standards derived from 40 CFR Part 20, Appendix B. Those values are known as Nuclear Regulatory Commission Derived Air Concentrations (DACs).

The ambient air thresholds derived from those sources are summarized in Table 3-6 and are applied to subsequent trigger level determinations. Because those ambient thresholds apply to occupational or industrial exposure, a safety factor of 10 was ultimately applied to the calculated trigger levels to ensure workers' safety and further limit any potential exposure due to offsite migration of airborne contaminants.

TABLE 3.6. COC SCREENING LEVELS USED FOR TRIGGER LEVEL ANALYSIS

COC	Screening Level	Source
Metals		
Aluminum	15,000 µg/m^3	OSHA PEL
Arsenic	10 µg/m^3	OSHA PEL
Cadmium	5 µg/m^3	OSHA PEL
Chromium (total)	1,000 µg/m^3	OSHA PEL
Manganese	5,000 µg/m^3	OSHA PEL
Nickel	1,000 µg/m^3	OSHA PEL
Vanadium	50 µg/m^3	OSHA PEL
Zinc	500 µg/m^3	Idaho DEQ
Other Non-Radioactive Inorganics		
Fluorides	2,500 µg/m^3	OSHA PEL
Phosphorus[1]	100 µg/m^3	OSHA PEL
Radioactive Isotopes		
Lead-210	100 pCi/m^3	10 CFR Part 20 Appendix B
Polonium-210	300 pCi/m^3	10 CFR Part 20 Appendix B
Radium-226	300 pCi/m^3	10 CFR Part 20 Appendix B
Thorium-232	0.5 pCi/m^3	10 CFR Part 20 Appendix B
Uranium-238	20 pCi/m^3	10 CFR Part 20 Appendix B

[1]There is no OSHA PEL for ***total*** phosphorus to directly compare with historical monitoring data. However, OSHA PELs are given for airborne phosphorus compounds including yellow phosphorus, phosphorus pentachloride, phosphorus pentasulfide and phosphorus trichloride. For conservatism, the lowest of those limits (0.1 mg/m^3 or 100 µg/m^3, for yellow phosphorus) was used for this evaluation.

3.2.6 Calculate Maximum COC-to-Particulate Ratios for Each COC

Since the objective of this analysis is to identify PM_{10} and TSP threshold concentrations that indicate potentially hazardous concentrations of one or more of the COCs, it was necessary to establish a reasonably conservative estimate of the fraction of each COC in airborne particulate matter. This was accomplished in two ways:

- The raw air quality data files from the 1993-1994 historical data set (containing 24-hour average values of COC, PM_{10} and TSP concentrations) were used to calculate mean ratios of each COC to TSP and PM_{10}, denoted as [COC]/[PM_{10}] and [COC]/[TSP], respectively. This was done individually for sites 1 through 7. For conservatism, the highest calculated ratio among the sites was used for subsequent evaluations. Section 3.2.7 of this Plan contains the calculations for these analyses.
- Additionally, COC concentration data from background soil, process slag and phosphorus ore material was examined. Those data are reported in units of mg/kg for non-radioactive COCs, and pCi/g for radioactive COCs – making them directly comparable to the ratios for airborne particulate. The maximum observed fraction of each COC among those three material types was identified, and denoted as [COC]/[FILL].

These approaches provided two estimates of the maximum fraction of each COC in airborne particulate matter – one based on measured COC concentrations in airborne particulate matter, and a second based on COC concentrations in background soil, process slag and phosphorus that could potentially become airborne during remediation. For subsequent analyses, the higher of the two estimates was used. Table 3-7 summarizes the results for each COC using these methodologies, and the [COC]/[PM_{10}] and [COC]/[TSP] ratios that were ultimately used to calculate PM_{10} and TSP trigger levels. Note that the ratios for non-radioactive COCs represent micrograms of COC per microgram of particulate, while those for radioactive COCs are in units of picocuries per microgram (pCi/µg) of particulate.

TABLE 3.7. SUMMARY OF COC-TO-PARTICULATE RATIOS

	Airborne Particulate		Soil - Fill	Maximum Ratio Used for Trigger Level Calculations	
COC	***Maximum [COC]/[PM$_{10}$] Ratio***	***Maximum [COC]/[TSP] Ratio***	***Maximum [COC]/[FILL] Ratio***	***[COC]/[PM$_{10}$]***	***[COC]/[TSP]***
Metals[1]					
Aluminum	1.14E-02	1.21E-02	2.69E-02	2.69E-02	2.69E-02
Arsenic	3.53E-05	1.97E-05	1.46E-05	3.53E-05	1.97E-05
Cadmium	2.07E-04	1.32E-04	1.03E-04	2.07E-04	1.32E-04
Chromium (total)	3.09E-04	5.01E-04	8.22E-04	8.22E-04	8.22E-04
Manganese	3.75E-04	3.96E-04	7.10E-04	7.10E-04	7.10E-04
Nickel	2.61E-04	1.26E-04	1.26E-04	2.61E-04	1.26E-04
Vanadium	3.42E-04	5.75E-04	9.96E-04	9.96E-04	9.96E-04
Zinc	1.38E-03	8.90E-04	9.91E-04	1.38E-03	9.91E-04
Other Non-Radioactive Inorganics[1]					
Fluorides	No Data	7.58E-02	1.78E-02	7.58E-02	7.58E-02
Phosphorus	9.52E-02	5.13E-02	6.59E-02	9.52E-02	6.59E-02
Radioactive Isotopes[2]					
Lead-210	1.58E-03	No Data	3.39E-05	1.58E-03	1.58E-03
Polonium-210	1.17E-03	No Data	2.88E-05	1.17E-03	1.17E-03
Radium-226	2.15E-05	No Data	5.40E-05	5.40E-05	5.40E-05
Thorium-232	6.91E-07	No Data	7.30E-07	7.30E-07	7.30E-07
Uranium-238	7.02E-06	No Data	3.16E-05	3.16E-05	3.16E-05

[1]Units are micrograms of COC per microgram of particulate.
[2]Units are picocuries of COC per microgram of particulate.

3.2.7 Calculate PM$_{10}$ and TSP Trigger Levels

The maximum particulate ratios for each COC (shown in the two rightmost columns in Table 3-7) were divided into the COC's respective screening level from Table 3-6 to calculate the PM$_{10}$ and/or TSP concentrations that would indicate an airborne concentration of potential concern for that COC. Those results are summarized in Table 3-8, which shows that ***the lowest PM$_{10}$ and TSP trigger level is associated with phosphorus***. As discussed previously, there is no specific OSHA PEL for total phosphorus although there are PELs for several phosphorus compounds. For conservatism, the PEL for yellow phosphorus (the lowest of any of the compounds) was used. The PM$_{10}$ and TSP trigger level calculations for phosphorus then were calculated as shown below:

- Phosphorus has a maximum [COC]/[PM_{10}] ratio of 9.52E-02, a maximum [COC]/[TSP] ratio of 5.13E-02, a maximum [COC]/[FILL] ratio of 6.59 E-02, and an OSHA PEL of 100 µg/m^3.
- The PM_{10} trigger level was calculated as 100 µg/m^3 ÷ 9.52E-02, or 1,051 µg/m^3.
- The TSP trigger level was calculated as 100 µg/m^3 ÷ 6.59E-02, or 1,518 µg/m^3. Because the [COC]/[FILL] value was higher than the [COC]/[TSP] value, it was assumed to be more representative of potential worst-case ambient conditions.

A similar methodology was applied for the radioactive isotopes. Consider Lead-210, which has a maximum [COC]/[PM_{10}] ratio of 1.58E-03 pCi/µg, and a screening level limit of 100 pCi/m^3:

- The PM_{10} trigger level was calculated as 100 pCi/m^3 ÷ 1.58E-03 pCi/µg, or 63,291 µg/m^3.
- Note that TSP samples were not analyzed for radioactive isotopes. In such cases, the fraction of the COC in TSP material is assumed to be the same as for PM_{10} and the TSP and PM_{10} trigger levels are assumed to be identical.

To provide an additional margin of safety, each initial trigger level calculation was subsequently divided by 10; those results are shown in the rightmost two columns. Thus, for phosphorus the adjusted PM_{10} and TSP trigger levels become 105 µg/m^3 and 152 µg/m^3. For Lead-210, the PM_{10} trigger level becomes 6,329 µg/m^3.

- Based on this analysis, the "worst-case" of the COCs is phosphorus, regardless of whether PM_{10} or TSP is being monitored. As shown in Table 3-8, a PM_{10} concentration of 105 µg/m^3 or a TSP concentration of 152 µg/m^3 indicates that airborne phosphorus concentrations may be approaching screening levels, and indicate that action should be taken to ensure that potentially hazardous levels of phosphorus do not develop.

TABLE 3.8. CALCULATED PARTICULATE TRIGGER LEVELS FOR COCS

	Unadjusted Trigger Level[1]		Adjusted Trigger Level[2]	
COC	PM_{10}	TSP	PM_{10}	TSP
Metals				
Aluminum	557,621	557,621	55,762	55,762
Arsenic	283,286	507,614	28,329	50,761
Cadmium	24,155	37,879	2,415	3,788
Chromium (total)	1,216,545	1,216,545	121,655	121,655
Manganese	7,042,254	7,042,254	704,225	704,225
Nickel	3,831,418	7,936,508	383,142	793,651
Vanadium	50,201	50,201	5,020	5,020
Zinc	362,319	504,541	36,232	50,454
Other Non-Radioactive Inorganics				
Fluorides	32,982	32,982	3,298	3,298
Phosphorus	1,050	1,517	105	152
Radioactive Isotopes				
Lead-210	63,291	63,291	6,329	6,329
Polonium-210	256,410	256,410	25,641	25,641
Radium-226	5,555,556	5,555,556	555,556	555,556
Thorium-232	684,932	684,932	68,493	68,493
Uranium-238	632,911	632,911	63,291	63,291
Minimum Calculated Trigger Levels				
PM_{10}: 105 µg/m^3 (limiting contaminant is phosphorus) **TSP: 152 µg/m^3** (limiting contaminant is phosphorus)				
[1]All values in micrograms per cubic meter. [2]All values in micrograms per cubic meter, adjusted downward by a factor of 10.				

TABLE 3-9: RADIONUCLIDE CONCENTRATIONS CORRESPONDING TO TSP TRIGGER LEVEL OF 152 µg/m^3

Radionuclide	10 CFR 20 Appendix B Effluent (air) Concentrations Table 2 Column 1, (pCi/m3)[1]	Concentration equivalent to 152 ug/m3 Trigger Level (pCi/m3)
Pb-210	0.6	0.24
Po-210	0.9	0.18
Ra-226	0.9	0.0082
Th-232	0.004	0.00011
U-238	0.06	0.0048
[1]Value shown is limit for public exposure		

3.3 AIR QUALITY OVERSIGHT

Remedial Activities (RA) at the site will be conducted with oversight from an independent contractor for dust control and air quality monitoring or SAQC contractor. Included among

the primary duties of the air quality oversight contractor will be maintenance of air monitoring equipment, management of air monitoring data and ongoing observation for dust being generated during the RA. The SAQC contractor will immediately notify the remedial contractor and the EPA oversight contractor that additional actions are required to address any dust problems

3.4 RATIONALE FOR USE OF TSP MEASUREMENTS

As will be discussed in Section 3.4 of this document, real-time monitors will be configured for TSP for this project rather than PM_{10} or $PM_{2.5}$ (fine particulate). While contemporary ambient particulate monitoring commonly focuses on PM_{10} (and increasingly $PM_{2.5}$) because those particles are more easily retained in the lungs after inhalation, TSP monitoring is appropriate for this project because:

- The construction dust at FMC site is likely to be coarser than the PM_{10} particulate size. In general, smaller particle sizes require lower shear or wind velocities to move them. However, this relationship reverses for particle sizes less than 0.2 mm (Kirkby and Morgan, 1980). Therefore for undisturbed ground, the PM_{10} sized particles, which are less than 0.01 mm in size, are likely to be relatively stable compared to larger sand and silt sized particles. The $PM_{2.5}$ sized particles are the clay-sized fraction of the soil and are even more stable. Although disturbance may change this dynamic somewhat, most particulate emissions resulting from excavation and hauling will be larger than the PM_{10} and would not be measured by a PM_{10} or $PM_{2.5}$ sampler.
- Because PM_{10} and $PM_{2.5}$ are ***subsets*** of TSP, a sampler that is set to monitor TSP will also capture the PM_{10} and $PM_{2.5}$ materials. However, a sampler set to monitor PM_{10} and $PM_{2.5}$ particle sizes will miss a lot of the particulate in the air.
- TSP monitoring is more useful for evaluating the effectiveness of site dust control efforts, and will be protective of public health as well.
- TSP monitoring is more useful for evaluating the potential for spread of airborne dust from the site and will indicate the total amount of airborne COCs which could be deposited off-site, and not (only) some fraction of the dust.

3.5 DESIGN AND IMPLEMENT REAL-TIME MONITORING NETWORK

3.5.1 Real Time Particulate Monitoring

A network of real time particulate (TSP) monitors, situated at appropriate locations at the FMC OU, will be designed, installed and operated as part of this plan. A fleet of at least six portable, real-time particulate samplers (E-Samplers manufactured by Met One Instruments, Inc. of Grants Pass, Oregon) will be included in this network. The samplers will be sited with the objective of monitoring particulate concentrations both upwind and downwind of remediation activities on any given day, recognizing that the on-site work will vary in location over time. This strategy will allow characterization of both background particulate levels, as well as FMC's contribution to downwind particulate levels.

The prevailing winds at the site have a strong southwest component, as shown in the windrose in Figure 3-2.

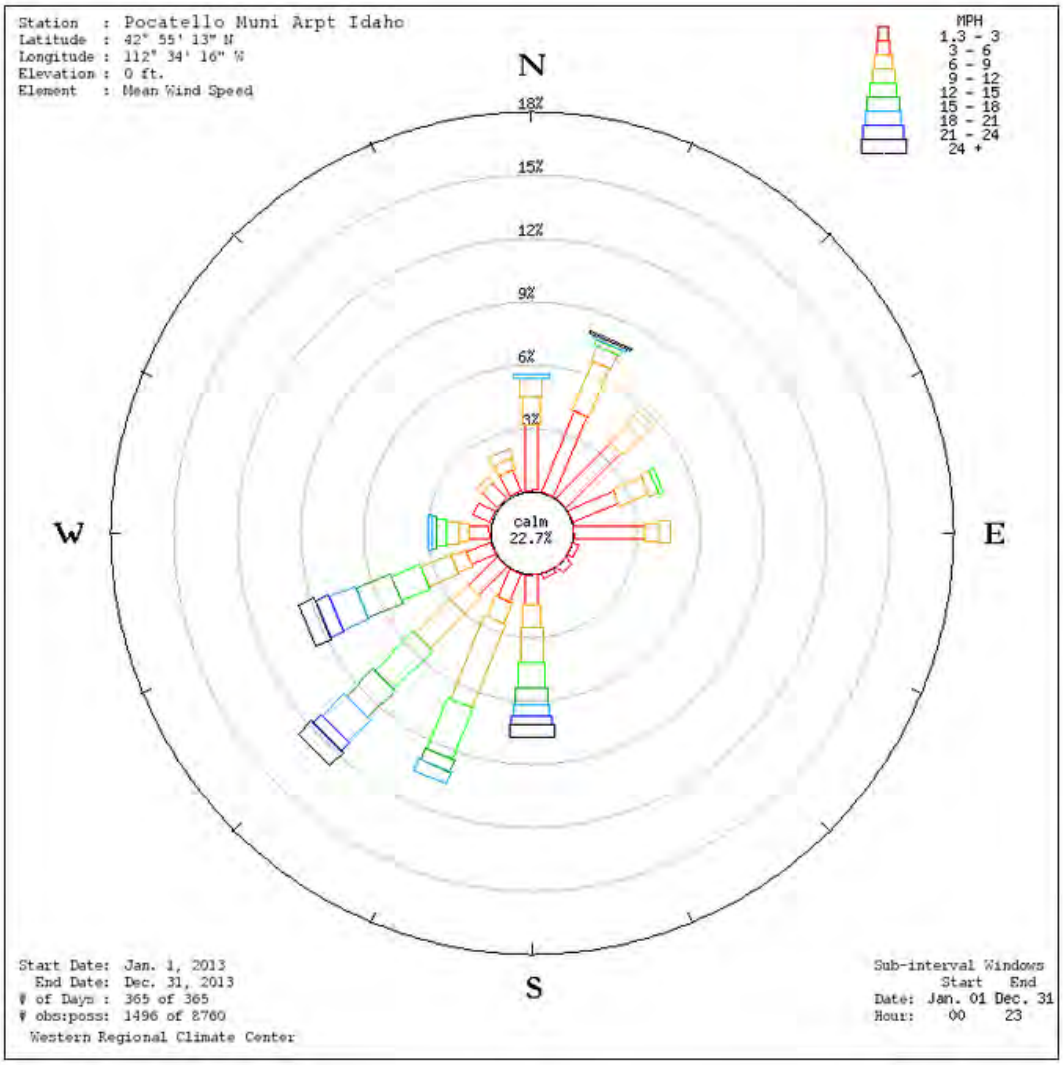
Three permanent monitors will be placed along the boundaries of the FMC OU, and at least three monitors will be designated portable units. A map of the placement of the permanent monitors and meteorological station is shown in Figure 3-3 below. The monitors would be placed as follows:

- One permanent site placed on the southwest boundary of the site, upwind of the prevailing wind direction for the Site-Wide Grading phase of remedial action.
- One permanent site placed near the center on the north boundary of the site, to monitor emissions leaving the site in the prevailing wind direction.
- One permanent site placed near the center on the eastern boundary of the site between FMC and Simplot. This monitor is meant to capture emissions leaving the site from a westerly wind and to monitor emissions coming onto the site from Simplot during an easterly wind condition.
- At least three portable "floaters" to be placed adjacent to, and downwind of, active remediation work sites within the FMC OU boundary. Exact locations will be identified by monitoring personnel in consultation with the EPA oversight contractor and/or EPA representative, and will be selected based on site-specific work plans.

Selection considerations will include planned construction activities, wind patterns, and protection of samplers from inadvertent damage. These monitors will need to be moved regularly as remediation progresses. Relocations of samplers will be documented, including the rationale for each move.

- Because the objective of the "floaters" is to monitor maximum airborne particulate concentrations resulting from remediation activities, they will generally be placed in close proximity (e.g., < 100 yards) in downwind directions from the most significant construction areas, subject to logistical constraints noted above. As shown in Figure 3-2 and indicated by local topography, winds at the FMC site should be predominantly from the southwest. Therefore, "floater" monitors will ***generally*** be located within 100 yards to the northeast of each significant construction area. However, field personnel will monitor wind forecasts from the Pocatello National Weather Service (NWS) office as well as readings from the on-site meteorological station on a daily basis, to ensure that the monitors are appropriately sited during atypical weather conditions. For example, Figure 3-2 shows that winds from the north-northeast approximately 8 percent of the time, and are sometimes strong. When such conditions occur, it is important that the "floaters" be relocated to the southwest of the construction areas until "normal" conditions return.

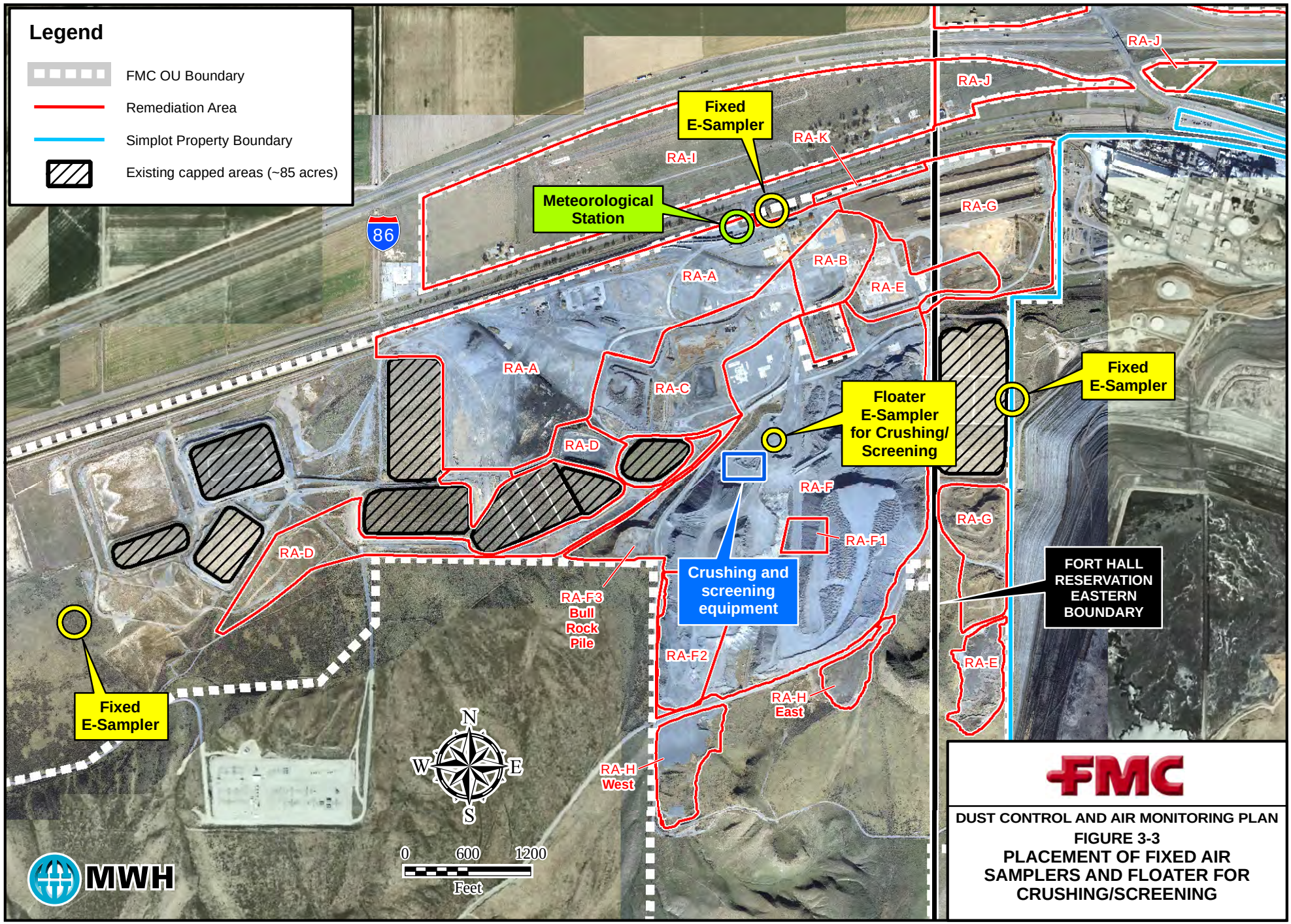
FIGURE 3-2. 2013 WINDROSE FROM NATIONAL WEATHER SERVICE STATIONS: POCATELLO, IDAHO



I:\projects\FMCidaho\FMC_Dust Control Plan\FIGURES\Fig 3-3_Placement of Fixed Air Samplers and Floater_Oct2014.mxd

3 Oct 2014

DRAWN BY D. Severson



DUST CONTROL AND AIR MONITORING PLAN

FIGURE 3-3

PLACEMENT OF FIXED AIR SAMPLERS AND FLOATER FOR CRUSHING/SCREENING

3.5.2 Real Time Meteorological Monitoring

A meteorological monitoring station will be sited within the boundary of the FMC OU, in a location exposed to the prevailing winds. The meteorological station will be utilized to monitor wind conditions which will help pinpoint sources of particulate emissions and document weather conditions around dust events.

The meteorological tower will be a 10-foot tall portable tripod, equipped with a Campbell Scientific Model CR1000 datalogger with an internal data storage capacity of over 6 months of hourly meteorological data plus internet communication capabilities. The tower installation will be sufficiently sturdy to withstand weather extremes, yet can be easily relocated if circumstances require it. The station will include Prevention of Significant Deterioration (PSD) quality sensors for the following parameters:

- Wind Speed
- Wind Direction
- Temperature
- Precipitation
- Relative Humidity
- Other useful parameters agreed upon by EPA and FMC.

3.5.3 Networking and Data Accessibility of the Monitoring System

The particulate monitors and the meteorological station will feature full remote communications, allowing real time networking of the complete system. The system will publish real-time data to an internet website. This will allow stakeholders to view and download particulate and meteorological data, with no special software required by the end-user. Site access will be password-restricted as appropriate.

3.5.4 Real Time Alarm When Trigger Levels Are Exceeded

The network of samplers will be programmed to alarm when the pre-set TSP trigger level, as described in Section 3.2 of this Monitoring Plan, is recorded by one or more of the E-Samplers. This alarm will be broadcast to the SAQC contractor and other designated personnel via e-mail or telephone, allowing immediate response and investigation by

personnel on-site. The internet page will show which monitor has been triggered and the prevailing wind conditions, helping point to the source of excess emissions.

3.6 RATIONALE FOR USE OF MET ONE E-SAMPLERS

The E-Samplers are rugged, portable, durable real-time particulate monitors, made specifically for long-term unattended operations outdoors. Details and specifications for the E-Sampler can be found at:

http://www.metone.com/documents/E-SAMPLER_Brochure.pdf

FIGURE 3-4. PHOTOS OF MET ONE E-SAMPLER

The primary advantages of the E-Sampler include:

- The sampler can be operated unattended for extended periods – unlike other samplers requiring frequent attention.
- The sampler includes a weatherproof enclosure and is deployed on a portable tripod.

- The sampler can be operated from either AC or solar power.
- Measurement range is 0.001 mg/m^3 (1 µg/m^3) to 65 mg/m^3 (65,000 µg/m^3).
- Includes both analog and RS-232 output options, and supports radio and modem communication.
- Can be operated with averaging periods from 1 to 60 minutes.
- Unit weighs only 28 pounds and can be easily moved by one person.
- Hydrometrics has successfully employed these samplers in conjunction with remediation and construction activities at Point Ruston, WA.

The E-Samplers offer advantages from a logistical standpoint, including lower required and expected down time, cost, ease of use, portability and dependability. An E-Sampler can easily be shut down, relocated, and restarted by a single minimally-trained field operator in 30 minutes or less with no special equipment. Otherwise, there is essentially no sampler downtime beyond routine quality assurance activities such as flow checks/calibrations, leak checks and audits. These activities are generally less time-intensive for E-Samplers than for other particulate monitors.

By contrast, other continuous particulate monitors (such as the EPA Reference Method Thermo Environmental TEOM and Met One BAM-1020 samplers) are considerably larger and more complex, and must be housed inside a substantial climate-controlled shelter that requires AC power. Relocation of such units in response to changing construction operations and wind conditions is a substantial task, and considerable training is required to achieve proficiency in their operation. If problems arise, troubleshooting can be difficult and replacement parts are not always immediately available. That issue will not be a concern for the E-Sampler network because FMC proposes to purchase ten units, with a maximum of 7-8 in use at any given time. In the event that an E-Sampler fails, it will immediately be replaced with an identical unit so that sampling can continue uninterrupted. The problematic unit then will be returned to the manufacturer for repair.

Although this E-Sampler is not designated by EPA as a Reference or Equivalent Method for measurement of particulates, several studies have been undertaken to compare the

performance of the E-Sampler to Reference Method or Equivalent Method samplers. One of the more intensive studies was done by the United States Forest Service (USFS). USFS uses these instruments to monitor smoke from wildfires and has evaluated the E-Sampler's performance for monitoring $PM_{2.5}$ particles against the BGI PQ-200 Federal Reference Method Sampler. It is important to note that the samplers employ fundamentally different technologies:

- The BGI PQ-200 sampler draws air through a pre-weighed filter at a known, constant flow rate for a period of 24 hours. The filter then is weighed after sampling, and the sample flow rate and particulate mass collected on the filter are used to calculate the average ambient particulate concentration over the 24-hour sampling period. The PQ-200 is a 24-hour episodic sampler, not a continuous hourly particulate monitor.
- The E-Sampler uses the principle of light scatter to determine real-time particulate concentrations. A filter may be used to calibrate the instrument's site-specific response, but is not required for operation.

Despite these inherent differences, the two instruments produced comparable results when used for collocated sampling of artificially-generated smoke over thirty discrete 24-hour periods. A regression analysis of the 30 paired measurements produced the following results of the form Y = MX + B, where:

Y = Indicated E-Sampler Concentration
X = BQ-200 Reference Sampler Concentration
M = Slope = 1.13
B = Intercept ($\mu g/m^3$) = 3.41
R^2 = Correlation Coefficient = 0.9628.

These results indicate that E-Sampler measurements correlate well with the PQ-200, with a small positive bias. It should be emphasized that the E-Sampler includes the option of operation with a pre-weighed sampling filter, which can be used to fine-tune its site-specific response to ambient particulate concentrations. A pre-weighed filter will be installed in each sampler at the outset of monitoring so that an empirical calibration factor can be established

for each sampler. Additional filter calibration checks will be performed when necessary to update these factors. These filters will also be submitted for analysis of COCs.

3.7 REAL-TIME MONITORING SCHEDULE

Real-time monitoring will be performed on the site per this Plan any time that construction activities described in this plan associated with the RDRA UAO remedial action construction are being carried out on the site. As indicated in Section 2.1.7, there are currently no such activities planned during December 15th through February 15th and therefore, real-time monitoring would not be performed during this shut-down period. However, the on-site remedial construction contractor will perform daily visual monitoring for dust during this period. This contractor will have the available resources to take necessary actions to control any fugitive dust generation should it be observed.

During the construction season, February 15th through December 15th, real-time monitoring will be performed during periods when the RDRA UAO remedial action construction activities described in this plan are being performed at the site. For example, if the operating shift is 10 hours per day, 6 days per week, the real-time monitoring will be performed during the operational hours only. Effectiveness of wetting and water application procedures will be evaluated by the presence or absence of visible dust. If visible dust is present, FMC will implement continuous (i.e., 24 hours a day, 7 days a week) monitoring downwind of areas of disturbed or exposed soils and continue with water application procedures until visible dust is eliminated.

3.8 QUALITY ASSURANCE

Quality assurance is critical to the collection of reliable, high-quality data that can be used to support operational decisions during remediation. Proposed quality assurance of this monitoring system will include:

- Calibration of the meteorological system and each E-Sampler at the time of installation using NIST-traceable calibration standards.

- Monthly checks of the E-Samplers' flow rates and indicated temperature and pressure readings by the operator stationed on-site.
- Quarterly inspections/audits of monitoring equipment using separate equipment from that used by the site operator.
- Quarterly maintenance and calibration of equipment in accordance with the manufacturers' recommendations.
- Frequent remote monitoring of the meteorological system and E-Sampler readings by experienced personnel, so that developing problems can be quickly detected and corrected.

3.9 DATA REPORTING

The FMC OU RD/RA UAO monthly report submitted to EPA by the 15th day of the following month will include a listing of periods when particulate levels were exceeded and periods of E-Sampler downtime (i.e., when any given E-Sampler should have been collecting data, but was not operating due to equipment failure or other factors).

A compiled monitoring report will be submitted within 45 days after the end of each calendar quarter as an attachment to the FMC OU RD/RA UAO monthly report. These reports will include:

- Hourly particulate readings for each E-Sampler monitoring location.
- Hourly readings for each meteorological instrument, including wind speed, wind direction, wind direction standard deviation, temperature, relative humidity and precipitation.
- Monthly and quarterly wind roses for the meteorological site.
- A cumulative listing of periods when particulate levels were exceeded and periods of E-Sampler downtime (i.e., when any given E-Sampler should have been collecting data, but was not operating due to equipment failure or other factors).
- Monthly flow temperature and pressure checks conducted on the E-Samplers.
- Equipment calibrations and audits performed during the quarter.

4.0 REFERENCES

10 CFR 20, Nuclear Regulatory Commission, Standards for Protection Against Radiation, Appendix B - Annual Limits on Intake (Alis) and Derived Air Concentrations (Dacs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage.

29 CFR 1910, Occupational Safety and Health Administration, Permissible Exposure Limits.

Bechtel, 1995. Remedial Investigation for the Eastern Michaud Flats Site: Part III, Air Quality Characterization / Air Monitoring Report.

FARR, 2005. Federal Air Rule for Indian Reservations in Idaho, Oregon, and Washington.

Kirkby, M.J. and Morgan, R.P.C., 1980. Soil Erosion.

MWH, 2013. Final Remedial Design Work Plan.

U.S. EPA, 2012. Interim Amendment to the Record of Decision for the EMF Superfund Site FMC Operable Unit.

U.S. EPA, 2013a. Remedial Design/Remedial Action (RD/RA) Unilateral Administrative Order.

U.S. EPA, 2013b. Regional Screening Levels (Formerly PRGs), HTTP://WWW.EPA.GOV/REGION9/SUPERFUND/PRG/

DUST CONTROL AND AIR MONITORING PLAN

APPENDIX A

INFORMATION ON DUST CONTROL TACKIFIERS

Dust Guard Liquid®

Product Data Sheet

North American Salt Company
A Compass Minerals Company

9900 West 109th Street – Suite 100
Overland Park, Kansas 66210
Phone 800-755-7258 Fax 800-359-7258

DUSTGARD® LIQUID

PRODUCTION LOCATION

Ogden, Utah

PRODUCT DESCRIPTION

Produced naturally from the Great Salt Lake, DustGard Liquid is formulated to control dust and stabilize soil on unpaved roads, stockpiles, and other sources of fugitive dust. DustGard Liquid is a light amber liquid with a density of approximately 185 gallons per ton.

PHYSICAL PROPERTIES

Specific Gravity	1.31+/- 0.02
pH (5% Solution)	7.0 - 9.0
Weight	10.7 - 11.1 lbs./gallon

Typical Analysis			Typical	Range
Magnesium Chloride	$MgCl_2$	(%)	30.9	29 – 33
Sulfate	SO_4	(%)	2.3	1.7 - 3.0
Potassium	K	(%)	0.3	0.1 – 0.5
Water	H_2O	(%)	66	62 - 70

METHOD OF ANALYSIS

All testing is from North American Salt's internal quality control procedures, which are available upon request.

APPLICATION AND STORAGE

This liquid MgCl2 product in storage should be agitated regularly to minimize precipitation of undesirable solids/crystals. Application equipment should be washed daily with water. Storage equipment should be rinsed with water to prevent buildup of solids. Aluminum storage tanks or hauling equipment should not be grounded. Overapplication of MgCl2 may result in unusually slippery road surfaces and should be avoided.

Product Description and Codes	UPC code	Product Code
Bulk		

Information herein is intended to be indicative and not to be interpreted as a specification and no warranty is given

Home

Dust Control

Road Stabilization

Usage Recommendations

All-Natural Product

Technical Resources

Distributor Locator

Cost Calculator

Contact Us

Preparation & Application

Road Surface Preparation:
If the surface is permeable, smooth, firm and shaped for drainage, it's ready for application. Before applying DustGard® liquid, make sure that ruts, washboards, potholes, drainage problems, gravel segregation and hard, impervious areas have been rectified - blading can take care of most of these problems.

Pre-Watering:
Before applying DustGard liquid, the road should be watered, ideally to a depth of 3 to 4 inches to break the surface tension and allow maximum penetration.

Application:
Recommended application rate is 1/2 gallon per square yard, split in two 1/4 gallon per square yard applications. This will ensure deep, even penetration for good dust control and stabilization.

How much product do you need? Multiply 300 gallons x width of road (in feet) x length (in miles) for the approximate amount for 1/2 gallon per square yard.

Example: to treat a 12-foot-wide road, 300 gallons x 12 ft x 1 mile is 3600 gallons per mile.

Road Shoulder Width	Square Yards per Mile	Gallons per Mile @ .50 Gal/Sq Yd	Miles per Truckload (4400 Gallons per Load)
4	2,347	1,173	3.75
8	4,694	2,346	1.88
12	7,040	3,520	1.25
16	9,386	4,694	0.94
20	11,372	5,866	0.75

Compacting:
As blading loosens the surface, it should be compacted with a vibratory or pneumatic roller to restore a dense, tight driving surface.

© 2014 Compass Minerals. All Rights Reserved
9900 W. 109th St., Suite 100, Overland Park, KS 66210 | Phone: 913-344-9200

TERMS OF USE PRIVACY STATEMENT CONTACT US

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product Name	**Magnesium Chloride Aqueous Solution**
CAS #	Mixture
Product use	Dust supression, deicing, general industrial, and speciality uses.
Manufacturer	North American Salt Company A Compass Minerals Company 9900 West 109th Street, Suite 100 Overland Park, KS 66210 US Phone: 913-344-9200
CHEMTREC	1-800-424-9300
CANUTEC	1-613-996-6666

2. Hazards Identification

Emergency overview	Contact may cause eye irritation.
Potential short term health effects	
Routes of exposure	Eye, Skin contact, Inhalation, Ingestion.
Eyes	May cause irritation.
Skin	Non-irritating to the skin.
Inhalation	May cause respiratory tract irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Target organs	Eyes. Respiratory system.
Chronic effects	None known.
Signs and symptoms	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
OSHA Regulatory Status	This product is NOT known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Potential environmental effects	See section 12.

3. Composition / Information on Ingredients

Ingredient(s)	CAS #	Percent
Magnesium chloride	7786-30-3	15 - 40

4. First Aid Measures

First aid procedures	
Eye contact	Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.
Skin contact	Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.
Inhalation	If symptoms develop move victim to fresh air. If symptoms persist, obtain medical attention.
Ingestion	Do not induce vomiting. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.
General advice	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Keep out of reach of children.

5. Fire Fighting Measures

Flammable properties	Not flammable by WHMIS/OSHA criteria.
Extinguishing media	
Suitable extinguishing media	Treat for surrounding material.

Unsuitable extinguishing media	Not available
Protection of firefighters	
Specific hazards arising from the chemical	Not available
Protective equipment for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus.
Hazardous combustion products	May include and are not limited to: Halogenated compounds. Hydrogen chloride.
Explosion data	
Sensitivity to mechanical impact	Not available
Sensitivity to static discharge	Not available

6. Accidental Release Measures

Personal precautions	Avoid inhalation of vapors or mists. Keep people away from and upwind of spill/leak. Do not touch or walk through spilled material.
Environmental precautions	Prevent entry into waterways, sewers, basements or confined areas.
Methods for containment	Stop leak if you can do so without risk.
Methods for cleaning up	Before attempting clean up, refer to hazard data given above. Small spills may be absorbed with non-reactive absorbent and placed in suitable, covered, labelled containers. Finish cleaning by spreading water on the affected surface and dispose of according to local and regional authority requirements.

7. Handling and Storage

Handling	Use good industrial hygiene practices in handling this material. Avoid breathing vapors or mists of this product.
Storage	Keep out of reach of children. Store in a closed container away from incompatible materials.

8. Exposure Controls / Personal Protection

Exposure limits

Ingredient(s)	**Exposure Limits**
Magnesium chloride	**ACGIH-TLV** Not established **OSHA-PEL** Not established

Engineering controls	TWA PEL: No specific limits have been established for magnesium chloride (a soluble substance). As a guideline, OSHA (United States) has established the following limits which are generally recognized for inert or nuisance dust. Particulates Not Otherwise Regulated (PNOR): 5mg/cu.m. Respirable Dust 8-Hour TWA PEL, 15mg/cu.m. Total Dust 8-Hour TWA PEL. TWA TLV: No specific limits have been established for magnesium chloride (a soluble substance). As a guideline, ACGIH (United States) has established the following limits which are generally recognized for inert or nuisance dust. Particulates (insolubles) Not Otherwise Classified (PNOC): 10mg/cu.m. Inhalable Particulate 8-Hours TWA TLV, 3mg/cu.m. Respirable Particulate TWA TLV. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Personal protective equipment	
Eye / face protection	Safety glasses
Hand protection	Rubber gloves. Confirm with a reputable supplier first.
Skin and body protection	As required by employer code.
Respiratory protection	Where exposure guideline levels may be exceeded, use an approved NIOSH respirator or NIOSH-approved filtering facepiece.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.

9. Physical and Chemical Properties

Appearance	Liquid
Color	Colourless to light amber
Form	Liquid
Odor	Odorless
Odor threshold	Not available
Physical state	Liquid
pH	7 - 9 (5% solution)
Melting point	Not available
Freezing point	-1 °F (-18.33 °C) (30% solution, periodically mixed to ensure homogeneity)
Boiling point	224.99 °F (107.22 °C)
Pour point	Not available
Evaporation rate	Not available
Flash point	None
Auto-ignition temperature	Not available
Flammability limits in air, lower, % by volume	Not applicable
Flammability limits in air, upper, % by volume	Not applicable
Vapor pressure	Not available
Vapor density	Not available
Specific gravity	1.24 - 1.34 (H_2O = 1)
Octanol/water coefficient	Not available
Solubility (H_2O)	Easily soluble in cold water, hot water, methanol, acetone.
Percent volatile	Not available

10. Stability and Reactivity

Reactivity	None known.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	Do not mix with other chemicals.
Incompatible materials	Oxidizing agents. Acids.
Hazardous decomposition products	May include and are not limited to: Halogenated compounds. Hydrogen chloride.

11. Toxicological Information

Component analysis - LC50

Ingredient(s)	**LC50**
Magnesium chloride	Not available

Component analysis - Oral LD50

Ingredient(s)	**LD50**
Magnesium chloride	2800 mg/kg rat

Effects of acute exposure

Eye	May cause irritation.
Skin	Non-irritating to the skin.
Inhalation	May cause respiratory tract irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Sensitization	Non-hazardous by WHMIS/OSHA criteria.
Chronic effects	Non-hazardous by WHMIS/OSHA criteria.
Carcinogenicity	Not classified or listed by IARC, NTP, OSHA and ACGIH.
Mutagenicity	Non-hazardous by WHMIS/OSHA criteria.
Reproductive effects	Non-hazardous by WHMIS/OSHA criteria.

Teratogenicity	Non-hazardous by WHMIS/OSHA criteria.
Name of Toxicologically Synergistic Products	Not available

12. Ecological Information

Ecotoxicity May be harmful to freshwater aquatic species and to plants that are not saline tolerant.

Ecotoxicity - Freshwater Algae - Acute Toxicity Data

Magnesium chloride	7786-30-3	72 Hr EC50 Desmodesmus subspicatus: 2200 mg/L

Ecotoxicity - Freshwater Fish - Acute Toxicity Data

Magnesium chloride	7786-30-3	96 Hr LC50 Gambusia affinis: 4210 mg/L [static]; 96 Hr LC50 Pimephales promelas: 1970-3880 mg/L [static]

Ecotoxicity - Water Flea - Acute Toxicity Data

Magnesium chloride	7786-30-3	24 Hr EC50 Daphnia magna: 1400 mg/L; 48 Hr EC50 Daphnia magna: 140 mg/L [Static]

Persistence / degradability	Not available
Bioaccumulation / accumulation	Not available
Mobility in environmental media	Not available
Environmental effects	Not available
Aquatic toxicity	Not available
Partition coefficient	Not available
Chemical fate information	Not available
Other adverse effects	Not available

13. Disposal Considerations

Disposal instructions	Review federal, state/provincial, and local government requirements prior to disposal.
Waste from residues / unused products	Not available
Contaminated packaging	Not available

14. Transport Information

U.S. Department of Transportation (DOT)

Not regulated as dangerous goods.

Transportation of Dangerous Goods (TDG - Canada)

Not regulated as dangerous goods.

15. Regulatory Information

Canadian federal regulations	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.
WHMIS status	Not Controlled

Occupational Safety and Health Administration (OSHA)

29 CFR 1910.1200 hazardous chemical	No
US Federal regulations	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

CERCLA (Superfund) reportable quantity

None

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No
Clean Air Act (CAA)	Not available

Clean Water Act (CWA)	Not available
State regulations	This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Inventory name

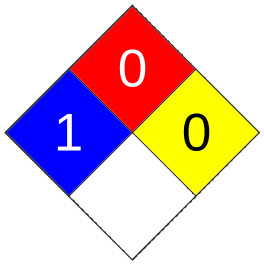
Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

LEGEND HMIS/NFPA	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0

Health	/ 1
Flammability	0
Physical Hazard	0
Personal Protection	B



Disclaimer Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

Issue date	16-Feb-2012
Effective date	15-Jan-2012
Expiry date	15-Jan-2015
Prepared by	Dell Tech Laboratories Ltd. (519) 858-5021
Other information	This MSDS conforms to the ANSI Z400.1/Z129.1-2010 Standard.

Road Oyl®

Road Oyl®
Resin Modified Emulsion

Versatile and multi-purpose for dust control, erosion control and stabilization

Road Oyl is a resin modified emulsion that provides a cold applied high performance treatment for bare earth areas, stockpiles and for unpaved road surfaces. Formulated from tree resin ingredients, this state-of-the-art, non-ionic emulsion technology is unique in its high bonding strength and is appropriate for use even in close proximity to wetland areas and other areas of environmental sensitivity. Road Oyl provides the clean, high performance technology needed for any type of project.

Originally developed to solve severe dust problems on mine haul roads, Road Oyl has been used around the world for over 15 years.

Since Road Oyl is made from all natural ingredients harvested on a sustainable basis, it has never had a problem being approved for use in any application or as part of an environmental permit issued to an operating entity such as a landfill, steel mill or mine.

MIDWEST

Road Oyl is versatile and multi-purpose in use for dust control, erosion control, stabilization, shoulder treatments and other specialized applications. It has been specifically designed and proven to be a long-term solution for efficient control of road dust as well as for use on mine tailings and stockpiles. Whether you are creating a landing strip, access road, haul road, hardened surface, trail or have erosion control requirements, Road Oyl provides a reliable, environmentally friendly binder.

Traffic on a Road Oyl surface will compact the surface into a smooth dust free pavement-like surface. It penetrates road aggregate and binds it into a surface proven stronger than asphalt. Road Oyl darkens the aggregate or soil that it's applied to slightly but maintains the same basic look, which makes it desirable in natural settings. Road Oyl will not track when applied as directed.

What is Road Oyl?

Road Oyl is a natural flexible pavement binder emulsion formulated from pine rosin and pitch in water. The pitch and rosin, which comprise roughly 50% of Road Oyl by weight, are co-produced with other timber products from southern pine in the southeastern United States. Pine pitch is a black, viscous "tar" derived from the distillation of wood; before the development of coal tar pitch. Pine rosin is the residue from distillation of turpentine oil from raw turpentine. The Road Oyl liquid is brownish in color with mild odor. When rubbed between the fingers, it becomes extremely sticky as the water evaporates.

Environmentally Friendly

Made from all natural products harvested on a sustainable basis, Road Oyl is non-hazardous and safe for the environment.

Economical

Road Oyl is shipped efficiently as a high concentrate and diluted with water before application. With its long lasting nature, you spend less time reapplying, saving you both time and money.

Long Lasting

The condition of the road, the degree of Road Oyl penetration, and the amount of traffic combine to determine the life of a Road Oyl application. It also helps stabilize the road in winter by protecting the road from water intrusion.

Road Oyl is versatile and multi-purpose in use for dust control, erosion control, stabilization, shoulder treatments and other specialized applications.

Physical Properties

Specific Gravity:	0.9 – 1.1 Kg/L
Weight per Gallon (US)	7.497 – 9.163 #/gallon
Appearance:	Light brown colored liquid emulsion
Odor:	Musty, woodsy
pH:	6 - 9
Boiling Point:	212°F (100°C)
Solubility in Water:	Dilutable
OSHA Hazard:	No
Flammability:	Non-flammable, non-combustible
Stability:	Stable under normal handling conditions
Corrosiveness:	Similar to water
Incompatibilities:	Can react with strong organic oxidizing materials, strong acids and strong bases.

Midwest Industrial Supply, Inc.
1101 3rd Street Southeast
Canton, Ohio 44707
www.midwestind.com

Tel 330.456.3121
Fax 330.456.3247
Toll Free 1.800.321.0699

MIDWEST

Road Oyl®
Frequently Asked Questions

1. How long will it last?
   It depends on a number of factors such as traffic, track-on, and spillage as well as the condition of the road. Applications are cumulative, so reapplications should become more dilute and less frequent until the maintenance level is reached.

2. Who else is using it?
   Road Oyl has been used all over the world for over 15 years, from the U.S. Military to landfills, steel mills, coal mines and gold.

3. What dilution ratio should I use?
   Road Oyl can be diluted from 4:1 to 15:1 with water. The lower the dilution the more control you will get with each application andthe less often you should have to spray. With track on or spillage, use higher dilutions and spray more often.

4. Is it EPA approved?
   ROAD OYL®is made from all natural ingredients harvested on a sustainable basis. It has never had a problem being approved for usein any application or as part of an environmental permit issued to an operating entity such as a landfill, steel mill, or mine.

5. Will it harm the water truck?
   No. When finished spraying, flush the system with water until it runs clear.

6. Will it get on the vehicles?
   When freshly applied, it might splash on nearby vehicles.

7. How do I clean it up?
   Fresh splashed product can be flushed off with water. Dried product can be cleaned with hot water and detergent.

8. Will it track?
   Road Oyl will not track when applied as directed. Excessive application or oversaturation will track when freshly applied.

9. Does it cause rust?
   No. It is non-corrosive as well as non-hazardous, non-flammable, and non-toxic.

10. Will it harm my roads?
    No. Unlike salts or other water soluble products, it will actually help stabilize the road rather than draw excessive moisture to the road base that can be harmful.

11. Do I need to grade the roads first?
    It is not necessary to grade the road. However, we recommend, if the road is rough, grading the road first.

12. How much does it cost?
    Road Oyl is an economical solution to dust control. Remember, this is a concentrate that is diluted from 4:1 to 15:1 with waterbefore use. Your actual cost will be determined by the dilution ratio and frequency of application.

Midwest Industrial Supply, Inc.
1101 3rd Street Southeast
Canton, Ohio 44707
www.midwestind.com

Tel 330.456.3121
Fax 330.456.3247
Toll Free 1.800.321.0699

MIDWEST

MIDWEST INDUSTRIAL SUPPLY, INC.
PO BOX 8431
CANTON, OH 44711

ROAD OYL® MSDS

MATERIAL SAFETY DATA SHEET

EMERGENCY PHONE NUMBER: 330-456-3121

SECTION I — IDENTIFICATION OF SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

TRADE NAME: .....Road Oyl
CHEMICAL NAME:.....Specialized Dust Suppressant and Soil Stabilization Agent
SYNONYMS: .....Dust Retardant
CHEMICAL FAMILY: .....N/A
MOLECULAR WEIGHT: ..N/A
FORMULA:.....N/A
CAS REGISTRY NO.: .....Product a Blend - No Number Assigned

SECTION II — COMPOSITION/INFORMATION ON INGREDIENTS

NAME	CAS REG NO.	WT. %
Proprietary pitch/rosin blend	8016-81-7 8050-09-7 8052-10-6	40 – 60

SECTION III — HAZARDS IDENTIFICATION

Eye and skin irritant.

SECTION IV — FIRST AID MEASURES

EYES: .....Flush eyes with flowing water at least 15 minutes, get medical attention.Remove contact lenses.
INHALATION: .....Move subject to fresh air. If victim is not breathing perform artificial respiration. Administer oxygen if available. Keep victim warm and at rest. Seek medical attention as soon as possible if breathing difficulty persists.
SKIN:.....Flush with large amount of water or wash with soap and water. Seek medical attention if irritation persists.
INGESTION:.....DO NOT induce vomiting because of aspiration into the lungs. Seek medical attention if irritation persists.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT ISUNCONSCIOUS OR HAVING CONVULSIONS.

NOTE TO PHYSICIAN:....Monitor respiratory distress. If cough or difficulty breathing develops, evaluate for respiratory tract irritation, bronchitis or pneumonitis.

SECTION V — FIRE FIGHTING MEASURES

FLAMMABILITY:.....Nonflammable, but will burn on prolonged exposure to flame or high temperature.
FLASH POINT
(TEST METHOD):.....>200°F (>94°C), aqueous blend
AUTOIGNITION
TEMPERATURE:.....Not determined
UNUSUAL FIRE AND
EXPLOSION HAZARDS: .....Do not cut, weld, heat of drill or pressurize empty container.
MATERIALS TO AVOID: .....Avoid contact with strong oxidizing agents, including peroxides, chlorine and strong acids.
PRODUCTS OF
COMBUSTION:.....Carbon dioxide, carbon monoxide, smoke and irritating fumes.

EXTINGUISHING MEDIA AND INSTRUCTIONS:
If a tank, railcar of tank truck is involved in a fire isolate for 0.5 miles in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from the area and let the fire burn itself out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of the tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion.
SMALL FIRE:.....use dry chemicals, foam, CO_2.
LARGE FIRE: .....use water spray, fog of foam. For small outdoor fires portable extinguishers may be used and SCBA (self contained breathing apparatus) may not be required. For all indoor fires and any significant outdoor fires SCBA if required. Respiratory and eye protection are required for fire fighting personnel.

SECTION VI - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK
PROCEDURES: .....ELIMINATE ALL IGNITION SOURCES. Stop leak without risk and contain spill. Absorb with inert absorbent materials such as clay or sand. Place absorbent in closed metal containers for later disposal or burn in appropriate facility. Keep spills out of sewers and open bodies of water.

SECTION VII — HANDLING AND STORAGE

STORAGE: .....Keep in a cool, dry, ventilated storage area and in closed containers. Keep away from sources of ignition and oxidizing materials. DO NOT FREEZE.
HANDLING: .....KEEP AWAY FROM SOURCES OF IGNITION. Do not reuse empty containers. Practice good hygiene. Wash hands before eating. Launder clothes before reuse. Discard saturated leather goods.

SECTION VIII — EXPOSURE CONTROL/PERSONAL PROTECTION

RESPIRATORY
PROTECTION: .....None required if good ventilation is maintained. If mist is generated by heating or spraying use a NIOSH approved organic respirator with a mist filter.
VENTILATION: .....Under normal handling conditions special ventilation is not necessary. If operation generates mist or fumes use ventilation of keep exposure to airborne contaminants below exposure limits.
EYE PROTECTION:.....Chemical splash, goggles recommended.
PROTECTIVE
CLOTHING: .....Clothing to minimize skin contact, long sleeves, boots or shoes. For casual contact PVC gloves are suitable, for prolonged contact use neoprene or nitrile gloves.

SECTION IX — PHYSICAL AND CHEMICAL PROPERTIES

BOILING/MELTING POINT @ 760 mm Hg: .....212°F (100°C)
VAPOR PRESSURE mm Hg @ 20°C: .....N/D
SPECIFIC GRAVITY OR BULK DENSITY: .....0.9 – 1.1
SOLUBILITY IN WATER: .....dilutable
APPEARANCE: .....light brown colored liquid emulsion
ODOR: .....musty, woodsy
pH: .....6 – 9

SECTION X — STABILITY AND REACTIVITY

STABILITY: .....Stable under normal handling conditions.
CHEMICAL INCOMPATIBILITY: .....Can react with strong organic oxidizing materials, strong acids and strong bases.
HAZARDOUS DECOMPOSITION PRODUCTS: .....Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide, smoke, hydrocarbons and irritating fumes of sulfide oxides.
HAZARDOUS POLYMERIZATION: .....Does not occur under normal industrial conditions.
CONDITIONS TO AVOID: .....Excessive heat and flame.
CORROSIVE TO METAL: .....Similar to water

SECTION XI — TOXICOLOGICAL INFORMATION

EFFECTS OF OVEREXPOSURE

INHALATION: .....Inhalation is highly unlikely. However prolonged or repeated inhalation of fumes or mists may cause irritation to the respiratory tract. Product deposits in lungs may lead to fibrosis and reduced pulmonary function.
SKIN: .....Prolonged or repeated contact may cause skin irritation, dermatitis or oil acne.
EYES: .....Prolonged or repeated contact may be irritating to eyes. Will not cause permanent damage.
INGESTION: .....Relatively non toxic to digestive tract.

SECTION XII — ECOLOGICAL INFORMATION

When used and applied properly ROAD OYL is not known to pose any ecological problems.

SECTION XIII — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: .....Consult your local authorities for regulations. Preferred waste management: recycle or reuse, incinerate with energy recovery, disposal in a licensed facility. Disposal facility should be compliant with state, local and federal government regulations.

SECTION XIV — TRANSPORTATION INFORMATION

D.O.T. PROPER SHIPPING NAME (49CFR172.101): ....Dust Control Agent
D.O.T. HAZARD CLASSIFICATION (49CFR172.101): ..Non-regulated
D.O.T. PLACARDS REQUIRED: .....None
BILL OF LADING DESCRIPTION: .....Dust suppressant

SECTION XV— REGULATORY INFORMATION

EPA SARA Title III hazard class:.....None
OSHA HCS hazard class: .....Irritant
CERCLA (40 CFR 302.4): .....None
TSCA: .....Components of this product are listed on TSCA inventory.
Canadian WHMIS classification: .....D2B, irritant
Canadian DSL: .....All components of this product are listed on DSL (Domestic Substance List).
California Proposition 65:.....Does not contain any Prop 65 chemicals.

SECTION XVI — OTHER INFORMATION

ABBREVIATIONS AND SYMBOLS:

N.D. = Not Determined
N.A. = Not Applicable
N.T. = Not Tested
< = Less Than
> = Greater Than

Soiltac/Gorilla Snot®

Soilworks, LLC®
1750 E. Northrop Blvd., Ste. 250, Chandler, AZ 85286
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Letter of Introduction

Soilworks®, LLC is the innovator and manufacturer of Soiltac® soil stabilizer and dust control agent. Soiltac® is an eco-safe, biodegradable, liquid copolymer used to stabilize and solidify any soil or aggregate as well as erosion control and dust suppression.

Soilworks'® recent advances in simulation, chemistry, processing techniques, and analytical instrumentation have allowed a whole host of new types of polymer particles and polymer nanotechnology applications to be realized. These advances led to the revolutionary development of nanotechnology into Soiltac's® superior performance.

Once applied to the soil or aggregate, the copolymer molecules coalesce forming bonds between the soil or aggregate particles. The key advantage of Soiltac® originates with its long, nanoparticle molecular structure that link and cross-link together. As the water dissipates from the soil or aggregate, a durable and water resistant matrix of flexible solid-mass is created. Once cured, Soiltac® becomes completely transparent, leaving the natural landscape to appear untouched.

Soiltac® results are based on the application rate used. Modest application rates are useful for dust suppression and erosion control by creating a three-dimensional cap or surface crust. Heavier rates can generate qualities similar to cement; useful for soil solidification and stabilization found in road building. By adjusting the application rate, Soiltac® can remain effective from weeks to several years. Most importantly, Soiltac® is a truly biodegradable product that is completely environmentally safe to use.

Soiltac® has been rigorously evaluated and its performance verified by the U.S. Army Engineering Research and Development Center (ERDC) against the industry's traditional top performing soil stabilizers and dust control agents. As a result, the Department of Defense continues to award Soilworks® with contracts to supply all branches of the Armed Forces globally, including operations in Iraq and Afghanistan. Its success with the U.S Military and Allied Forces has led to Soilworks® GSA contract (# GS-07F-5364P) and a complete listing of National Stock Numbers for the U.S. Department of Defense warehouses.

Soiltac's® advanced nanotechnology is modernizing the way we stabilize soils and aggregates in addition to controlling dust and erosion for a whole new generation. Soiltac® applications are extensive ranging from simple backyard trails and construction sites to heavy-lift military cargo runways and global transportation infrastructure.

Soilworks® is dedicated to economically solving soil stabilization challenges throughout the world's commercial, industrial and military markets. For more information about Soiltac®, please visit us online at www.soilworks.com or call 1-800-545-5420.

Respectfully,

Chad Falkenberg
CEO & Chairman

Bima International Marketing Counseling Trade Plc.

OUR PRODUCTS

Soiltac
Durasoil
Dowel Bars
Underground tapes
Cork
Tiedown
Aslan FRP
Paintings and Coatings
Micro reinforcements
Download Catalogs

QUALITY CERTIFICATE

GOOGLE TRANSLATION

Soiltac® Application Rates for Soil Stabiliztion & Dust Control

Topical only	Undiluted concentrate Standard ft²/ gal.	gal./ ft²	yd²/ gal.	gal./ yd²	Metric gal./ acre	m²/ gal	gal./ m²	m²/ L	L/ m²	Parts Water	Traffic Area	Dilution gal./ Acre	gal./ SY	Life/ months
Water Retention Basin & Pond Lining	20	0.0500	2.2	0.450	2178	1.9	0.538	0.5	2.04	2	No	6534	1.35	12-24
Aircraft Runways (Heavy use)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	4	Yes	6223	1.29	12-24
Aircraft Runways (single engine)	50	0.0200	5.6	0.180	871	4.6	0.215	1.2	0.81	6	Yes	6098	1.26	12-24
Helicopter Landing Pads (Heavy Craft)	45	0.2220	5.0	0.200	968	4.2	0.239	1.1	0.91	5	Yes	5808	1.20	12-24
Helicopter Landing Pads (Light Craft)	70	0.0143	7.8	0.129	622	6.5	0.154	1.7	0.58	8	Yes	5601	1.16	12-24
Heavy Haul Roads & Mining Roads	60	0.0167	6.7	0.150	726	5.6	0.179	1.5	0.68	6	Yes	5082	1.05	12-24
Military Convoy & Supply Roads	65	0.0154	7.2	0.138	670	6.0	0.166	1.6	0.63	6	Yes	4691	0.97	12-24
Roads (High Traffic)	65	0.0154	7.2	0.138	670	6.0	0.166	1.6	0.63	6	Yes	4691	0.97	12-24
Residential Driveways	65	0.0154	7.2	0.013	670	6.0	0.016	1.6	0.63	6	Yes	4691	0.97	12-24
Parking Lots	65	0.0154	7.2	0.138	670	6.0	0.166	1.6	0.63	6	Yes	4691	0.97	12-24
Roads (Light Traffic)	70	0.0143	7.8	0.129	622	6.5	0.154	1.7	0.58	7	Yes	4978	1.03	12-24
Golf Course Bunker Liner	50	0.0200	5.6	0.180	871	4.6	0.215	1.2	0.81	5	Yes	5227	1.08	12-24
Golf Course Cart Paths	80	0.0125	8.9	0.113	545	7.4	0.135	2.0	0.51	8	Yes	4901	1.01	12-24
Walking Trails and Paths	100	0.0100	11.1	0.090	436	9.3	0.108	2.5	0.41	10	Yes	4792	0.99	12-24
Road Sealer over Soiltac Stabilized Base	100	0.0100	11.1	0.090	436	9.3	0.108	2.5	0.41	4	Yes	2178	0.45	12-24
BMX Tracks	120	0.0083	13.3	0.075	363	11.1	0.090	2.9	0.34	10	Yes	3993	0.83	9-16
Temporary Parking Lots	120	0.0083	13.3	0.075	363	11.1	0.090	2.9	0.34	10	Yes	3993	0.83	1-3
Temporary Roads & Detours	150	0.0067	16.7	0.600	290	13.9	0.072	3.7	0.27	13	Yes	4066	0.84	1-3
Road Shoulders	160	0.0063	17.8	0.056	272	14.9	0.067	3.9	0.25	14	Yes	4084	0.84	12-24
Slope Erosion Control (Steep Slope)	100	0.0100	11.0	0.090	436	9.0	0.108	2.9	0.41	5	Yes	2614	0.54	12-24
Slope Erosion Control (Average Slope)	180	0.0056	20.0	0.050	242	17.0	0.060	4.0	0.23	10	Yes	2662	0.55	12-24
Slope Erosion Control (Light Slope)	220	0.0045	24.0	0.041	198	20.0	0.049	5.0	0.19	12	No	2574	0.53	12-24
Stock Pile Dust Capping (Steep Slope)	220	0.0045	24.0	0.014	198	20.0	0.049	5.0	0.19	9	No	1980	0.41	12-24
Stock Pile Dust Capping (Average Slope)	270	0.0037	30.0	0.033	161	25.0	0.040	7.0	0.15	12	No	2097	0.43	12-24
Stock Pile Dust Capping (Light Slope)	320	0.0031	36.0	0.028	136	30.0	0.034	8.0	0.13	14	No	2042	0.42	12-24
Hazardous Material Capping & Sealing	160	0.0063	18.0	0.056	272	15.0	0.067	4.0	0.25	8	No	2450	0.51	12-24
Landfill Capping & Reclamation	360	0.0028	40.0	0.025	121	33.0	0.030	9.0	0.11	10	No	1331	0.28	12-24
Odor & Vapor Suppression	360	0.0028	40.0	0.025	121	33.0	0.030	9.0	0.11	20	No	2541	0.53	12-24
Mine Tailings Capping & Reclamation	450	0.0022	50.0	0.020	97	42.0	0.024	11.0	0.09	12	No	1258	0.26	12-24
Coal Rail Car Capping	1000	0.0010	111.0	0.009	44	93.0	0.011	25.0	0.04	29	No	1307	0.27	1+
Dust Control (30 Days)	1250	0.0008	139.0	0.007	35	116.0	0.009	31.0	0.03	34	No	1220	0.25	1+
Dust Control (90 days)	795	0.0013	88.0	0.011	55	74.0	0.014	20.0	0.05	21	No	1205	0.25	3+
Dust Control (6 Months)	580	0.0017	64.0	0.016	75	54.0	0.019	14.0	0.07	15	No	1202	0.25	6+
Dust Control (12 Months)	415	0.0024	46.0	0.022	105	39.0	0.026	10.0	0.10	11	No	1260	0.26	12+
Dust Control (12-24 Months)	320	0.0031	36.0	0.028	136	30.0	0.034	8.0	0.13	8	No	1225	0.25	12-24
Hydroseed & Hydromulch Tackifier	1740	0.0006	193.0	0.005	25	162.0	0.006	43.0	0.02	40	No	1026	0.21	3-6
(Mixed-In/Processed)														

Base Stabilization Light (4"-10cm deep)	45	0.0222	5.0	0.200	968	4.2	0.239	1.1	0.91	**
Base Stabilization Average (4"-10cm deep)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	**
Base Stabilization Heavy (4"-10cm deep)	25	0.0400	2.8	0.360	1742	2.3	0.431	0.6	1.63	**
Road Pot Hole Repair (4"-10cm deep)	25	0.0400	2.8	0.360	1742	2.3	0.431	0.6	1.63	**
Adobe Blocks & Earth Blocks (6"-15cm Tall)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	**
Base Stabilization Light (6"-15cm deep)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	**
Base Stabilization Average (6"-15cm deep)	25	0.0400	2.8	0.360	1742	2.3	0.431	0.6	1.63	**
Base Stabilization Heavy (6"-15cm deep)	15	0.0667	1.7	0.600	2904	1.4	0.718	0.4	2.72	**

**Dilution rates for mix-in/processed applications are based on the difference between optimum moisture and in-situ moisture levels.
Please consult with your local Soiltac® representative to calculate recommended dilution rates for all mix-in applications.

Application coverage and dilution rates may vary depending on traffic volume, load bearing capacity, soil type, weather conditions, soil moisture levels and compaction. All Mixed-in/Processed applications require laboratory and on-site testing to determine optimal application and dilution rates.

Copyright © 2006-2008 **BiMA International Marketing Counseling Trade Plc.**
Yesilcam Sanayi Sitesi E Blok No:116 Ostim/ANKARA
Phone : +90.3122780581 - bima@bima.gen.tr
Developed by Etik | CMS Limbo

Soilworks, LLC®
1750 E. Northrop Blvd., Ste. 250, Chandler, AZ 85286
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Global Manufacturer & Distributor of
Soiltac® / powdered soiltac® Durasoil® and Gorilla-snot®

MATERIAL SAFETY DATA SHEET

SECTION 1 - MATERIAL IDENTIFICATION

PRODUCT NAME	**SOILTAC*** *SOILTAC is a registered trademark of Soilworks, LLC.
MANUFACTURER	Soilworks, LLC. 1750 East Northrop Blvd, Suite 250 Chandler, Arizona 85286-1747 USA www.soilworks.com
TELEPHONE NUMBER	800-545-5420
ONLINE INFORMATION	www.Soiltac.com
EMERGENCY TELEPHONE NUMBERS	800-545-5420 (National & International)
REVISION DATE	November 2006 *(supersedes March 2006)*
PHYSICAL FORM	Mobile liquid
COLOR	Milky White (transparent once cured)
ODOR	Mild / Slight (no odor once cured)
C.A.S. CHEMICAL NAME	Mixture
SYNONYMS	Soil stabilizer, soil stabilization agent, soil solidifier, soil amendment, soil additive, soil crusting agent, dust control agent, dust inhibitor, dust palliative, dust suppressant, dust retardant
CHEMICAL FAMILY	Vinyl Copolymer Emulsion
EMPIRICAL FORMULA	Mixture
INTENDED USE	Soil stabilization, soil solidification, fugitive dust control, dust suppression, dust abatement, tackifier, dust abatement, PM_{10} and $PM_{2.5}$ air quality control and erosion control

SECTION 2 - INGREDIENTS

	%	CAS Number	Chemical Name
1.	50-60	Proprietary	Vinyl Copolymer
2.	40-50	7732-18-5	Water

SECTION 3 - HEALTH HAZARDS

ROUTES OF ENTRY

Eye Contact, Skin Contact, Ingestion and Inhalation

SIGNS AND SYMPTOMS OF ACUTE EXPOSURE

Eyes: Direct contact with this material may cause eye irritation including lachrymation (tearing).
Inhalation: Inhalation of vapor or aerosol may cause irritation to the respiratory tract (nose, throat, and lungs).
Skin: Contact may cause skin irritation.
Ingestion: No hazard in normal industrial use.

SIGNS AND SYMPTOMS OF CHRONIC EXPOSURE

Prolonged or repeated contact with skin may cause irritation and dermatitis (inflammation).

CARCINOGENICITY

This material **does not** contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the Occupational Safety and Health Administration (OSHA) as a carcinogen.

SECTION 4 - FIRST AID

EYE CONTACT

Flush eyes with clean water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT

Remove contaminated clothing and shoes. Wash affected area with soap and water. Get medical attention if irritation develops or persists.

INHALATION

Move patient to fresh air. If breathing has stopped or is labored give assisted respiration (e.g. mouth-to-mouth). Supplemental oxygen may be indicated. Seek medical advice.

INGESTION

Give the victim one or two glasses of water or milk to drink. Get immediate medical attention. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE AND EXPLOSION DATA

FLASH POINT (closed cup)	Not applicable
UPPER EXPLOSION LIMIT (UEL)	Not applicable
LOWER EXPLOSION LIMIT (LEL)	Not applicable
AUTOIGNITION TEMPERATURE	Not applicable
FIRE HAZARD CLASSIFICATION (OSHA/NFPA)	Non-Combustible

EXTINGUISHING MEDIA

Product does not burn. The product will only burn after the water it contains is driven off. For dry polymer use carbon dioxide, foam, dry chemical or water fog to extinguish fire. Aqueous solution **is not flammable**.

FIRE FIGHTING EQUIPMENT

Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. Thoroughly decontaminate all protective equipment after use.

FIRE FIGHTING INSTRUCTIONS

Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers.

FIRE AND EXPLOSION HAZARDS

This material **will not burn** unless it is evaporated to dryness. Closed containers may rupture when exposed to extreme heat.

HAZARDOUS COMBUSTION PRODUCTS

When dried polymer burns, water (H_2O), carbon dioxide (CO_2), carbon monoxide (CO) and smoke are produced.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

CONTAINMENT TECHNIQUES (Removal of ignition sources, diking etc)

Stop the leak, if possible. Ventilate the space involved.

CLEAN-UP PROCEDURES

Wear suitable protective equipment. If recovery is not feasible, admix with dry soil, sand or non-reactive absorbent and place in an appropriate chemical waste container. Prevent spilled material from entering sanitary sewers, storm sewers, drainage systems and from entering bodies of water or ditches that lead to waterways. Transfer to containers by suction, preparatory for later disposal. Place in metal containers for recovery or disposal. Flush area with water spray. Wash contaminated property (e.g., automobiles) quickly before the material dries. For large spills, recover spilled material with a vacuum truck.

OTHER EMERGENCY ADVICE

Spilled polymer emulsion is very slippery. Use care to avoid falls. A film will form on drying. Remove saturated clothing and wash contacted skin area with soap and water. Product imparts a milky white color to contaminated waters. Foaming may result. Sewage treatment plants may not be able to remove the white color imparted to the water.

SECTION 7 - HANDLING AND STORAGE

STORAGE

Keep from freezing. Store in a dry area. Keep containers closed when not in use to minimize contact with atmospheric air and prevent inoculation with microorganisms.

HANDLING

Use only in well-ventilated areas. Avoid contact with eyes. Avoid breathing vapors. Avoid prolonged or repeated contact with skin. Wash hands thoroughly after handling and before eating or drinking.

SECTION 8 - PERSONAL PROTECTION / EXPOSURE CONTROLS

EXPOSURE GUIDELINES

There are no Occupational Safety and Health (OSHA) Permissible Exposure Limits (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) or Short Term Exposure Limits (STEL) established for the component(s) of this product.

EYE PROTECTION

Chemical safety glasses.

HAND PROTECTION

Rubber Gloves. The breakthrough time of the selected glove(s) must be greater than the intended use period.

RESPIRATORY PROTECTION

Not required under normal use.

PROTECTIVE CLOTHING

No specific recommendation.

ENGINEERING CONTROLS

Good general ventilation should be sufficient to control airborne levels of irritating vapors.

SECTION 9 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM	liquid
COLOR	Milky White (transparent once cured)
ODOR	Mild / Slight (no odor once cured)
pH	4.5-6.0
EVAPORATION RATE	< 1 (BuAc=1)
VAPOR DENSITY	> 1 (Air = 1)
BOILING POINT	>100.00°C (>212.00°F)
FREEZING POINT	<0°C (<32°F)
SOLUBILITY IN WATER	Completely (100%) (until cured)
SPECIFIC GRAVITY (Water = 1)	1.05-1.10

SECTION 10 - STABILITY AND REACTIVITY

STABILITY

Stable at ambient temperatures. Coagulation may occur following freezing, thawing or boiling.

INCOMPATIBILITY (Materials to Avoid)

No incompatibilities have been identified.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition may form: Acetic acid and Acrolein. Thermal decomposition may produce various hydrocarbons and irritating, acrid vapors.

HAZARDOUS POLYMERIZATION

Will not occur

CONDITIONS TO AVOID

Freezing temperatures (until cured).

SECTION 11 - TOXICOLOGICAL PROPERTIES

ACUTE EYE TOXICITY

No Information is available.

ACUTE ORAL TOXICITY

No Information is available.

ACUTE SKIN TOXICITY

No Information is available.

ACUTE INHALATION TOXICITY

No Information is available.

CHRONIC/CARCINOGENICY

This material **does not** contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the Occupational Safety and Health Administration (OSHA) as a carcinogen.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICITY

Common Name	Species	Test	Result	Concentration
Green Algae	Raphidocelus Subcapitata	96-hr chronic LC50	>1,000	Undiluted
Fathead Minnow	Pimephales Promelas	96-hr acute LC50	>1,208	Undiluted
Rainbow Trout	Oncorhynchus Mykiss	96-hr acute LC50	>1,000	Undiluted

ENVIRONMENTAL FATE

No data is available.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

This material **is not** a RCRA hazardous waste. Disposal of this material is not regulated under RCRA. Consult federal, state and local regulations to ensure that this material and its containers, if discarded, is disposed of in compliance with all regulatory requirements. NOTE: As supplied or diluted, product material (foam included), when splashed on automobiles or other personal property, is difficult to remove if allowed to dry.

RCRA HAZARD CLASS

This material **is not** a RCRA hazardous waste. When discarded in its purchased form, this material would not be regulated as a RCRA Hazardous waste under 40 CFR 261.

SECTION 14 - TRANSPORT INFORMATION

DOT NON-BULK SHIPPING NAME	Refer to Bill of Lading - Not DOT Regulated // Keep From Freezing // Not dangerous goods
DOT BULK SHIPPING NAME	Refer to Bill of Lading.
IMO SHIPPING DATA	Refer to Bill of Lading.
ICAO/IATA SHIPPING DATA	Refer to Bill of Lading - Not IATA Regulated // Keep From Freezing // Not dangerous goods
CFR	Not Regulated // Keep From Freezing // Not dangerous goods
IMDG	Not Regulated // Keep From Freezing // Not dangerous goods
CTC	Not Regulated // Keep From Freezing // Not dangerous goods

SECTION 15 - REGULATORY INFORMATION

TSCA SECTION 8(b) INVENTORY STATUS

All components are included in the EPA Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

TSCA SECTION 12(b) EXPORT NOTIFICATION

This material **does not** contain any components that are subject to the U.S. Toxic Substances Control Act (TSCA) Section 12 (b) Export Notification requirements.

OSHA Hazard Communication Standard (29CFR1910.1200) hazard class(es)

This material **is not** classified as hazardous under the criteria of the U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR 1910.1200

EPA SARA Title III Section 304 CERCLA

Reportable quantities have not been established for any of this material's components.

EPA SARA Title III Section 311/312 HAZARD COMMUNICATION STANDARD (HCS)

This material **is not** a hazardous chemical.

EPA SARA Title III Section 313 TOXIC CHEMICAL LIST (TCL)

This product **does not** contain Section 313 Reportable Ingredients.

CANADIAN INVENTORY STATUS

All components of this material are listed on the Canadian Domestic Substances List (DSL)

CANADIAN WHMIS

This material **is not** classified as a controlled product under the Canadian Workplace Hazardous Material Information System.

ADDITIONAL CANADIAN REGULATORY INFORMATION

This product **does not** contain a substance present on the WHMIS Ingredient Disclosure List (IDL) which is at or above the specified concentration limit.

EUROPEAN INVENTORY STATUS (EINECS)

The polymer portion of this product is manufactured from reactants which are listed on EINECS and meets the EINECS definition of an exempt polymer.

AICS (Australia)

Included on inventory

ENCS (Japan)

Included on inventory

ECL (South Korea)

Included on inventory

SEPA (China)

Included on inventory

SECTION 16 – OTHER INFORMATION

HMIS and NFPA Classification

Health	: 1
Flammability	: 0
Reactivity	: 0
Special Hazard	: 0

APPENDIX D

CONTRACTOR'S STORMWATER POLLUTION PREVENTION PLAN

(SWPPP FOR SWG PHASE INCLUDED IN RAWP FOR SWG PHASE [SEP 2015])

(SWPPP FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

APPENDIX E

CONTRACTOR'S MATERIALS MANAGEMENT PLAN

(PLAN FOR SWG PHASE INCLUDED IN RAWP FOR SWG PHASE [SEP 2015])

(PLAN FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

APPENDIX F

CONTRACTOR'S WATER MANAGEMENT PLAN

(PLAN FOR SWG PHASE INCLUDED IN RAWP FOR SWG PHASE [SEP 2015])

(PLAN FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

APPENDIX G

CONTRACTOR'S EMISSION REDUCTION PLAN

(PLAN FOR SWG PHASE INCLUDED IN RAWP FOR SWG PHASE [SEP 2015])

(PLAN FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

APPENDIX H

CONTRACTOR'S HEALTH AND SAFETY PLAN

(CB&I HASP, REV 3)

(HASP FOR CAPPING PHASE TO BE PROVIDED BY CONTRACTOR)

HEALTH AND SAFETY PLAN
FMC Operable Unit of the Eastern Michaud Flats Superfund Site
Remedial Action Activities
Pocatello, Idaho

Shaw Environmental and Infrastructure, Inc. (A CB&I Company)

November 14, 2014 Rev.3

Prepared for:

FMC Corporation

Prepared by:

CB&I

9201 East Dry Creek Road,
Centennial, CO 80112

Project Manager – Roger Voiss

HSE District Manager – Barry Conaway, CSP

In February 2013, CB&I acquired The Shaw Group Inc., inclusive of Shaw Environmental and Infrastructure, creating the most complete energy infrastructure focused company in the world and a major provider of government services. As a result of this acquisition, CB&I has a combined global work force of approximately 50,000 employees and a much larger pool of skilled engineers, craftsmen and professionals to deliver a world of solutions.

Shaw Environmental and Infrastructure, a CB&I company, is referred to as CB&I throughout this document.

The information in this HASP has been designed for the methods presently contemplated by CB&I (CB&I) for execution of the proposed work. Therefore, this HASP may not be appropriate if the work is not performed by or using the methods presently contemplated by CB&I. In addition, as the work is performed, conditions different from those anticipated may be encountered and the HASP may have to be modified. Therefore, CB&I only makes representations or warranties as to the adequacy of the HASP for currently anticipated activities and conditions

Copyright© CB&I. All Rights Reserved

Table of Contents

List of Tables ..... **iii**
List of Figures ..... **iii**
List of Appendices ..... **iii**
Acronyms and Abbreviations ..... **iii**
1.0 Introduction **1-1**
1.1 Site Description/Background Information 1-3
1.2 Scope of Work 1-3
1.2.1 Chemicals of Concern 1-3
1.2.2 Additional Measures for Phosphorous and Phosphine 1-7
1.2.3 Radioactive Isotopes of Concern 1-9
1.2.4 Project PPE Levels 1-9
1.2.5 Air Monitoring Requirements 1-12
1.2.6 Daily Tailgate and Job Safety Analysis Requirements 1-14
1.2.7 Injury Management and Hospital Route Maps 1-15
2.0 Key Safety Personnel **2-1**
2.1.1 Responsibilities of Key Personnel 2-1
3.0 Health and Safety Training Programs **3-1**
3.1 Medical Surveillance 3-1
3.2 Training 3-1
3.3 Initial Orientation 3-2
4.0 Hazard Communication Procedures **4-1**
4.1 Hazard Communication Procedures 4-1
4.2 Contaminants of Concern Profile 4-1
4.2.1 Hazard Communication Program 4-1
5.0 Hazard Identification and Control **5-1**
5.1 General Hazards and Controls 5-1
5.1.1 General 5-1
5.1.2 Incident Reporting 5-1
5.1.3 Daily Safety Meetings 5-2
5.1.4 Safety Inspections 5-2
5.1.5 Slip/Trip/Fall 5-3
5.1.6 Underground/Utility Line Contact 5-3
5.1.7 Overhead Utility Line Contact 5-3
5.1.8 Concrete Demolition Activities 5-4
5.1.9 Debris Removal 5-4
5.1.10 General Falls/Ladders 5-5
5.1.11 Heavy Equipment Operations 5-5
5.1.12 Excavation and Trenching 5-6
5.1.13 Confined Spaces 5-7
5.1.14 Electric Shock 5-7
5.1.15 Line Entry Activities 5-8
5.1.16 Hand and Power Tools 5-8
5.1.17 Physical Injury/Ergonomics 5-9
5.1.18 Vehicular Traffic 5-9

5.1.19 Noise 5-10
5.1.20 Lifting and Material Handling 5-10
5.1.21 Fire Control 5-10
5.1.22 Static Electricity/Transfer of Flammable Liquids 5-11
5.1.23 Biological and Wildlife Hazards 5-11
5.1.24 Heat Stress 5-21
5.1.25 Cold Stress 5-23
5.1.26 Inclement Weather 5-23
5.1.27 Welding, Cutting, Brazing 5-24
5.1.28 Heavy Equipment Decontamination 5-24
5.1.29 Cleaning Equipment 5-24
6.0 Air Monitoring/PPE 6-1
6.1 Air Monitoring 6-1
6.1.1 Air Monitoring Frequency Guidelines 6-1
6.2 Personal Protective Equipment (PPE) 6-2
6.2.1 Respiratory Protection 6-2
7.0 Decontamination 1
7.1 Decontamination Procedures 1
7.1.1 Decontamination Procedures 1
7.2 Example Decontamination Diagram 2
8.0 Site Control/Communications 8-1
8.1 Site Control 8-1
8.1.1 Site Security and Work Zone Definition 8-1
8.2 Field Communications 8-2
9.0 Emergency Response and Contingency Plan 9-1
9.1 Pre-emergency Plan for Site Emergencies 9-1
9.1.1 Evacuation Routes And Procedures 9-1
9.1.2 Spill or Leaks 9-2
9.1.3 Emergency Medical Treatment Procedures 9-3
9.1.4 Fire Emergency 9-4

List of Tables

Table 1	Contaminants of Concern Profile
Table 2	Radiological Isotopes of Concern
Table 3	Personal Protective Equipment
Table 4	Task-Specific Air Monitoring/PPE Summary
Table 5	Air Monitoring Action Levels
Table 6	Emergency Phone Numbers
Table 7	Field Communication Methods

List of Figures

Figure 1	Site Location
Figure 2	Hospital Map
Figure 3	Occupational Clinic Map
Figure 4	Contamination Reduction Zone
Figure 5	Primary Evacuation Routes and Emergency Checkpoints
FMC Figure 2	RCRA Pond Area and Remediation Areas with Identified or Suspected P4

List of Appendices

Appendix A	H&S Site Logs and Forms
Appendix B	Activity Hazard Analysis (AHA) / Job Safety Analysis (JSA)
Appendix C	Accident Forms
Appendix D	Hazard Communication Written Program/ Safety Data Sheets (SDS)
Appendix E	CB&I Health Safety & Environmental Procedures (Table of Contents)
Appendix F	FMC Site Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards
Appendix G	FMC RCRA Pond Area Rules

Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
CAP	Corrective Action Plan
CMS	CB&I Management System
COC	Contaminants of Concern
CRZ	Contamination Reduction Zone
DOT	Department of Transportation
EMF	Eastern Michaud Flats Superfund Site
ERCP	Emergency Response and Contingency Plan
EZ	Exclusion Zone
FID	Flame Ionization Detector
GFCI	Ground Fault Circuit Interrupter

HASP	Health and Safety Plan
HSE	Health, Safety Environmental
IDLH	Immediately Dangerous to Life or Health
JSA	Job Safety Analysis
LO/TO	Lockout/Tagout
MHR	Maximum Heart Rate
NIOSH	National Institute for Occupational Safety and Health
NORM	Naturally Occurring Radiological Material
OSHA	Occupational Safety and Health Administration
PE	Professional Engineer
PEL	Permissible Exposure Limit
PEL	Permissible Exposure Limit
PHR	Project Hazard Review
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
REL	Recommended Exposure Limits
SDS	Safety Data Sheet
SHSM	Site Health and Safety Manager
SHSR	Site Health and Safety Representative
SIPP	Supervisor Incident Prevention Program
SS	Site Supervisor
SZ	Support Zone
TLV	Threshold Limit Values
WBGT	Wet Bulb Globe Temperature

1.0 Introduction

It is the Policy of CB&I and a key component of our culture, to execute all of our activities in such a manner that will ensure the Health, Safety and Environmental protection of all our employees, subcontractors, suppliers, Owner and the communities in which we live and work. We believe all accidents are preventable. This will be accomplished by having a comprehensive environmental, health, and safety plan that is followed by a proactive approach to identifying potential problems and resolving them.

This Health and Safety Plan's (HASP) objective is to help establish safe working conditions at the site. Safety procedures and protective equipment are chosen according to potential hazards. Specific hazard control methods have been evaluated and selected to minimize the potential of accident or injury.

This HASP prescribes the procedures that must be followed during specific site activities. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Project Health, Safety & Environmental Manager (Site HSM).

The provisions of this plan are mandatory for all personnel and subcontractors assigned to the project. All visitors to the work site must abide by the requirements of this plan. All project participants will attend a pre-job briefing where the contents of this HASP and the Activity Hazard Analysis ([AHA] Appendix B), will be discussed. Project staff assigned to this project must sign the HASP Agreement and Acknowledgement Sheet (below) to confirm that they understand and agree to abide by the provisions of this plan. Daily, the Site Manager (PM) or designee will need to complete a Tailgate Safety Meeting Form (Appendix A) and a Job Safety Analysis (JSA) Form (Appendix A) and ensure all personnel working on site sign both forms.

All work will comply with the Occupational Safety and Health Act (OSHA) standard, "Hazardous Waste Operations and Emergency Response" (29 CFR 1910.120), CB&I Health and Safety Procedures, FMC Site Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards requirements, and other federal, state, and local procedures that require the development and implementation of a HASP. Generation of this document certifies that the workplace has been evaluated for hazards. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected was evaluated as required by 29 CFR 1910.132(d), 1910.134, 1926.25, and 1926.55.

I have read the site safety plan for FMC OU EMF Site Remedial Action Activities Pocatello, Idaho and fully understand its contents.

HASP Agreement & Acknowledgement Sheet		
Date	**Name**	**Company**

1.1 Site Description/Background Information

The remedial design and remedial action (RD/RA) FMC is conducting at the FMC Operating Unit (OU) Eastern Michaud Flats (EMF) Superfund Site is a directive under the Unilateral Administrative Order (UAO; EPA, 2013) that the U.S. Environmental Protection Agency (EPA) issued to FMC effective June 20, 2013.

The EMF Superfund Site includes two adjacent production facilities, the former FMC Corporation elemental phosphorus (P4) processing plant that ceased operation in 2001 and a phosphate fertilizer processing facility currently operated by the J.R. Simplot Company. The EMF Superfund Site is shown on Figure 1 and encompasses both the FMC and Simplot plants and surrounding areas (Off-Plant Operable Unit [OU]) affected by releases from these facilities.

The FMC Plant OU of the EMF Superfund Site, consisting of the FMC Plant Site and other FMC-owned properties at the site, is on privately-owned fee land, most of which is located within the exterior boundaries of the Fort Hall Indian Reservation. As shown on Figure 2, the FMC OU occupies approximately 1,450 acres in Power County, Idaho approximately 2.5 miles northwest of the city of Pocatello and consists of the FMC Plant Site (i.e., the former operating facility located south of Highway 30), the Southern and Western Undeveloped Areas (SUA and WUA) that are also located south of Highway 30, and FMC-owned Northern Properties located north of Highway 30. The easternmost portions of the FMC OU are located outside the reservation boundary.

1.2 Scope of Work

All CB&I and Subcontractors employees will attend a site orientation which will include CB&I Site Specific Work Plan, HASP and Job Safety Analyses review, as well as review of the FMC Site Wide HASP, the FMC OU Remedial Action Emergency Response Plan, and general site rules.

This plan addresses health and safety issues involved with the following tasks:

- Mobilization to the project site.
- Site Setup
- Site Clearance Activities
- Modification of existing monitoring wells and structures
- Site Grading Activities /Excavation of site-impacted fill materials and soils -
- Cleaning of underground storm water piping
- Decontamination of equipment
- Site cleanup and demobilization

For specific hazards associated with each task and their mitigated results see the Activity Hazard Analysis (AHA) in Appendix B. For information regarding the project-specific execution of each of the above tasks please refer to the September 2014 FMC Remedial Action Work Plan for Site-Wide Grading Phase.

1.2.1 Chemicals of Concern

See Table 1 for a summary profile of the hazards and control measures to follow for the contaminants of concern (COC). This profile is based on recent site history and site characterization. For more detailed and specific information, always refer to the Safety Data Sheets (SDS) or equivalent information for the compound (see Appendix C).

Table 1: Contaminants of Concern Profile

Contaminant	Physical/Chemical Characteristics	(Target Organs/ Route of Entry)	OSHA PEL	NIOSH REL
Aluminum	Combustible Solid, finely divided dust is easily ignited may cause explosions. Strong oxidizers & acids, halogenated hydrocarbons [Note: Corrodes in contact with acids & other metals. Ignition may occur if powders are mixed with halogens, carbon disulfide, or methyl chloride.] Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system Inhalation, skin and/or eye contact	TWA 15 mg/m^3 (total) TWA 5 mg/m3 (resp)	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
Arsenic	Appearance and odor vary depending upon the specific organic arsenic compound In animals: irritation skin, possible dermatitis; resp distress; diarrhea; kidney damage; muscle tremor, convulsions; possible gastrointestinal tract, reproductive effects; possible liver damage	Skin, respiratory system, kidneys, central nervous system, liver, gastrointestinal tract, reproductive system Inhalation, ingestion, skin and/or eye contact	[1910.1018] TWA 0.010 mg/m3	*Ca (See NIOSH Guide -Appendix A) C 0.002 m/mg3 [15-minute]
Cadmium	Metal: Silver-white, blue-tinged lustrous, odorless solid. Strong oxidizers; elemental sulfur, selenium & tellurium Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Respiratory system, kidneys, prostate, blood Inhalation, ingestion	*[1910.1027] TWA 0.005 mg/m3 [*Note: The PEL applies to all Cadmium compounds (as Cd).]	*Ca (See NIOSH Guide -Appendix A) [*Note: The REL applies to all Cadmium compounds (as Cd).]
Chromium	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid. Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame. Strong oxidizers (such as hydrogen peroxide), alkalis	Eyes, skin, respiratory system Inhalation, ingestion, skin and/or eye	TWA 1 mg/m3 (See NIOSH Guide Appendix C) [*Note: The PEL also applies to insoluble chromium salts.]	TWA 0.5 mg/m3 (See NIOSH Guide Appendix C)

	Irritation eyes, skin; lung fibrosis (histologic)	contact		
Fluorides	Odorless, white powder or colorless crystals. [Note: Pesticide grade is often dyed blue.] Strong oxidizers Irritation eyes, respiratory system; nausea, abdominal pain, diarrhea; salivation, thirst, sweating; stiff spine; dermatitis; calcification of ligaments of ribs, pelvis	Eyes, skin, respiratory system, central nervous system, skeleton, kidneys Inhalation, ingestion, skin and/or eye contact	TWA 2.5 mg/m3 [*Note: The PEL also applies to other inorganic, solid fluorides (as F).]	TWA 2.5 mg/m3 [*Note: The REL also applies to other inorganic, solid fluorides (as F).] IDLH 250 mg F/m^3
Manganese	Oxidizers [Note: Will react with water or steam to produce hydrogen.] Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	Respiratory system, central nervous system, blood, kidneys Inhalation, ingestion	C 5 mg/m3 [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl and Methyl cyclopentadienyl manganese tricarbonyl.]	TWA 1 mg/m3 ST 3 mg/m3 [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]
Naturally Occurring Radioactive Material (NORM) including Uranium, Thorium, Radium	No physical sensation to identify that exposure occurred. Survey instruments required to measure the degree of exposure. Limit airborne dust and surface contamination in order to reduce the potential for inhalation and ingestion. Precautions to limit exposures are similar to other solid contaminants such as lead or heavy metals.	Whole Body Irradiation (external exposure); Inhalation & Ingestion (internal exposure)	5 REM TEDE (Total Effective Dose Equivalent) Nuclear Regulatory Commission - Occupational Exposure Limit	5 REM TEDE (Total Effective Dose Equivalent) Nuclear Regulatory Commission - Occupational Exposure Limit
Nickel	Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air. Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin Inhalation, ingestion, skin and/or eye contact	TWA 1 mg/m^3 [*Note: The PEL does not apply to Nickel carbonyl.]	Ca TWA 0.015 mg/m^3 (See NIOSH Guide - Appendix A) [*Note: The REL does not apply to Nickel carbonyl.]
Phosphine	Colorless gas with a fish or garlic like odor. Reacts with air, oxidizers, chlorine, acids, moisture,	Respiratory system Inhalation and	TWA 0.3 ppm (0.4 mg/m3)	TWA 0.3 ppm (0.4 mg/m3) ST 1 ppm (1

	halogenated hydrocarbons, copper [Note: May ignite SPONTANEOUSLY on contact with air. PH_3 LEL = ~20,000 ppm at site elevation] Nausea, vomiting, abdominal pain, diarrhea; thirst; chest tightness, dyspnea (breathing difficulty); muscle pain, chills; stupor or syncope; pulmonary edema; liquid: frostbite	ingestion		mg/m3)
Phosphorus (Elemental)	White to yellow, soft, waxy solid with acrid fumes in air. [Note: Usually shipped or stored in water.] Reacts with air, oxidizers, and halogens (including elemental sulfur and strong caustics), halogens. Ignites spontaneously in moist air. Irritation eyes, resp tract; eye, skin burns; abdominal pain, nausea, jaundice; anemia; cachexia; dental pain, salivation, jaw pain, swelling	Eyes, skin, respiratory system, liver, kidneys, jaw, teeth, blood Inhalation, ingestion, skin and/or eye contact	TWA 0.1 mg/m3	TWA 0.1 mg/m3 IDLH 5mg/m^3
Phosphorus pentoxide (airborne particulate or aerosol)	White smoke produced from oxidation of elemental phosphorus. Hydrolyses with water vapor in air to form phosphoric acids. Irritation eyes, resp tract	Eyes, skin, respiratory system Inhalation, skin and/or eye contact	(as H_3PO_4 aerosol) TWA 1 mg/m^3	(as H_3PO_4 aerosol) TWA 1 mg/m^3 ST 3 mg/m^3
Zinc	Soft, white powder with a slight, characteristic odor. Oxidizers, dilute acids [Note: Hydrophobic (i.e., repels water).] irritation eyes, skin, upper respiratory system; cough	Eyes, skin, respiratory system Inhalation, ingestion, skin and/or eye contact	TWA 15 mg/m3 (total) TWA 5 mg/m3 (resp)	TWA 10 mg/m3 (total) TWA 5 mg/m3 (resp)
Nuisance Dust	Depending on the composition; may be potentially explosive in confined/contained areas (flour/grain) or relatively inert (sand); can react with strong oxidizers and organic peroxides; thermal decomposition can produce airborne silica and/or toxic gases (depending on the composition)	Skin, eye and respiratory irritant Inhalation, skin and /or eye contact	15 mg/m^3 (total) 5 mg/m^3 (resp)	10 mg/m^3 (total) 3 mg/m^3 (resp)

	Irritation to eyes, skin, throat, upper respiratory system			
Silica, crystalline (as respirable dust)	Powerful oxidizers: fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, hydrogen peroxide, etc.; acetylene; ammonia Coughing, dyspenia, wheezing, decreased pulmonary; progressive respiratory function; silicosis; a carcinogen; Reacts with strong oxidizers, fluorine, oxygen difluoride, chlorine trifluoride, ammonia, acetylene, hydrogen peroxide, manganese trioxide	Eye and respiratory irritant; Inhalation, skin and/or eye contact	10 mg/m3 divided by the value "%SiO2 + 2."	Ca TWA 0.05 mg/m3 (See NIOSH Guide Appendix A)

Ca – Substances that NIOSH considers to be potential occupational carcinogens
C – Ceiling
IDLH – Immediate Danger to Life and Health
NIOSH – National Institute for Occupational Safety and Health
OSHA – Occupational Safety and Health Administration
PEL – Permissible exposure limit
REL – Recommended exposure limit
STEL – Short-term exposure limit
TWA – Time-weighted average

1.2.2 Additional Measures for Phosphorous and Phosphine

There are certain areas within the FMC Pocatello site where elemental phosphorus is known or suspected to exist under the surface with conditions that can result in phosphine gas generation. Therefore, the potential for phosphine gas must be considered for all persons working in or entering these areas. Plant historical experience as well as extensive phosphine monitoring has shown the most significant potential for phosphine exposure to be at or near the closed and capped RCRA ponds, known as the RCRA Pond Area (see FMC Figure 2). FMC has established specific rules referred to as the RCRA Pond Area Work Rules (see Appendix G). All persons entering the RCRA Pond Area must have received specific training on the most recent version of the RCRA Pond Area Work Rules within the past six (6) months in order to be authorized to enter the RCRA Pond Area. Copies of the signed RCRA Pond Rules will be filed in the FMC Trailers.

Areas outside the RCRA Pond Area where elemental phosphorus is known or suspected to exist under the surface are listed below and depicted in FMC Figure 2. Sampling has shown some of these areas to have detectable, low levels of phosphine in the soil gas, although there has been no detection of phosphine in ambient air at the breathing level. Thus FMC has not implemented specific work rules concerning phosphine in those areas.

Remediation Area (RA)	Description
RA-B	Furnace building and slag pit area.
RA-C	Phossy/precipitator slurry ponds, piping corridor, and Pond 8S recovery process area.
RA-F1	Area within slag pile containing buried rail cars.
RA-K	Railroad swale area.
Underground piping	Located furnace building/slag pit area (RA-B), in piping corridor (RA-C), phossy/precipitator slurry pond area (RA-C and RA-D), calciner area (RA-E), and underground storm sewers (In RA-B and RA-A).

During all earthwork activities in areas with known or suspected elemental phosphorous (P4) materials, if an encounter with P4 materials occurs the following steps will be taken:

- If possible to safely do so with the appropriate PPE, cover up the burning/smoking material with other fill materials/soil from an adjacent area using available mobile equipment. Relocate equipment and personnel (or remain) in an up- or cross wind position of any smoke (phosphorus pentoxide).
- Immediately contact the FMC Incident Commander.
- If smoking is still evident after covering with fill/soil, continue to add fill/soil and spray with water using the water truck. Equipment and personnel will remain in an up- or cross wind position of any smoke (phosphorus pentoxide).
- Once the burning/smoking is under control and the FMC Incident Commander has determined the incident is under control then an evaluation of potential actions will be completed as per the FMC OU Remedial Design Emergency Response Plan.

If the burning/smoking cannot be contained using these recommended P4 response protocols with on-site personnel and equipment, site personnel will take actions as directed by the FMC Incident Commander. The FMC Incident Commander will make the determination to call in other responders as appropriate.

The following precautions shall be taken to prevent disturbance of an intact drum or other container which could potentially contain hazardous substances:

- Construction contractor will train personnel to be alert to indications of encountering buried materials, as evidenced by unusual resistance with equipment, unusual or unpleasant odors, evidence of soil staining/spill residues, or visual evidence of buried materials.

- If any of these indicators are observed, construction shall stop work and notify the Site Health and Safety Manager (SHSM) who, in consultation with the FMC Incident Commander, will review documented historical plant operations at the area and assess the known subsurface materials and determine whether the unusual resistance or other observed condition is consistent with those operations. If not, the hazard associated with unknown buried materials must be assumed to be high due to the unknown nature of the material, until an assessment establishes the actual nature of threat of hazardous material releases. The Incident Commander will direct site personnel to conduct an evaluation per the FMC OU Remedial Design Emergency Response Plan.

1.2.3 Radioactive Isotopes of Concern

See Table 2 for a summary profile of the Naturally Occurring Radiological Materials (NORM) that have been identified on site. This profile was taken from the FMC OU Dust Control and Air Monitoring Plan (DCAMP). CB&I Radiation Safety Program (CMS-710-01-PR-04000) will be implemented on this site to protect personnel from the potential exposure to sources of ionizing radiation. The CB&I Radiation Safety Officer (RSO) will develop a Radiation Protection Program (RPP) to meet project specific requirements. The function of the RPP is to provide all necessary information to meet project-specific requirements, regulations, and commitments.

Table 2: Radiological Isotopes of Concern

Isotope	Critical Organ	Exposure Route	Nuclear Regulatory Commission Occupational Exposure Limit
Lead -210	Bone Surfaces	Ingestion, inhalation, puncture wound, skin contamination absorption	100pCi/m3
Polonium-210	Whole Body	Ingestion, inhalation, puncture wound, skin contamination absorption	300 pCi/m3
Radium-226	Bone Tissue	Ingestion and inhalation	300 pCi/m3
Thorium-232	Respiratory System	Inhalation	0.5 pCi/m3
Uranium-238	Kidney	Ingestion and inhalation	20 pCI/m3

"As Low As Reasonably Achievable" (ALARA) principles shall be incorporated into all RPPs and HASPs involving radioactive materials. All RPPs include a formal ALARA review. Occupancy time in the work area will be limited to necessary work; the bounding conditions for work authorized under this HASP incorporate limits that adhere to the ALARA principle.

1.2.4 Project PPE Levels

See Table 3 for specific clothing required for each level of PPE for this site; see Table 4 for task-specific level requirements. Level D is the minimum acceptable level for the FMC OU site. Upgrade to Level C occurs when the results of air monitoring reveals that air monitoring action levels have been exceeded. Upgrade to Level B occurs when the results of air monitoring reveals action levels have been exceeded (site personnel must have met training requirements). Workers must maintain proficiency in the use and care of PPE that is to be worn. FMC's PPE Standard will be followed as applicable (see Appendix F).

Table 3: Personal Protection Equipment

Level	Requirements	Optional PPE
Level D	Long pants with long sleeved shirt or coveralls Steel-toed boots High visibility clothing or traffic vest (vest required in the vicinity of moving equipment or roadway traffic) Approved safety glasses or goggles Hard hat Leather work gloves	Hearing protection (muffs and/or plugs). Face shield / metatarsal guards for decon activities (high pressure washing) Tyvek coveralls (for non-Phosphorus handling activities) Latex booties or rubber over boots.

Level	Requirements	Optional PPE
Level C	Level D NIOSH/MSHA-approved full-face respirator with organic vapor/acid gas oil proof high efficiency (P100) cartridges.	Hearing protection (muffs and/or plugs). High visibility traffic vest (in the vicinity of moving equipment or roadway traffic) Face shield / metatarsal guards for decon activities (high pressure washing) Nomex coveralls w/ aluminized carbon Kevlar coat, pants, gloves and leggings (known Phosphorus handling activities)
Level B	Level D Hazmat over the sock boots NIOSH/MSHA approved full-face positive pressure demand supplied air respirator, either airline or self-contained.	Hearing protection (muffs and/or plugs). High visibility traffic vest (in the vicinity of moving equipment or roadway traffic) Nomex coveralls w/ aluminized carbon Kevlar coat, pants, gloves and leggings

Prior to using, all equipment must be inspected to ensure proper working condition.

Table 4: Task-Specific Air Monitoring/PPE Summary

A downgrade in air monitoring and PPE level must be approved by the Area or District HSM.

Job Task	PPE Level	Instrument	Frequency
Mobilization / Site Setup	Level D	None	None
Site-Wide Grading	Level D	Dust monitor (pDR Data Ram)	Periodic in operator's cab
Site Clearance Activities (including demolition)	Level D	MultiRae (PID and LEL/02/CO/H2S) Dust monitor (pDR Data Ram)	During clearance / demolition activities when conditions exist where flammable vapors/gases and/or oxygen deficiency or enrichment can occur. Continuous during demolition activities in the work area
Site-Wide Grading Activities (excavation below original grade)	Level D (Upgrade to Level C or B possible but not anticipated)	Phosphine Dräger CMS meter Personal Phosphine monitor (Toxipro or equivalent) Dust monitor (pDR Data Ram) Radiation monitoring equipment	Startup of work at task location in areas of known or suspected P4, then daily based upon air monitoring results. Monitor 15 minutes to continuously if action levels have been reached. Continuous wear by employees entering the RCRA Pond work area /operators doing intrusive/soil disturbance work in areas of known or suspected P4 Periodic in operator's cab As determined by the RSO
Excavation of Contaminated fill material /soils	Level D	Dust monitor (pDR Data Ram)	Periodic in operator's cab
Cleaning of underground storm water piping	Level D (Upgrade to Level C or B possible but not anticipated)	PID and LEL/0_2/CO/H_2S Phosphine Dräger CMS meter Personal Phosphine monitor (Toxipro or equivalent)	Continuous during activity Startup of work at task location, then every 30 to 60 minutes based upon air monitoring results. Monitor 15 minutes to continuously if action levels have been reached. Continuous wear by employees entering the work area with known or unknown P4 Periodic during activity

		Radiation monitoring equipment	As determined by the RSO
Equipment decontamination	Level D	None	None
General site duties	Level D	None	None

Note: "Start-up of work at each new task location" means to monitor the air quality at each new operation on the site. The breathing zone is the area inside a 1-foot radius around the head.

1.2.5 Air Monitoring Requirements

Section 6.0 of the HASP provides information on when air monitoring must be conducted, calibration requirements, and how to document air monitoring readings. The monitoring will be conducted by the Environmental Health and Safety (EHS) staff or their designee in the work areas. The perimeter monitoring will be conducted by Bison Engineering, Inc. Table 5 provides a summary of the requirements for this project site.

Table 5: Air Monitoring Action Levels

NOTE: EHS will add other screening instruments and action levels as per site specific requirements.

Instrument*	Function	Measurement	Action
PID[1] (10.6*eV lamp) - Measures Total Organic Vapors	Conduct air monitoring for volatile organic compounds during activities where contaminated media are present. Make sure that a background reading is taken before the startup of activities and periodically thereafter.	0 - 5 ppm above background	Level D
		> 5 - 10 ppm above background	Level D
		≥ 10 - ≤ 25 ppm above background	Upgrade to Level C. Coordinate with PM and SHSE Manager for guidance
		≥250 ppm	Stop work required. Leave work area, contact PM and SHSE Manager for guidance
Four gas Oxygen/Combustible Gas/ Carbon Monoxide and Hydrogen Sulfide Meter[1] (O2/LEL/CO/H2S)) Measures oxygen level (O2), lower explosive limit (LEL), Carbon Monoxide (CO) and hydrogen sulfide (H2S)	Conduct air monitoring for O2/LEL when conditions exist where flammable vapors/gases and/or oxygen deficiency or enrichment can occur. A decreased O2 reading of 0.1% (e.g., 20.9% to 20.8%) actually represents a change in the total air envelope of approximately 0.5% or 5,000 ppm. This represents little hazard if the displacing gas is inert; if the displacing gas is toxic/flammable/reactive, such a concentration	O2 = 20.9 %	Acceptable
		O2 >19.5 - 20.8%	Verify reasons for O2 depletion with appropriate air monitoring instru-mentation before work continues. Utilize appropriate engineering controls/PPE once atmospheric contaminants have been verified.
		O2 >20.9 % - 22 %	Verify reasons for O2 enrichment before entering area. Utilize appropriate engineering controls/PPE to control O2 enriched atmosphere.
		O2 >22 %	Leave area immediately; this atmosphere is extremely flammable. Notify PM or SHSM for guidance.

Instrument*	Function	Measurement	Action
	represents a real hazard. Verify reasons for O2 depletion by conducting air monitoring with instruments that can measure suspected contaminants (PID/FID) or that can confirm presence of contaminants (detector tubes or chemical specific real-time air monitors). **Do not rely on LEL meter when Oxygen level is below 12%**	O2 <19.5%	Leave area immediately; this atmosphere is oxygen deficient. Verify reasons for O2 depletion with appropriate air monitoring instrumentation before work continues. Utilize appropriate engineering controls/PPE once atmospheric contaminants have been verified.
		LEL <1%	Acceptable conditions. Continue normal activity.
		LEL >1%	Leave area immediately. Contact PM or SHSM for guidance on venting and other safety measures.
		CO < 35 ppm	Continue Work
		CO > 35 ppm	**Stop work**; Contact SS and SHSM. Go upwind for 10 min. Utilize engineering controls (i.e. copious blower etc.). Re-monitor work area until level is below 35 ppm. If readings do not return to < 35 ppm, SS or SHSM must contact PM & District HSE Manager
		H_2S < 5 ppm	Continue Work
		H_2S >5 ppm	**Stop work**; Shut down any ignition sources and evacuate area for 10 min; Contact SS and SHSM. Utilize engineering controls (i.e. copious blower, etc.). Re-monitor work area until level is below 5 ppm. If readings do not go below 5ppm, SS or SHSM must contact PM & District HSE Manager
Aerosol monitor (total dust)	Conduct total dust monitoring during excavation activities.	<0.025 mg/m3 (15 minutes TWA)	Continue work
		0.025 mg/m3 - 2.5 mg/m3 (15 minute TWA)	Continue work; begin dust control activities
		≥ 2.5 mg/m3 (15 minute TWA)	**Stop work**; continue dust control activities until dust level fall below action levels
Dräger Chip Management System (CMS) - Phosphine Personnel phosphine gas meter	Conduct phosphine monitoring during activities around RCRA ponds, railroad swale, underground piping and other Remediation Areas which contain or suspected P4	≤ 0.3 ppm	Continue work
		≥ 0.3 ppm	**Stop work**; review readings with PM and client; upgrade to Level B

Instrument*	Function	Measurement	Action
/ badge			

**Note: Instruments must be calibrated according to manufacturer's recommendations, as well, CB&I requires a daily calibration*

[1]MultiRae 4 gas/PID combination meter may be used in place of the 2 separate meters.

1.2.6 Daily Tailgate and Job Safety Analysis Requirements

See Section 2.1 for the chemical hazards associated for the site. See Section 2.2 for chemical handling procedures to be followed when handling corrosive materials. JSAs for specific work tasks will be developed in the field. They will be appropriate for site conditions and will be reviewed during daily tailgate safety meetings which will be attended by all CB&I employees and subcontractors. Any JSAs developed for ongoing operations will be included in Appendix B. See Section 3.1 for general guidelines that are common to most projects.

Any change in the scope of work will require an amendment to this HASP. Any task conducted beyond the scope of work identified in this HASP must be evaluated using the JSA process. The PM and Site Supervisor (SS) will be responsible for identifying conditions that are beyond the scope of work and communicating to the SHSM. The SHSM will work with the PM and SS to develop JSAs or provide guidance in the development of JSAs. See Appendix B for the JSA format either **CMS-710-05-FM-01704**—Sample JSA 1 or **CMS-710-05-FM-01705**—Sample JSA 2.

A JSA, according to CB&I policy, will be completed daily for each task by the SS responsible for the task(s). The SHSM will facilitate the process and help guide the supervisor in correctly assessing each task for the proper hazards and controls. JSAs are completed in-depth at the beginning of each task identified herein, and for new tasks that develop. However, as the work progresses, the JSAs are modified each day to address changes in work practices, site conditions, process changes, or unusual occurrences. If no modifications are necessary, the JSAs must still be completed, noting such. As work changes can happen at any time, these JSAs may be necessary to be modified more than once a day per task. The JSA must remain with the work crews until task is completed.

The supervisor and SHSM and Site Health and Safety Representatives (SHSR) share the responsibility to review these JSAs with the work crew each day and when JSAs are modified. The JSA procedure allows for signature of work crews, who must sign the bottom form of the JSA for the task that they are working on, acknowledging that they have been briefed. The JSA process is actually the same as a “safe work permit,” where the supervisor grants permission to work only after the initial assessment of hazards has been made and proper work controls or injury minimization measures have been communicated and understood by affected workers.

Although daily JSAs capture the changes that may occur throughout the project, the changes that are made shall be used to update the initial JSA weekly or bi-weekly. This is important, especially for long-term projects, in that it serves to maintain an up-to-date JSA for reference and/or training/orientation purposes.

Although this HASP contains the safety requirements for the identified work tasks, this process is critical to identifying changes in the hazard scenario or identifying new hazards that need to be addressed. If there are any questions regarding this process or assistance is required, contact the local SHSM.

5X5 Analysis/STARRT Cards

An additional step in the Work Hazard Analysis/Recognition Process (**CMS -710-05-PR-01700**) is to develop a 5 X 5 Analysis/Safety Task Analysis and Risk Reduction Talk (STARRT) Card or equivalent form) just prior to the performance of the work. The job or task specific analysis is performed by the

individual who is to perform the work. This is the individual's opportunity to confirm that he has everything needed to perform the work in a safe manner.

The individual will prepare job step specific analysis, using one of the following found in Appendix A:

- **CMS-710-05-FM-01706**—Sample 5x5 Analysis
- **CMS-710-05-FM-01707**—Sample STARRT Card

The work crew will be actively involved in conducting a 360° review of their specific work area, identifying hazards of their work and the hazards of work activities surround them. The work crew lead and the work crew will also collectively review the means of mitigation and ensure proper controls and measures are in place.

The job or task specific analysis is a tool for the individual to identify any unaccounted hazards that one may encounter associated with the tasks he will actually be performing.

1.2.7 Injury Management and Hospital Route Maps

Injury Management/Incident Notification

Observe the following injury management/incident notification procedures and practices:

Injury Management

Observe the following injury management procedures and practices:

- Once a personal injury incident is discovered the first action will be to ensure the injured party receives appropriate medical attention.
- If it is safe to do so, the nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident.
- The site supervisor will be summoned. The site supervisor will immediately make contact with the PM or other designated individual to alert them of the medical emergency. The site supervisor will advise and perform the following "Care of the Employee":
  - Location of the victim at the work site.
  - Nature of the emergency.
  - Whether the victim is conscious.
  - Specific conditions contributing to the injury, if known.
  - Notify FMC representative of the injury*.
  - Escort the injured person to the occupational clinic or hospital or arrange for ambulance.
  - Contact CORE (877-347-7429) to inform them of the clinic or hospital the employee is going to be treated and to arrange for a drug and alcohol test

Notification Requirements

Directly After "Care of the Employee," make the following notifications, in order:

- Contact the PM and Site H&S Manager immediately
- Contact CORE (877-347-7429) prior to or during treatment
- Contact the CB&I Help Desk within 1 hour at (866) 299-3445
- Onsite personnel will notify the onsite FMC Representative*
- PM will contact upper line management

- The H&S Manager will facilitate the incident investigation
- Incident will be entered into Cintellate within the appropriate reporting time frames (See **CMS-710-05-PR-02200**).
- Site supervisor will complete appropriate accident reports (see Appendix C) in accordance with **CMS-710- 05-PR-02300**.

*All FMC requirements will be adhered to pertinent to incident reporting (near miss, property damage, injury or environmental release.

Incident Other Than Personal Injury

Responses to all incidents including fire, explosion, property damage, environmental release etc. will be done in accordance with the FMC Corporation Site-Wide Health and Safety Plan for the site (see Section 9.0). In general, this includes securing the site appropriate to the incident, turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. CB&I will immediately notify the FMC Representative of any major incident, fire, equipment/ property damage, and environmental incident by immediate contact. A full report will be provided within the requirements in **CMS-710- 05-PR-02200**.

Motor Vehicle Incidents

All motor vehicle accidents will be reported to the Help Desk, Project Management, and SHSM. SHSM will determine whether the motor vehicle incident requires the driver of the vehicle to obtain a drug and alcohol test. In general all chargeable, at fault accidents will require the operator to submit to a drug and alcohol screening. Special note regarding any incident: Should you become involved in any incident always contact the Area HSE Manager for guidance.

Table 6: Emergency Phone Numbers

Contact	Phone Number
Ambulance	911[1] / if calling from cell phone (208) 239-1800
Chubbuck Fire Department (Co-primary) Fort Hall Fire and EMF District (Co-Primary) Pocatello Fire Department (alternate)	911[1] / (208) 237-3212 [non-business hours answering mach.] (208) 478-3783 911[1] / (208) 234-6201 [non-business hours answering mach.]
Sherriff – Power County (Primary) Idaho State Police (Alternate) Fort Hall Police (Alternate)	911[1] / (208) 226-2319 [non-business hours answering mach.] 911[1] / (208) 236-6066 (208) 237-0137[2] [non-business hours answering mach.] (208) 478-4000 [Dispatcher during non-business hours]
Poison Control	1-800-222-1222
CB&I Corp. Medical Provider (CORE- 24 hr Medical Svc)	CORE Health Services – 877-347-7429 (24 hr service)
CB&I Medical Case Manager	Dr. William Nassetta, MD, MPH, CORE Health Services (225) 756-2673 (direct dial)
Hospital Name / Phone Number	**Portneuf Medical Center** **777 Hospital Way** **Pocatello, Idaho 83201** **(208) 239-1800**
Occupational Clinic Name / Phone Number	**Intermountain Medical Clinic** **1951 Bench Rd.** **Ste. B** **Pocatello, ID 83201** **Ph. 208-238-1000** **HOO: Mon-Fri: 8a-8p / Sat: 9a-5p**
Program Manager	George Arbutina (609) 588 6338 (O) / (610) 209 4134 (C)
Project Manager (PM)	Roger Voiss (630) 248-0738 (C)
Site Supervisor (SS)	Wayne Wolter (925) 595-5355 (C)
Site HS Manager (SHSM)	Marcella Wallace (252) 773-2900 (C)
Radiation Safety Officer	Mark Somerville, CHP 925-222-0848 (O)
District HSE Manager	Barry Conaway 609 588-6394 (O) /609 510-1134 (C)
Area HSE Manager	Wayne Watson 225 987 7441 (O) / 225 771 9839 (C)
FMC Project Manager	Mike Steiner (215) 299-6477 (O) / (540) 533-7549 (C)
FMC Remediation Program Manager (Parsons)	Leslie Plazio (540) 635-3110 (O) / (540) 204-3455 (C)
Construction Management (Parsons)	Lee Rice (253) 606-6309
Assistant Construction Manager (Parsons)	Doug Dumont (301) 536-3260
Health and Safety Officer (Parsons)	Greg Cunningham (304) 276-6374
National Response Center	800-424-8802
CB&I Transportation Spill Emergency Information (CHEM-TREC)	800-424-9300
CB&I (Hot Line)	866-299-3445 (24 hr service)
Idaho One-Call	800-DIG SAFE or 811

[1]The 911 telephone number contacts the Pocatello Police Department, who will dispatch the appropriate off-site emergency response organization[2]Number for Shoshone-Bannock Tribes Emergency Management & response (during business hours)

NOTE: In the event of any emergency contact Project Manager (PM) or the Health and Safety Manager

Figure 1
Site Location

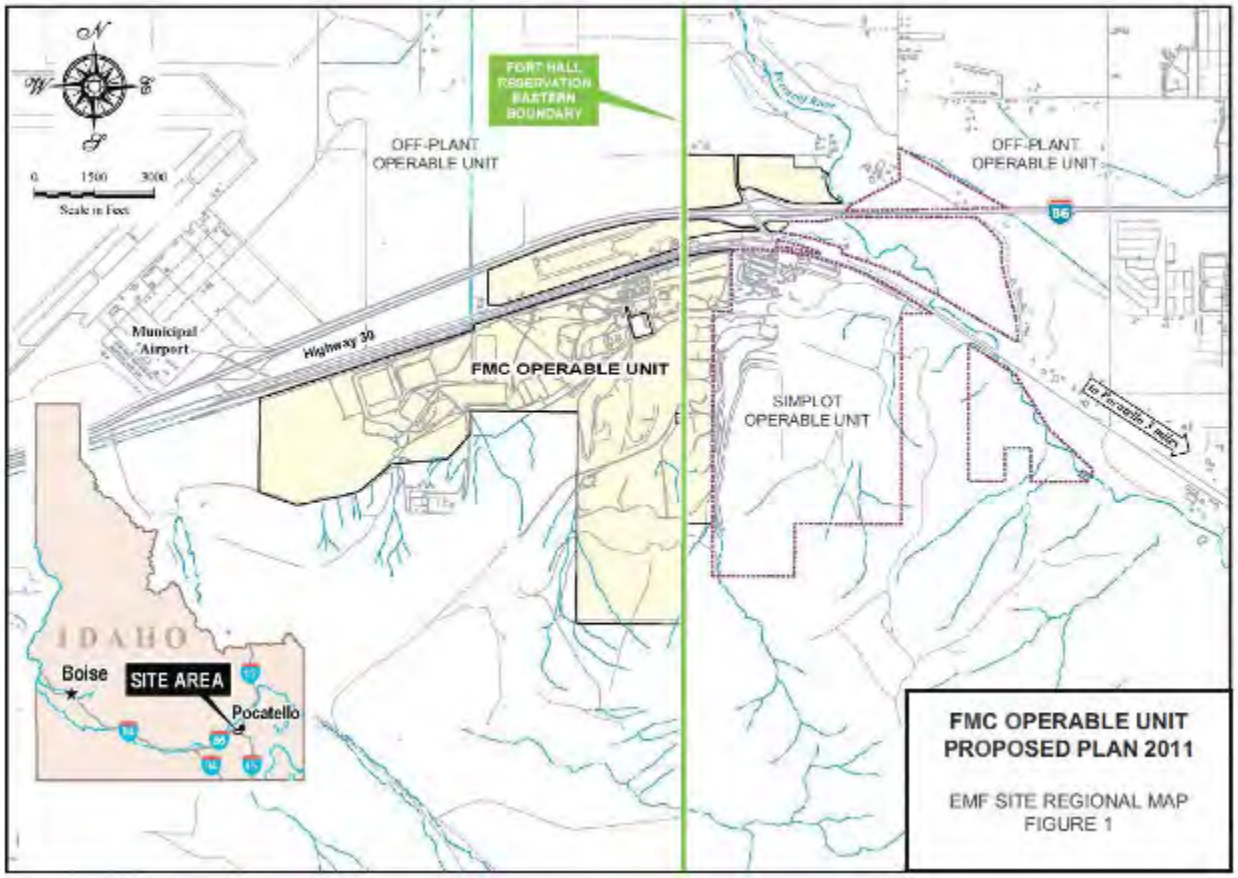


Figure 2
Hospital Map

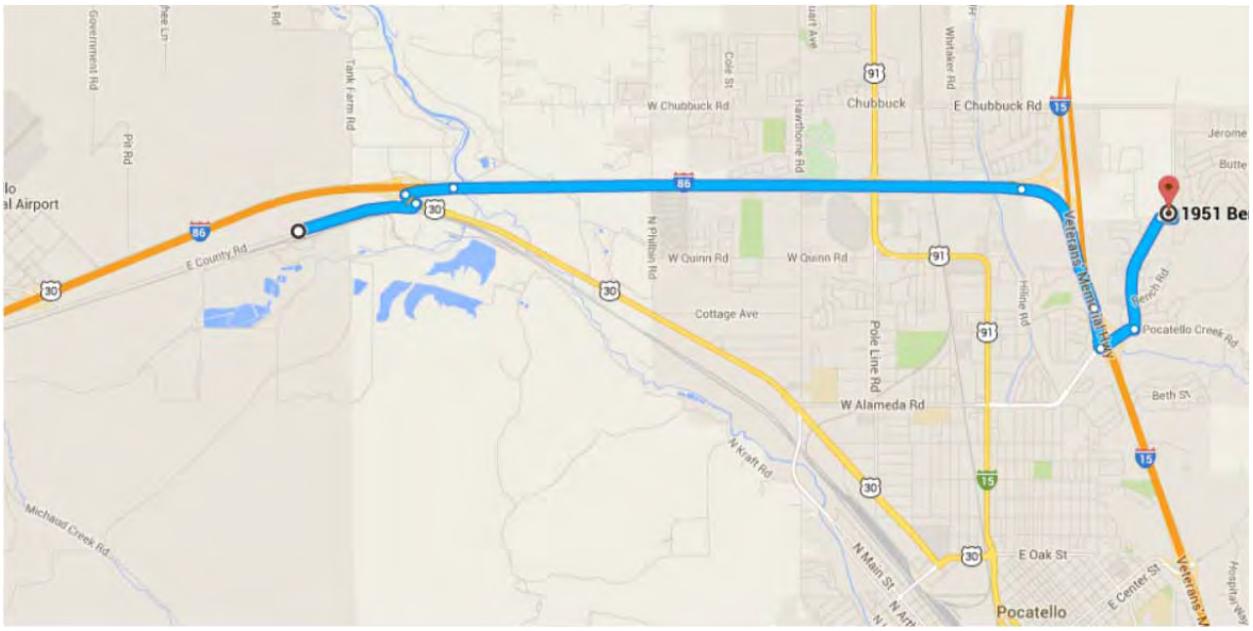
Hospital Directions:

1.	**Head North toward E County Rd**	**20 feet**
2.	**Turn Right onto E County Road**	**0.8 miles**
3.	**Turn left onto US 30 W**	**0.1 miles**
4.	**Turn Right to merge onto I-86 toward Idaho Falls**	**0.3 miles**
5.	**Merge onto I-86 E**	**3.8 miles**
6.	**Take exit 63A to merge onto I-15 toward Salt Lake**	**2.4 miles**
7.	**Take exit 69 for Clark Street**	**0.4 miles**
8.	**Keep left at the fork, follow signs for Center St**	**0.1 miles**
9.	**Turn left onto E Center St**	**0.4 miles**
10.	**Turn right onto Hospital Way**	**0.2 miles**
11.	**Turn right to 777 Hospital Way**	**Total Miles 8.8**

Hospital Information:

Category	Information
Name:	Portneuf Medical Center
Address:	777 Hospital Way
City, State:	Pocatello, Idaho
Phone:	(208) 239-1800
Emergency Phone:	911

Figure 3
Occupational Clinic Map



Occupational Clinic Directions: Hospital Directions:

Depart 1233 E County Rd, Pocatello, ID 83204

Get on I-86 E	1.3 mi / 3 min
1. Head east on E County Rd toward U.S. 30 E	0.8 mi
2. Turn left onto U.S. 30 W	0.1 mi
3. Turn right to merge onto I-86 E toward Idaho Falls	0.3 mi
Continue on I-86 E to Pocatello Take Exit 71 from I-15S	5.1 mi / 5 min
4. Merge onto I-86 E	3.8 mi
5. Take exit 63A to merge onto I-15 S toward Salt Lake	1.0 mi
6. Take exit 71 for I-15/Pocatello Creek Rd	0.3 mi
Take Olympus Dr to Bench Rd	1.2 mi / 3 min
7. Turn left onto Pocatello Creek Rd	0.3 mi
8. Turn left onto Olympus Dr	0.8 mi
9. Turn right at Fairground Dr	476 ft
10. Take the 1st left onto Bench Rd	207 ft

Arrive at 1951 Bench Rd Pocatello, ID 83201

Occupational Clinic Information:

Category	Information
Name:	Intermountain Medical Clinic
Address:	1951 Bench Rd. Ste. B
City, State:	Pocatello, ID 83201
Phone:	Ph. 208-238-1000
Hours of Operation:	Mon-Fri: 8a-8p / Sat: 9a-5p

The following table provides a minimum list of safety requirements and when or how often they should be conducted. It is the responsibility of the Site Supervisor to complete the safety requirements or designate a competent person from the work crew to carry out the duties. Contact your local Health Safety Environmental Manager for guidance on form completion and /or submission

Project Safety Matrix

	3 days before excavation and /or drilling	1st day of field activities	Daily Req.	Weekly Req.	Monthly Req.	Periodic Req.
General Safety Inspections			SHSM and SHSR			
Site HSE Inspection				SHSM	PM	
Utility Mark out by OneCall or Private Locator	SS to arrange Mark out digging location					
Conduct Site Orientation- Review SOW, HASP, JSA, Air Monitoring, Emergency Response, etc.		SHSM				
Sign HASP Acknowledgement		All CB&I employees and Subcontractors				
Draft / sign Tailgate meeting sheet		SHSM and all workers	All on-site workers			
Draft and sign task specific JSA		SHSM or SHSR	All on-site workers			
Complete 5X5 or STARRT Card						SS or workers upon new site tasks as needed
Complete I-Care Cards (Focused and Leading Indicator)				All on-site workers 1 Observation/10 man hours worke		
Complete CSE, hot work, drilling, excavation, lifting, or other work permits			SHSM/SHSR complete or issue / SS to request as needed			

	3 days before excavation and /or drilling	1st day of field activities	Daily Req.	Weekly Req.	Monthly Req.	Periodic	Annual activities
Inspect tools and equipment before use			Individual utilizing equipment				
Vehicle/ Heavy Equipment Inspection			Operator				
Calibrate air monitoring equipment			SHSR				
Record air monitoring results			SHSR				
Fire ext. Inspection					SHSR		
First aid Inspection				SHSR			
Eye Wash /Safety Shower Inspection				SHSR			
HSE Assessment						Area or District HSE Manager Quarterly	
40 HR HAZWOPER training							All site Employees
8 hr HAWOPER Training							All site Employees
HAZWOPER Medical Exam / Respirator Fitness for Duty							All site Employees
Respirator Fit Test							Any employees utilizing a respirator or supplied air

2.0 Key Safety Personnel

CB&I will oversee and act accordingly during all phases of the project. The following management structure will be instituted to successfully and safely completing this project.

Health and Safety Advisor
Barry Conaway, CSP
(609) 510-1134

The specific duties of the technical advisors include:

- Providing technical input into the design and implementation of the site HASP
- Advising on potential for worker exposure to project hazards along with appropriate methods and/or controls to eliminate site hazards.

The following people share responsibility for health and safety at the site. See Section 2.1.1 for a description of the role and responsibility of each.

Program Manager *George G. Arbutina*	609-588-6338 (office) 610-209-4134 (cellular)
Project Manager *Roger Voiss, P.E.*	630-248-0738 (cellular)
Site Supervisor *Wayne Wolter*	925-595-5355 (cellular)
Site HSE Manager *Marcella Wallace*	252-773-2900 (cellular)
Radiation Safety Officer *Mark Somerville, CHP*	925-222-0848 (office) (805) 441-6747 (cellular)
Area HSE Manager *Wayne Watson, OHST, CSP*	225-987-7441 (office) 225-771-9839 (cellular)
Director HSE, CB&I Environmental& Infrastructure *Matthew Hetzler*	225-987-7665 (office) 225-202-8650 (cellular)

2.1.1 Responsibilities of Key Personnel

2.1.1.1 Project Manager (PM)

The PM has authority to direct response operations; the PM assumes total control over site activities. In addition, the PM:

- Prepares and organizes background review of the project, the work plan, and the field team.
- On a monthly basis, the PM, SS, SHSM, and one member of the HSE Committee shall conduct an additional compliance inspection using the Site HS Inspection Form (**CMS-710-05-FM-01402**) (Appendix A) or the Shop and Warehouse HSE Inspection Form (**CMS 710-05-FM-01403**) to document this inspection. The results shall be discussed at the HSE Committee meeting as well as the Supervisor's HSE Meeting, and a copy shall be forwarded to the HSE Manager
- Obtains FMC permission for site access and coordinates activities with appropriate officials.
- Sees that the work plan is properly carried out and on schedule.
- Briefs the Site Supervisor (SS), SHSM, and field personnel on specific assignments.

- Together with the SS and SHSM, sees that health and safety requirements are met.
- Encourages and Actively participates in the ICARE Observation Program (Focused and Leading Indicator)
- Consults with the Health Safety & Environmental Manager (HSM) regarding unsafe conditions, incidents, or changes in site conditions or the scope of work.
- Ensures CB&I Safety procedures and FMC Site Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards requirements are followed.
- Ensures Company Accident/Incident report procedures are followed (see Appendix C).

2.1.1.2 Site Supervisor (SS)

The SS reports to the PM, has authority to direct response operations, and assumes control over on-site activities. In addition the SS:

- Conducts daily safety meetings.
- Conducts daily HSE Inspections and records their findings on the Daily HSE Site Inspection Form (**CMS-710-05-FM-01401**) (Appendix A).
- Leads a formal written HSE Inspection of his work area each week. The inspection team shall consist of the SS, the SHSM, and HSE Leader of the Week using **CMS-710-05-FM-01402** (Appendix A).
- Actively participates in the ICARE Observation Program (Focused and Leading Indicator).
- Executes the work plan and schedule.
- Manages the soil remedy activities
- In conjunction with SHSM, conducts periodic field health and safety inspections to ensure compliance with this HASP.
- Enforces CB&I safety procedures, including FMC Site Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards.
- Coordinates with the SHSM in enforcing worker protection levels.
- Enforces site control.
- Coordinates onsite activities
- Notifies, when necessary, local public emergency officials.
- Ensures onsite CB&I and subcontractor personnel understand they can issue Stop Work Authority without fear of reprimand or retaliation.
- In conjunction with the SHSM, responsible for following-up on incident reports to the PM.

2.1.1.3 Site HSE Manager (SHSM)

The Site HSE Manager advises the SS and PM on all aspects of health and safety on site. The Site HSE Manager stops work if site operations threaten worker, FMC facility or public health and safety, and informs the District HSE Manager of any changes in site conditions or project status. In addition, the Site HSE Manager:

- Enforces CB&I safety procedures, including FMC Site-Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards.

- Conducts periodic inspections to assess whether the HASP is being followed.
- Periodically inspects protective clothing and equipment.
- Sees that protective clothing and equipment are properly stored and maintained.
- Controls entry and exit at the access control points.
- Performs air monitoring in accordance with this HASP. Maintains and oversees operation of monitoring equipment and interpretation of data from the monitoring equipment.
- Monitors workers for signs of stress, including heat stress, cold exposure, and fatigue.
- Enforces the "buddy" system.
- Is informed of emergency procedures, evacuation routes, and telephone numbers of the local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Communicates incidents promptly to SS and PM.
- Maintains communication with District HSE Manager on site activities.
- If applicable, ensures decontamination and disposal procedures are followed.
- Maintains the availability of required equipment.
- Ensures onsite CB&I and subcontractor personnel understand they can issue Stop Work Authority without fear of reprimand or retaliation.
- Advises appropriate health services and medical personnel of potential exposures.
- Notifies FMC /emergency response personnel in the event of an emergency. Coordinates emergency medical care with CORE (CB&I's third party medical provider).

2.1.1.4 Radiation Safety Officer (RSO)

The Radiation Safety Officer interfaces with the PM, SS and SHSM on radiation protection issues. In addition, the RSO:

- The RSO is the individual responsible for the development and implementation of a site specific RPP.
- Responsible to ensure exposure to ionizing radiation is maintained ALARA
- Ensure appropriate instrumentation, protective devices, dosimetry, training and other items needed to perform work in accordance with the site specific RPP elements are available and used properly.

2.1.1.5 HSE Leader of the Week

- Watch for and help correct safety hazards/problems.
- Serve as an observer for the I Care process by doing at least one observation each day.
- Help with HSE orientation of new employees.
- Work as an HSE partner with new employees for their first few weeks of employment.
- Assist with HSE inspections and completion of the site HSE Inspection Form. Supervision shall be present to answer questions and help rectify problems encountered.

- Review the site HSE Inspection Form with the Site Supervisor.
- Work with the Site Supervisor and other employees to correct problems found. Help find causal factors for HSE problems discovered.
- Assist with correcting procedures, training and behavior-causing problems.
- Work with the Site Supervisor on HSE meeting outline/agenda and take part in the meeting where appropriate.
- Stop unsafe work where appropriate.

2.1.1.6 Work Team

The Work Team reports to the SS for on-site activities. All work parties must comprise at least two people. In addition, the Work Team:

- Safely completes on-site tasks required to fulfill the work plan.
- Participates in JSA, 5X5 or STARRT, and I-CARE programs
- Complies with the HASP, CB&I safety procedures and FMC Site Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards.
- Empowered to implement Stop Work Authority without fear of reprimand or retaliation for any work activity that presents a danger to coworkers, subcontractors, FMC personnel, the public and the environment.
- Attends and participates in daily safety meetings.
- Participates in HSE Leader of the Week Program.
- Notifies the SS and SHSM of suspected unsafe conditions.
- Reports all incidents to the SS and SHSM.

2.1.1.7 Subcontractor Health and Safety

This section of the HASP outlines general requirements for subcontractors including adoption of the CB&I HASP, correction of safety violations, and other general requirements.

Adoption of CB&I HASP

If a subcontractor of this project chooses to adopt CB&I's Health and Safety Plan, the subcontractor shall acknowledge this with the signature of a designated representative on a letter accepting the plan. The letter (or signed form included in Appendix A) must be provided prior to that subcontractor commencing work activities at the site. The subcontractor must make an independent determination of the applicability of CB&I's HASP to his/her work and must comply with all CB&I Safety Procedures / Programs, FMC Operating Standards, and all applicable federal, state and local statutes, regulations. CB&I does not warrant that the plan will be sufficient for the subcontractor's work.

If the subcontractor adopts the CB&I HASP, this HASP becomes the subcontractor's responsibility to implement as it pertains to its work. The subcontractor assumes all liabilities for such adoption and implementation. All subcontractor personnel will read and sign the CB&I HASP.

If a subcontractor chooses to develop its own HASP, the subcontractor will provide a copy for CB&I to review within five (5) days of award of this subcontract or at least 5 days prior to commencement of work activities at the site, whichever occurs last. The subcontractor will insure that its HASP will be in compliance with CB&I's HASP and all applicable federal, state and local regulations.

In either case, the subcontractor will prepare a written summary of job hazards, e.g., Activity Hazard Analysis or Job Safety Analysis, for all major tasks they will perform on site and submit them to the CB&I Site HS Manager for review prior to the start of that task.

Prior to starting work on this project, all subcontractor personnel will receive the site orientation from the Site HSM or a Site Health and Safety Representative (SHSR). The Subcontractor Pre-job Safety Checklist will be completed and signed by the subcontractor field supervisor (see Appendix A). All subcontractor safety related incidents including near misses, shall be reported to the CB&I SHSM immediately.

Correction of Safety Violations

Every employer on the project site has an obligation to prevent or correct hazards and to protect all employees from exposure to such conditions if they exist. To assure these obligations are being met, subcontractors will be subject to periodic inspection by CB&I. The subcontractor will be notified in writing if a safety violation is observed. The subcontractor shall have these violations corrected within the time frame noted and shall sign and enter the date on which the item was corrected and return the signed inspection reports so items can be rechecked. Failure to correct the violations and to return the signed inspection reports may result in termination of contract.

General Safety Requirements

Additionally, the subcontractor is responsible for assuring the following:

- Accepting CB&I Subcontractor safety policies.
- Providing CB&I with written procedures for the specific tasks they will perform; e.g. JSA.
- Providing all medical clearances, training and certification documentation as applicable.
- Implement applicable FMC Policies (see Appendix F).
- Ensuring, via daily inspections, that all work conditions, practices and equipment are free of hazards
- Providing SHSM with copies of Safety Data Sheets (SDS) for all hazardous materials brought on-site.
- Providing all the required personal protective equipment for their employees.
- Participating in the daily safety meeting and ICARE Observation program.
- Reporting all safety incidents, including near misses, first aid, medical, equipment, vehicle, property and environmental spills to the CB&I SHSM, immediately. The notification shall be followed with a report within 24 hours.

3.0 Health and Safety Training Programs

This Section describes the health and safety training programs that site personnel must comply with.

3.1 Medical Surveillance

This program tracks the physical condition of the company's employees in compliance with Department of Transportation (DOT) regulations and Occupational Safety and Health Administration (OSHA) standards, and FMC requirements. In addition, medical surveillance will consist of the following:

- Medical examinations and consultations must be completed for all 24 hour /40 hour HAZWOPER employees prior to assignment, annually, upon termination, and in the event of injury and/or illness resulting from exposure at the work site.
- When tasks are applicable to site work, remediation and construction craft personnel with special licenses (DOT driver's license, heavy equipment operators, 24 hr/40 hr HAZWOPER, etc.) are required to adhere to medical requirements of the issuing organization;
- Any personnel donning a respirator, required or optional shall be "medically fit" to wear a respirator and provide documentation.
- CB&I and Subcontractor personnel work clearance examination certificates will be available for FMC review.
- Dr. William Nassetta (MD, MPH), of Core Health Services, will review all medical examinations and will be available for medical consultation on an as needed basis.

Documentation of medical clearance and respirator fit testing will be maintained on site for all CB&I and subcontractor personnel as applicable.

3.2 Training

Training requirements and programs will comply with the OSHA Hazardous Waste Operations and Emergency Response regulation (29 CFR 1910.120 / 1926.65). Training requirements will consist of the following:

- Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction.
- Field personnel must complete a minimum of three days of supervised field instruction.
- Project Manager and Supervisor shall have successfully completed Supervisors Incident Prevention Program (SIPP)
- Field personnel assigned to the site will also receive 8 hours of HAZWOPER refresher training each year.
- On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations will receive an additional 8 hours of supervisory training.
- At least one person assigned to site will also receive first aid/CPR and blood borne pathogen training.
- Other training may be required depending on the task to be performed (e.g., confined space, fall protection, respiratory protection, and hazard communication). See the Activity Hazard Analysis (AHA) in Appendix B.

Documentation of training and certifications will be maintained on site for all CB&I personnel and subcontract personnel as applicable.

3.3 Initial Orientation

The initial Health and Safety Orientation will consist of the following:

- All employees of CB&I and its subcontractors engaged in site operations will attend an initial site orientation where this HASP will be discussed and followed. Personnel will acknowledge having been given the orientation by signing the agreement and acknowledgement form in Appendix A. A standard site orientation includes the following:
  - FMC orientation
  - Sign in/out procedures
  - Chain of command
  - CB&I and FMC safety rules and regulations
  - ICARE Observation Program (Focused and Leading Indicator)
  - SMARRT & 5x5 Card completion
  - Hours of work
  - Task required Personal Protective Equipment
  - Emergency Information
  - Work Zones
  - Hazard Communication Program
  - AHA/JSA review
  - Air Monitoring Program
  - Forms, site-specific
  - Training Requirements
  - Review of FMC's Site Specific Occupational Safety, Health, Industrial Hygiene and Environmental Operating Standards

An orientation is a general overview of the site only. The PM shall be prepared to conduct site-specific training or provide qualified personnel to conduct each of the tasks and/or operate the necessary equipment/tools to complete the project.

4.0 Hazard Communication Procedures

4.1 Hazard Communication Procedures

The purpose of hazard communication (Employee Right-to-Know) is to ensure that the hazards of all demolition waste and operational chemicals located at this field project site are communicated according to **CMS-710-01-PR-00400 and** 29 CFR 1926.59 to all CB&I personnel and CB&I subcontractors. Personnel must follow the hazard communication procedures listed in Sections 4.2.1. Each site/project must develop a Hazard Communication plan following the template **CMS- 710-01-FM-00403** found in Appendix D.

4.2 Contaminants of Concern Profile

See Table 1 for a summary profile of the hazards and control measures to follow for the contaminants of concern (COC). This profile is based on recent site history and site characterization. For more detailed and specific information, always refer to the SDS or equivalent information for the compound (see Appendix D). A hard copy book of SDSs will be maintained and available in the Site Safety Manager's office and/or a note will be posted in the main meeting area for all employees to give its location.

4.2.1 Hazard Communication Program

4.2.1.1 Container Labeling

CB&I personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on site by operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party.

4.2.1.2 Employee Information and Training

An ongoing corporate training program will train employees on chemical hazards. In addition, chemical hazards will be communicated to employees through daily safety meetings and by an initial site orientation program. At a minimum, CB&I and related subcontractor employees will be instructed on the following:

- Chemicals and their hazards in the work area.
- How to prevent exposure to these hazardous chemicals.
- What the company has done to prevent workers' exposure to these chemicals.
- Procedures to follow if they are exposed to these chemicals.
- How to read and interpret labels and SDS for hazardous substances found on CB&I sites.
- Emergency spill procedures.
- Proper storage and labeling.

5.0 Hazard Identification and Control

In addition to the Task-Specific JSAs, Section 5.1 lists the general procedures and practices common to construction projects. For additional information, refer to CB&I required health and safety procedures, FMC Safety procedures or consult with your health and safety professional. A copy of all required CB&I Health and Safety Procedures and FMC Safety Operating Standards are maintained in the CB&I office managing this project. The more stringent of CB&I Health and Safety Procedures and FMC Operating Standards shall be followed at all times. (See Appendix F for the FMC Operating Standards)

5.1 General Hazards and Controls

5.1.1 General

Observe the following general procedures and practices:

- All applicable CB&I CMS Health Safety and Environmental procedures and FMC Site Specific Occupational Safety, Health, Industrial Hygiene and Environmental Operating Standards.
- Legible and understandable precautionary labels shall be affixed prominently to containers of potentially contaminated soil, water, and clothing.
- Food or beverages shall only be present or consumed in approved areas of the FMC site.
- Tobacco products shall not be present or used, and cosmetics shall not be applied in work areas that have not been designated by the site.
- Beards, facial hair, or other facial obstructions that interfere with respirator fit will preclude use when respirators are required.
- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury, splash, etc., must have approved eyewash units locally available capable of delivering at least 0.4 gallons per minute for at least 15 minutes.
- All on-site activities will be conducted during daylight hours. If work after dusk becomes necessary due to an emergency, adequate lighting must be provided and notification of such activity made to the location contact.
- Hazardous work, such as handling hazardous materials and heavy loads, and equipment operation, etc., should not be conducted during severe storms.
- All temporary electrical power must have a ground fault circuit interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. All equipment must be suitable and approved for the class of hazard present.

5.1.2 Incident Reporting

Observe the following incident reporting procedures and practices:

- All occupational injuries/illnesses, vehicle accidents, third party damage and near miss incidents must be reported promptly to the PM, SS and SHSM and investigated as per **CMS-710- 05-PR-02200 (**See Appendix C for incident forms and Appendix F for FMC's Reporting Standard. The subcontractor will provide an incident report within 24 hours of an incident occurring.
- Immediately notify the PM, SS and SHSM when an incident occurs.
- Immediate notification the FMC Representative(s).

5.1.3 Daily Safety Meetings

A daily safety meeting makes accident prevention a top priority for all site workers and makes them aware of important accident prevention techniques. Site personnel must follow **CMS-710-05-PR-01900** when conducting safety meetings. Observe the following daily safety meetings procedures and practices:

- Daily safety meetings will be held each morning prior to site activities utilizing
- Direct CB&I subcontractors are required to attend all tailgate meetings.
- The tailgate meeting form in Appendix A will be used to document the meeting.

5.1.4 Safety Inspections

Site HSE Inspections shall be conducted as per **CMS-710-05-PR-01400.** Observe the following safety inspection procedures and practices:

Daily Requirements

- The Site Supervisor shall conduct daily HSE inspections and record the findings on the Daily HSE Site Inspection Form (**CMS 710-05-FM-01401**) (Appendix A). The Site Supervisor shall also ensure that unsafe acts/conditions are corrected immediately.

Weekly Requirements

- The Site Supervisor shall lead a formal written HSE inspection of his or her work area each week. The inspection team shall consist of the Site Supervisor, the SHSO, and the HSE Leader of the Week.
- The Site HS Inspection Form (**CMS 710-05-FM-01402**) (Appendix A) shall be used to document this inspection.

Semi-Monthly Site HSE Committee Inspection (if applicable)

- The Site HSE Committee shall conduct an inspection at least every two weeks. The inspection team shall consist of one member of Management (Supervisor or subcontract administrator), one supervisor (foreman), and at least three craft members from the HSE Committee. The HSE Committee Chairperson shall assign the members of the HSE Committee inspection team on a rotating basis.
- The members of the inspection team shall use the Site HS Inspection Form (CMS-710-05-FM-01402) to document this inspection. In addition, FMC will conduct a safety inspection at the project using a check list found in Appendix F.

Monthly Construction Project Managers Inspection

- On a monthly basis, the Project Manager, shall conduct an additional compliance inspection using the Site HS Inspection Form (CMS-710-05-FM-01402) to document this inspection. The results shall be discussed at the HSE Committee meeting as well as the Supervisor's HSE Meeting, and a copy shall be forwarded to the Area HSE Manager.

5.1.5 Slip/Trip/Fall

Observe the following procedures and practices to prevent slips/trips/fall:

- Inspect each work area for slip/trip/fall potential prior to each work task.
- Slip/trip/fall hazards identified must be communicated to all personnel. Hazards identified shall be corrected or labeled with warning signs to be avoided.
- All personnel must be aware of their surroundings and maintain constant communication with each other at all times.

5.1.6 Underground/Utility Line Contact

Personnel working onsite shall be aware of overhead power lines and a high pressure natural gas pipe line onsite. Before soil grading activities, a surveyor shall measure the power lines sag height and mark out proximity distances on the ground to make personnel aware of the distance to the utility. The over power line is between 230 kV and 360 kV. An onsite utility survey shall be completed to verify that work activities are not adjacent to the 425 psig natural gas line. Observe the following underground/utility line contact procedures and practices:

- Completion of utility mark-out documentation (CMS-710-02-FM-06901)
- Contact FMC representative to have utility lines investigated and marked prior to excavation/trenching.
- Review CB&I CMS-710-02-PR-06600 (Work Around Overhead Power Lines with Mobile Cranes & Derricks) and CMS-710-02-PR-01610 (Identifying Underground Installations)
- Refer to FMC Facility site drawings for utility locations.
- Hand dig, probe, post hole dig or air knife to 5 feet down and 5 feet to each side of utility marker to avoid breaking utility lines.

5.1.7 Overhead Utility Line Contact

Observe the following overhead utility line contact procedures and practices:

- Maintain appropriate distance from overhead utilities:
  - Maintain at least 10 feet from overhead power lines, up to 50 kV
  - For voltages over 50 kV, add 0.4 inches per kV to obtain the safe distance between equipment and power lines.
  - If voltage is unknown, remain at least 20 feet from overhead power lines.
- Conduct a daily site inspection to determine where activities will take place and the location of overhead utilities and overhead obstructions. Once identified place-warning tape on poles and/or guy wires and attempt to plan the work so that no contact will be made with the overhead utilities or obstructions. Share the in-formation with the all site personnel.
- As a precaution, a spotter will be used at all times during the construction phase when near overhead utilities or overhead obstructions. If contact is deemed unavoidable, consult with the FMC Facility representative, SS and SHSM to evaluate the area to determine if the particular overhead utility or obstruction can be removed prior to engaging in the activity.

5.1.8 Concrete Demolition Activities

Personnel performing concrete demolition may be exposed to various physical hazards such as, loud noises, dust, lacerations and impact from flying debris. CB&I will use heavy equipment with hoe ram attachment, pneumatic jack or chipping hammers to separate concrete and remove rebar.

- The operator shall inspect the concrete saw and blades before use.
- The concrete saw blade shall have a revolution per minute (RPM) speed higher than the saw's rated RPM speed.
- The cutting equipment shall not be modified unless approved in writing by the manufacturer.
- Cap vertical and horizontal protruding rebar ends to prevent someone from being impaled, cut, or scratched.
- The concrete saw shall be equipped with a water source to control dust during cutting.
- The contractor and site lead shall be prepared to monitor for Carbon monoxide if cutting with a gas or diesel equipment inside a building.
- Hoe ram and jackhammer bits shall be inspected prior to use.
- CB&I shall make an assessment for dust and crystalline silica in the work area.
- Set up barricades to prevent unauthorized personnel from getting too close to the cutting area.
- Use mechanical equipment to move demolition debris /concrete from the work area.
- Air lines shall have hose chains to prevent whipping if a disconnection occurs.
- Use good technique to avoid back injuries and over-exertion.
- Report all work related injuries immediately to the project supervisor.
- Protect face, eyes, skin, and feet with protective clothing. A hygiene stations shall be available for personnel to wash their face and hands.
- Complete an engineering survey to make sure all utilities are shut off before cutting begins. Prepare or brace the demolition area to guard against an unplanned collapse. Adjacent structures need to be protected from damage during cutting.

5.1.9 Debris Removal

Site workers will clean up scattered debris throughout the demolition process. Construction debris may contain hazardous and non- hazardous materials, concrete and metal.

The anticipated hazards of debris cleanup include: lacerations, punctures and cuts, strains and sprains from lifting awkward or heavy debris, struck by material handling equipment or thrown debris, injury using power tools, high noise level, and heat/cold stress.

Critical safety practices necessary to prevent negative occurrences must be discussed at the tailgate meeting and recorded on a JSA before work starts. Prevention tips shall include:

- Review the work plan and JSA with task specific crew prior to work. The Project Manager and workers shall walk the site together and identify debris requiring disposal.

- A first aid kit shall be on site at all times. A minimum of one person shall have training in first aid and CPR.
- Material handling equipment shall be used to move awkward/heavy debris to roll off containers.
- Material handling equipment shall be properly operated. All heavy equipment shall have a documented inspection before use each day.
- Personnel shall be prohibited from throwing bags of debris to each other.
- Personnel working adjacent to moving equipment shall don a reflective traffic vest.
- Power and hand tools require inspection before use.
- Electric powered tools must be attached to a GFCI when in use
- Personnel using chainsaws shall wear protective chaps when cutting wood debris.
- When loading debris containers, all personnel shall load from one side of the container to prevent accidental contact.

5.1.10 General Falls/Ladders

Observe CB&I Procedure **CMS-710-02-PR-00500**. In addition, observe the following general falls / ladders procedures and practices:

- CB&I requires 100% fall protection when ascending, descending, or working from ladders with a potential fall of 6ft (1.8.m) or more. The specific requirements for implementation are found in **CMS-710-02-PR-00900** (Fall Protection). Follow FMC OS-2Working from Heights policy when possible.
- Use Type 1A rated ladders.
- Make sure ladder rungs are sturdy and free of cracks.
- Use ladders with secure safety feet.
- Pitch ladders at a 4:1 ratio.
- Secure ladders at the top or have another person at the bottom to help stabilize it.
- Ladders used to access an upper landing surface shall extend at least three feet above the upper landing surface.
- Do not use ladders for access to air stripper towers above six feet. Instead, use aerial lift.
- Use non-conductive ladders near electrical wires.
- The top step of a stepladder should not be used as a step.
- Do not carry any object or load that could cause a loss of balance or a fall.
- All ladders need to be inspected using the CB&I ladder Inspection Form (**CMS-710-02-FM-00501**) (Appendix A)

5.1.11 Heavy Equipment Operations

Observe the following heavy equipment operations procedures and practices:

- All equipment operators will hold a valid Equipment Operator Wallet Card in conformance with **CMS-710-02-PR-02800**
- Wear leather gloves while attaching support members to protect against pinching injuries.
- While working from elevated levels greater than six feet, ensure that all employees have 100% fall protection with full body harnesses and guardrails.
- Do not stand under loads that are being raised or lowered with cranes or aerial lifts.
- The subcontractor or CB&I Operator must conduct pre-operational inspections of all equipment. In addition, daily inspections will be conducted on the equipment prior to site activities.
- Maintain appropriate distance from overhead utilities:
  - Maintain at least 10 feet from overhead power lines, up to 50 kV
  - For voltages over 50 kV, add 0.4 inches per kV to obtain the safe distance between equipment and power lines.
  - If voltage is unknown, remain at least 20 feet from overhead power lines.
- Always stay out of the swing radius of all heavy equipment. Always use a spotter during movement of equipment. The spotter and others, as appropriate, shall maintain constant communication with the operator.
- All operators must have adequate training and be qualified to operate the particular heavy equipment unit.
- Conduct site evaluation to determine proper positioning for the unit. Make sure surface is level. Cordon off holes, drop-offs, bumps or weak ground surfaces.
- When using a crane, do not use hands when the load is being lifted or lowered. Use non-conductive tag line to help direct and position the load.
- Never climb a raised platform or stand on the mid-rail or top-rail.
- Always use 3-points of contact when entering or exiting equipment.
- Implement applicable FMC Policies (see Appendix F).
- Tools should always be hung or put into a belt whenever possible.

5.1.12 Excavation and Trenching

Observe CB&I Procedure **CMS-710-02-PR-01600**. In addition, observe the following Excavation and Trenching practices and procedures:

- Ensure a competent person is assigned.
- All soils shall be classified as Class C soils.
- Before any excavation can be started, an Excavation Permit (**CMS-710-02-FM-01601**) (Appendix A) must be completed by the responsible Supervisor with input from the Authorized Person for underground testing (utility identification) and the Excavation Competent Person. Appropriate Client approval is also necessary where required by Client regulations. Client and/or utility company representatives shall be notified 24 hours prior to beginning excavations.
- Check for utilities (see Underground Utility Line Contact, Appendix A).
- Have a Professional Engineer (PE) evaluate all excavations deeper than 20 feet.

- Excavations shall be inspected by a Competent Person and the results recorded on **CMS-710-02-FM-01602** (Appendix A):
    - Prior to entry
    - After rain or snowfall
    - After freezing and/or thawing temperatures occur
    - After any condition that can change the integrity of the soil
- Use protective systems (sloping, shoring, shielding) for entry in excavations over four feet deep.
- Provide for rescue for cave-ins.
- Place spoils a minimum of two feet from edge.
- Monitor excavations over four feet deep for hazardous atmospheres and LEL/oxygen.
- Place ladders within 25 feet of lateral travel if the excavation is over four feet deep.
- Place barriers around excavations near pedestrian access.
- Follow work zone security procedures of Section 6.1.

5.1.13 Confined Spaces

Observe **CMS-710-02-PR-01700**. In addition, observe the following confined spaces procedures and practices:

- A hazard assessment shall be performed and documented on the Safe Work Permit (**CMS-710-02-FM-01701**) (Appendix A) prior to entry. The supervisor in charge of the work shall schedule this action.
- Ensure employees are trained in the hazards of confined spaces.
- Post Confined Space Entry Permits at the entrance to the space.
- Have a copy of the confined space entry procedure available.
- Implement applicable FMC OS-8 Policy (see Appendix F).
- Establish a rescue plan. Evaluate to ensure rescuers are qualified.
- Ensure an entry supervisor is present at each permit-required entry.
- Ensure the required extraction/fall protection devices are being used properly.

5.1.14 Electric Shock

Observe CB&I Procedure **CMS-710-02-PR-01400** and **CMS-710-02-PR-01500**. In addition, observe the following procedures and practices to prevent electric shock:

- Maintain appropriate distance from overhead utilities:
    - Maintain at least 10 feet from overhead power lines, up to 50 kV.
    - For voltages over 50 kV, add 0.4 inches per kV to obtain the safe distance between equipment and power lines (follow **CMS-710-02-PR-06600)**.
    - If voltage is unknown, remain at least 20 feet from overhead power lines.
- Use ground-fault circuit interrupters as required.

- Perform lockout/tagout (LO/TO) procedures in accordance with CB&I Procedure **CMS-710-02-PR-01500**
- Use three-pronged plugs and extension cords.
- Contact your local underground utility-locating service.
- Follow code requirements for electrical installations in hazardous locations.
- Implement applicable FMC OS-1Policy (see Appendix F).
- Always use qualified electricians to install electrical equipment and when con-ducting troubleshooting activities within 10 feet of exposed live wires.

5.1.15 Line Entry Activities

Following **CMS-710-02-PR-5300** (Extra and Hazardous and Repair Work), permits **CMS-710-02-FM-5302 – 5308**, task-specific hazard analyses for entry activities, precautionary engineering controls and safety measures shall be implemented prior to commencing line-entry activities. Line-breaking and related intrusive activities shall comply with the following requirements:

- Review the Pre-Demolition Engineering plan and Decommissioning plan.
- The SS is responsible for authorizing line-breaking permit and related intrusive activities such as Lock out / tagout (See **CMS-710-02-PR-1500 – Control of Hazardous Energy**). A task specific hazard analysis shall be performed and reviewed as part of the line-breaking permit. The approved permit shall be posted near the job site and approved by FMC.
- Workers performing intrusive operations and their supervisors shall be properly trained in the safe operation of their equipment, PPE requirements, safe line-entry practices, spill containment, and emergency procedures.
- The line-breaking permit is good only for the date issued and is valid only for the 8-hour shift for which it is issued.
- Hot work <u>shall not</u> be used as a pipeline entry / cleaning procedure.
- Calibrate air monitoring equipment before use; perform air monitoring during line entry activities
- If at any time during line-entry activities a change in conditions at the work site is suspected, work shall be stopped immediately and the Project Manager or other designated individual shall be notified. Such work stoppage <u>invalidates</u> the line-entry permit, and a new permit shall be completed after an inspection has been performed by the SS or SHSM.
- Prior to line breaking activities, CB&I personnel will place plastic sheeting and plans under the investigation ports. Personnel will have clamps or plugs to secure/close the investigation ports in the pipe to prevent leaking. Spill supplies such as oil pads will be available to cleanup residual oil.
- No erasures or changes of dates on line-breaking permits shall be permitted.
- Implement applicable FMC Policy OS- 7 (see Appendix F).

5.1.16 Hand and Power Tools

Observe CB&I Procedure **CMS-710-02-PR-01100, CMS-710-02-PR-01200,** and **CMS-710-02-PR-01300.** Observe the following procedures and practices when working with hand and power tools:

- Keep hand tools sharp, clean, oiled, dressed, and not abused.

- Worn tools are dangerous: e.g., the “teeth” in a pipe wrench can slip if worn smooth; an adjustable wrench will slip if the jaws are sprung; hammerheads can fly off loose handles.
- Tools subject to impact (chisels, star drills, and caulking irons) tend to “mush-room.” Keep them dressed to avoid flying spalls. Use tool holders.
- Don't force tools beyond their capacity. No “homemade” handles or extensions (cheaters) are permitted! Don't use tools for pry bars.
- Flying objects can result from operating almost any power tool, so always warn people in the vicinity and use proper eye protection.
- Each power tool should be examined before use for damaged parts, loose fittings, and frayed or cut electric cords. Tag and return defective tools for repairs. Inspect also for adequate lighting, proper lubrication, and abandoned tools or material that could “vibrate into trouble.”
- Air must be shut off or the electric cord unplugged before making tool adjustments. Air must be “bled down” before replacement or disconnection.
- Proper guards or shields must be installed on all power tools before issue. Do not use improper tools or tools without guards in place.
- Implement applicable FMC Policies (see Appendix F).
- Replace all guards before start-up. Remove cranks, key, or wrenches used in service work.

5.1.17 Physical Injury/Ergonomics

Review CB&I procedure **CMS-710-01-PR-03700.** Observe the following procedures and practices to prevent physical injuries:

- Wear hard hats and safety glasses, gloves, high visibility vests/clothing when on site.
- Maintain visual contact with the equipment operator and wear safety vest / hi-vis clothing when heavy equipment is used on-site. When adjacent to or in roadways safety vests are required.
- Avoid loose-fitting clothing.
- Prevent slips, trips and falls—keep work area uncluttered.
- Keep your hands away from moving parts (i.e., augers).

5.1.18 Vehicular Traffic

Observe the following procedures and practices regarding vehicular traffic:

- Wear traffic safety vest when vehicle hazard exists.
- Use cones, flags, barricades, and caution tape to define work area.
- Use vehicle to block work area.
- Engage FMC regarding activities that will create high-traffic situations.
- Always use a spotter in tight or congested areas for material deliveries.
- Implement applicable FMC Policy OS-09 (see Appendix F).
- Review CB&I Procedure **CMS-710-02-PR-02700** Vehicle Safety.

5.1.19 Noise

Observe CB&I Procedure **CMS-710-01-PR-0900**. In addition, observe the following procedures and practices regarding noise:

- Wear hearing protection when equipment such as a drill rig, jackhammer, cut saw, air compressor, blower or other heavy equipment is operating on the site.
- Wear hearing protection whenever it is necessary to speak above normal conversational speech due to loud noise—this much noise indicates the need for protection.
- Conduct noise monitoring of suspected high noise operations at the beginning of the workday or start-up of new operations to verify noise control/hearing protection requirements.

5.1.20 Lifting and Material Handling

Review CB&I procedure **CMS-710-01-PR-03700.** Observe the lifting and material handling procedures and practices:

- Use leather gloves when handling metal, wire rope, sharp debris, or transporting materials (wood, piping, drums, etc.).
- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weights over 50 pounds. Multiple employees or mechanical lifting devices are required for objects over the 50-pound limit.
- Plan a lift before doing it. Bend at the knees and lift with the legs; keep the natural curves of the back; do not use back muscles.
- Check route for clearance.
- Use the buddy system when lifting heavy or awkward objects.
- Do not twist body while lifting.
- Know the capacity of any handling device (crane, forklift, chain fall, come-along) that you intend to use.
- Use tag lines to control loads.
- Ensure that your body, material, tools, and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, bowing, or any other un-controlled motion.
- Trucks (i.e., flat beds) hauling equipment or materials must not be moved once rigging has been released.
- Chock all material and equipment (such as pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- When working at heights, secure tools, equipment, and wrenches against falling.
- Do not store materials or tools on ducts, lighting fixtures, beam flanges, hung ceilings, or similar elevated locations.

5.1.21 Fire Control

Follow CB&I Procedure **CMS-710-02-PR-02400.** Observe the following fire control procedures and practices:

- Smoke only in designated areas.
- Prepare work areas to control / snuff out potential flash / smoldering of elemental phosphorus.
- Keep flammable liquids in closed containers.
- Keep site clean; avoid accumulating combustible debris such as paper.
- Elemental Phosphorus work area with personnel shall have a quenching pool / tank / running water
- Follow Hot Work Safety Procedures (which includes a fire watch during and 30 minutes after work completes) when welding or performing other activities requiring an open flame.
- Isolate flammable and combustible materials from ignition sources.
- Ensure fire safety integrity of equipment installations according to NEC specifications.

5.1.22 Static Electricity/Transfer of Flammable Liquids

Observe the following procedures and practices regarding static electricity when transferring flammable liquids:

- Do not create static discharge in flammable atmosphere.
- Electrically bond and ground pumps, transfer vessels, tanks, drums, bailers, and probes when moving flammable liquids.
- Electrically bond and ground vacuum trucks and the tanks they are emptying.
- Do not splash fill containers with flammable liquids.
- Pour flammable liquids slowly and carefully.
- Two Fire extinguishers (2A20: BC) must be available, charged, inspected, and readily accessible.

5.1.23 Biological and Wildlife Hazards

Due to the size and location of the Site, Site workers are at risk from several wildlife hazards including:

- Microbial (mold, bacterial, viral, etc.)
- Poisonous Snakes
- Ticks
- Bees and Yellow Jackets
- Mosquitoes (West Nile, Malaria, Japanese Encephalitis)
- Spiders
- Scorpions
- Animal Bites/Animal Borne Diseases
- Bird and Rodent Droppings
- Moose and Other Large Animals
- Mountain Lions

The subsections below briefly describe each of the above hazards and the control measures for each.

5.1.23.1 Microbial

Microbial-related project risks are generally associated with exposure to untreated water and soils. If these media are contaminated with animal fecal matter or animal remains, they can present a risk of infection to unprotected workers and/or where personal hygiene is difficult.

Escherichia coli O157 is a species of bacteria. The most common type of *E. coli* infection that causes illness in people is called *E. coli* O157. Symptoms of *E. coli* O157 include watery or bloody diarrhea, fever, abdominal cramps, nausea, and vomiting. Illness may be mild or severe. In addition to the more common route of ingesting contaminated food, infection from E. coli can occur for exposure it contaminated water, either through open wounds or ineffective hygiene methods when working with or in E. coli-contaminated water.

Cryptosporidium infection (cryptosporidiosis) (krip-toe-spo-rid-ee-oh-sis) is a parasitic disease caused by Cryptosporidium parvum. It usually causes a mild to severe infection of the gastrointestinal system, including watery diarrhea, fever, abdominal cramps, nausea, and vomiting.

Giardia is a microscopic parasite that causes the diarrheal illness known as giardiasis. Giardia (also known as Giardia intestinalis, Giardia lamblia, or Giardia duodenalis) is found on surfaces or in soil, food, or water that has been contaminated with feces from infected humans or animals. Giardia is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it tolerant to chlorine disinfection. While the parasite can be spread in different ways, water is the most common method of transmission.

5.1.23.2 Biological Hazards

Biological hazards that may be encountered during site activities include poisonous snakes, ticks and other insects (e.g., wasps, mosquitoes).

5.1.23.3 Poisonous Snakes

Rattlesnakes are found at the Site. During the spring, summer and fall months, workers should be aware of areas frequented by rattlesnakes and take appropriate precautions.

Precautions to lower the risk of being bitten by a rattlesnake include:

- Leave snakes alone, many people are bitten because they try to kill a snake or get a closer look.
- In areas known to have snakes present wear snake chaps to protect the lower legs from snake bites.
- Stay out of tall grass unless you wear tall thick leather boots, and remain on paths as much as possible.
- Keep hands and feet out of areas that you can’t see.
- If you encounter a snake, walk around it, giving it a berth of approximately 6 feet.
- If you are bit by a snake, immediately seek medical help, whether the snake is believed to be venomous or not.

For a venomous snakebite victim, the following first aid should be administered:

- Wash the bite with soap and water.
- Immobilize the bitten area and keep it lower than the heart.
- Immediately seek medical help.
- Do not ice or cool the bite; do not apply a tourniquet; do not cut into the wound!

5.1.23.4 Ticks

Ticks are transmitters of many different diseases, including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever, and Lyme disease. It is suggested that all workers check themselves periodically for ticks while working on site and upon leaving the Site. When working in tall grass or brush areas, workers should wear long trousers and apply insect repellent to pant legs and socks to deter ticks and other insects. Lyme disease is an illness caused by bacteria which is transmitted to animals and man through the bite of infected ticks.

Not all ticks are infected. Infection rates in tick populations vary by tick species and geographic region from as few as two percent to 90 percent or more.

The deer tick is responsible for most of the cases of Lyme disease in the United States. According to the Center for Disease Control and Prevention, between 2002 and 2010 the State of Idaho has reported 46 cases of Lyme disease. Some species of birds also function as a reservoir of infection.

Lyme Disease Symptoms and Treatment

In about 50% of the cases a characteristic rash or lesion is seen. It begins a few days to a few weeks after the bite of an infected tick. The rash generally looks like an expanding red ring. It is often described as looking like a bull's-eye with alternating light and dark rings. However, it can vary from a reddish blotchy appearance to red throughout, and can be confused with poison ivy, spider or insect bite, or ringworm. At about the same time that the rash develops, flu-like symptoms may appear with headache, sore throat, stiff neck, fever, muscle aches, fatigue and general malaise. Some people develop the flu-like illness without getting a rash.

Seek prompt medical attention if any of these symptoms appear, especially after being bitten by a tick or visiting an area where Lyme disease is common. If possible document the presence of the rash by taking a picture because it may disappear before a physician can see it.

If ignored, the early symptoms may disappear, but more serious problems can develop months to years later. The later symptoms of Lyme disease can be quite severe and chronic. Muscle pain and arthritis, usually of the large joints is common. Neurological symptoms include meningitis, numbness, tingling, and burning sensations in the extremities, Bell's palsy (loss of control of one or both sides of the face), severe pain and fatigue (often extreme and incapacitating) and depression. Heart, eye, respiratory and gastrointestinal problems can develop. Symptoms are often intermittent lasting from a few days to several months and sometimes years. Chronic Lyme disease, because of its diverse symptoms, mimics many other diseases and can be difficult to diagnose.

Lyme disease is treated with antibiotics. Timely treatment increases chances of recovery and may

lessen the severity of any later symptoms in both animals and man. The most effective treatment will be recommended by your physician. Treatment for later stages is more difficult often requiring extended and repeated courses of antibiotic therapy and treatment failures and relapses are reported.

Preventing Tick Bites

- When out of doors several precautions can minimize your chances of being bitten.
- Tuck your pant legs into your socks and your shirt into your pants.
- Wear light colored clothing. Dark ticks are more easily spotted against a light background.
- Inspect clothes often for ticks. Have a companion inspect your back and other hard to see areas.
- Apply repellents according to label instructions. Applying directly to clothing appears to be most effective.
- Upon returning to the home remove clothing and wash or put it in the dryer for 30 minutes to kill any ticks.
- When you get in from the field; shower and inspect your body thoroughly. Especially check groin, navel, armpits, head and behind knees and ears. Have a companion check your back, or use a mirror.
- When hiking, stay in the middle of trails.

How to Remove Attached Ticks

Prompt removal of ticks decreases the chances of getting Lyme disease. The proper and easiest method is to grasp the tick with fine tweezers, as near the skin as you can, and gently pull it straight out. Be careful not to squeeze the tick when removing it which could result in more bacteria being injected. After removing the tick, quickly fill the hole in the skin with triple antibiotic cream. Do not try to remove the tick with your fingers or attempt to remove with lighted cigarettes, matches, nail polish, or Vaseline.

Once removed save the tick for identification. Accurate identification becomes very important if you or your animals develop disease symptoms. Proof of tick bite and the kind of tick doing the biting is especially important to document in areas where Lyme disease is not considered prevalent and doctor suspicion is low.

In most areas, ticks can be submitted for identification through local or state health department offices. Many physicians and veterinarians will also submit ticks. Put the tick in a tightly closed container with a small amount of alcohol (rubbing alcohol will do). Mark it with your name, address and phone number, date collected, host collected from (animal or man) and recent travel history.

5.1.23.5 Bees, Wasps and Yellow Jackets

Encounters with bees, wasps and yellow jackets occur when nests are disturbed. At the Site bees, wasps and yellow jackets have been observed in trees, monitoring well enclosures, on equipment and are commonly seen throughout the Site. Before entering an area or opening an enclosure that is not

frequently disturbed, take a few moments to observe whether or not insects are entering or exiting. If they are flying to or from the area or enclosure, avoid it if possible. If you must be in an area where disturbing a nest is likely, be sure to wear long pants and a long-sleeved shirt. Stinging insects fly around the top of their target, so if you get into trouble, cover your head if possible and immediately evacuate the area.

If you get stung, look for an imbedded stinger, and, if present, remove. Several over-the-counter products or a simple cold compress can be used to alleviate the pain of the sting. If the sting is followed by severe symptoms, or if it occurs in the neck or the mouth, seek medical attention immediately because swelling could cause suffocation.

If you need to destroy a nest, consult with the SSHO first. Commercially available stinging insect control aerosols are very effective, but could potentially contaminate the area.

Once the nest is destroyed, fine mesh may be applied over the exit and entry points of an enclosure to prevent re-infestation.

Employees with a known bee sting allergy should carry an EpiPen® prescribed by their personnel physician. Having an EpiPen® on Site and proper storage is the responsibility of the person it is prescribed for. These employees shall let the SSHO know about this allergy and where the EpiPen® will be kept while that employee is on-Site.

5.1.23.6 Mosquitoes

Mosquitoes in the U.S. have been known to carry West Nile Virus, St. Louis encephalitis, and Dengue Fever. To avoid mosquito bites:

- Apply insect repellent containing *N*,*N*-Diethyl-*meta*-toluamide (DEET) when you're outdoors.
- Read and follow the product directions whenever you use insect repellent.
- Wearing long-sleeved clothes and long pants treated with repellent to further reduce your risk, as will staying indoors during peak mosquito feeding hours (dusk until dawn).
- Limit the number of places available for mosquitoes to lay their eggs by eliminating standing water sources from around the work area.

5.1.23.7 Spiders

The most dangerous spiders to humans in North America are Black Widows and Brown Recluse spiders (also known as Fiddleback spiders). Although Black Widows and Brown Recluse spiders are relatively rare at the site and surrounding locations, there are indications that these spiders may be transported fairly easily. With the transfer of large amounts of construction materials, transfer to the site of these spiders is possible. A guide to identifying these spiders is presented below.

Black Widow Spider Identification Abdomen usually shows hourglass marking; The female is 3-4 centimeters in diameter; Have been found in well casings and flush-mount well covers; Not aggressive, but more likely to bite if guarding eggs; Symptoms include light, local swelling and reddening of the bite are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea; and If bitten, immediately seek medical help.	

Brown Recluse Identification Has a ¼-to ½-inch-long body, full grown are approximately the size of a silver dollar, legs included. Prefers to hide in baseboards, ceiling cracks, and undisturbed piles of material. At first the bite may either go unnoticed or be followed by a severe localized reaction, including scabbing, necrosis of affected tissue, and very slow healing. If bitten, immediately seek medical help.	

5.1.23.8 Scorpions

The scorpions in the US range through the Southern and Southwestern United States. Scorpions usually hide during the day and are active at night. They may be hiding under rocks, wood, or anything else lying on the ground. Some species may also burrow into the ground. Most scorpions live in dry, desert areas. However, some species can be found in grasslands, forests, and inside caves.

Symptoms

Symptoms of a scorpion sting may include:

- A stinging or burning sensation at the injection site (very little swelling or inflammation)
- Positive "tap test" (i.e., extreme pain when the sting site is tapped with a finger)

- Restlessness
- Convulsions
- Roving eyes
- Staggering gait
- Thick tongue sensation
- Slurred speech
- Drooling
- Muscle twitches
- Abdominal pain and cramps
- Respiratory depression

These symptoms usually subside within 48 hours, although stings from a bark scorpion can be life-threatening.

Preventing Scorpion Stings

Workers should take the following steps to prevent scorpion stings:

- Wear long sleeves and pants.
- Wear leather gloves.
- Shake out clothing or shoes before putting them on.
- Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

First Aid

Workers should take the following steps if they are stung by a scorpion:

- Contact a qualified health care provider or poison control center for advice and medical instructions.
- Ice may be applied directly to the sting site (never submerge the affected limb in ice water).
- Remain relaxed and calm.
- Do not take any sedatives.
- Capture the scorpion for identification if it is possible to do so safely.

5.1.23.9 Animal Bites/Animal Borne Disease (Other Than Droppings)

In addition the potential physical injury, bites and contact with animals can present significant health issues. Infection can result from the penetrating wound of bite and diseases from animals can be

transmitted to humans by vectors hosted by an animal (ticks, fleas).

Rabies

Rabies is a disease caused by the rabies virus. It may take several weeks or even a few years for people to show symptoms after getting infected with rabies, but usually people start to show signs of the disease 1 to 3 months after the virus infects them. The early signs of rabies can be fever or headache, but this changes quickly to nervous system signs, such as confusion, sleepiness, or agitation. Once someone with rabies infection starts having these symptoms, that person usually does not survive. This is why it is very important to talk to your doctor or health care provider right away if any animal bites you, especially a wild animal.

Many kinds of animal can pass rabies to people. Wild animals are much more likely to carry rabies, especially raccoons, skunks, bats, foxes, and coyotes. However, dogs, cats, cattle (cows), or any warm-blooded animal can pass rabies to people. People usually get rabies from the bite of an infected animal. Many animals, such as dogs, cats, and horses are vaccinated against rabies, but you should always wash any bite thoroughly and check with your health care provider about what to do if any animal bites you.

Plague

Plague is a rare bacterial disease caused by Yersinia pestis (yer-SIN-ee-ah PEST-iss). People usually show symptoms 2 to 6 days after getting plague. Symptoms include fever, chills, weakness, and swollen and painful lymph nodes. A few people get pneumonia (infection of the lungs) as a first symptom of plague. The infection then spreads to other parts of the body. If this disease is not treated right away, many people who get sick will not survive.

People can get plague from an infected animal, but this is very rare. Rodents (for example, mice, rats, and squirrels) and cats are animals that can carry plague. This disease most often occurs in the southwestern part of the United States. Usually, people get plague from the bite of an infected flea. Since fleas bite both people and animals, especially cats and rodents, an infected flea can pass plague to animals or people. Sometimes, people get plague from working with an animal that is infected. People also can get infected by breathing in tiny droplets of water contaminated with Y. pestis.

Tularemia

Tularemia is caused by the bacteria Francisella tularensis and is characterized by sudden onset of high fever and chills, joint and muscle pain, and prostration. Slow-healing sores or lesions develop at the site of entry of the bacteria (or arthropod bite). Inflammation and swelling of nearby lymph nodes follow.
The bacteria is maintained in rabbits, hares, rodents, and birds by tick transmission. The natural reservoir for the bacteria includes infected ticks and animal species that are less susceptible and thus survive acute infections. Hard ticks, primarily D. andersoni, D. variabilis, and Haemaphysalis leporispalustris, and some flies, especially the deerfly (Chrysops discalis), can subsequently transmit the disease to humans. Tularemia can also be transmitted directly to humans. Transmission routes include drinking contaminated water; eating contaminated food or improperly cooked game meat; inhaling aerosols contaminated with rodent urine, feces, or dust; cuts from contaminated knives or other instruments; and scratches or bites

from infected animals.

5.1.23.10 Birds and Rodent Droppings

Bird Droppings

Large populations of roosting birds may present a disease risk. The most serious health risks arise from disease organisms that grow in the accumulations of bird droppings, feathers, and debris under a roost, especially if roosts have been active for years. Among the fungal diseases associated with bird droppings, the two most common are Histoplasmosis and Cryptococcosis.

If you are working in an area where large quantities of droppings are present, follow certain precautions to minimize the risk from disease organisms in the droppings:

- Wear a respirator that can filter particles as small as 0.3 microns, such as a HEPA filter.
- Wear disposable protective gloves, hat, coveralls, and boots if you will be in close contact.
- Wash at the work Site after cleanup, if possible.
- Modify the structure or use methods to prevent birds from reestablishing the roost.

Rodent Droppings

In the United States, deer mice are the predominant carrier of Hantavirus which causes Hantavirus pulmonary syndrome (HPS) in humans. This virus occurs in rodent urine, feces, or saliva, and is transported via aerosol particles, which can cause the fatal respiratory disease when inhaled.

The deer mouse has big eyes and big ears and its head and body are normally about 2 -3 inches long, and the tail adds another 2 -3 inches in length. It has been observed in a variety of colors, from gray to reddish brown, depending on its age. The underbelly is always white and the tail has sharply defined white sides. All Site workers must eliminate or minimize contact with these rodents and any areas of obvious rodent infestation.

Hantavirus has been shown to be transmitted by rodents. Hantavirus has resulted in several deaths in southeast Idaho. While there not have been any outbreaks or notices of the virus at FMC, field team members should be aware of the cause and potential control methods. Hantavirus has been shown to be transmitted through the aerosolization of dried rodent excreta (feces, urine). Hantavirus-associated disease begins with one or more symptoms including fever, muscle aches, headache, and cough and progresses rapidly to severe lung disease, often requiring intensive care treatment. To control potential contact with dust that may be carrying the rodent excreta, the field team will conduct a visual survey of the area around each site to note whether rodents are thriving in the area. If it is determined that rodents may be living near the work area a Job Planning Safety Analysis as discussed below will be developed including appropriate dust suppression techniques and/or respiratory protection (dust mask or dual cartridge air purifying respirator with dust filters) should be used.

HPS Symptoms and Treatment

There is no specific treatment, cure, or vaccine for Hantavirus infection. However, it is known that if infected individuals are recognized early and receive medical care in an intensive care unit, they may do better. In intensive care, patients are intubated and given oxygen therapy to help them through the period of severe respiratory distress. HPS will manifest symptoms in 1 to 5 weeks after exposure to mice or rats that carried a Hantavirus. Initially symptoms of HPS will be:

- Fever
- Severe muscle aches in the large muscle groups-thighs, hips, back, and sometimes shoulders. These symptoms are universal.
- Fatigue
- After a few days difficulty in breathing occurs. Symptoms can also include headaches, dizziness, chills, nausea, vomiting, diarrhea, and stomach pain.

Preventing HPS

It is important to avoid actions such as sweeping that raise dust in closed structures, since the infection occurs when the virus particles are inhaled. All structures on-Site will be aired out and decontaminated during start-up operations in the spring in an effort to prevent transmission of the virus. An effective decontamination agent is a dilute solution of bleach, consisting of 1 part commercial liquid bleach to 9 parts water.

5.1.23.11 Moose and Other Large Animals

Moose and other large animals such as deer, elk, cattle and wild or domestic dogs may be present at the site. As with all animals, do not approach animals, feed the animals or attempt to approach them. If a sick or injured animal is noticed at the Site, contact a representative from KASE/Warbonnet and they will contact local agencies to have the animal removed.

5.1.23.12 Mountain Lions

Mountain lions may be present at the Site. To avoid encounters with Mountain Lions at the Site, observe the following procedures:

- Avoid working by yourself in an isolated area at either dawn or dusk as cats are most active at this time.
- Do not approach a mountain lion.
- If you are in a group, gather together.
- If you are alone, remain calm. If you are wearing a jacket, raise it above your head to make yourself appear larger or find anything to hold or rise above yourself to make yourself look as big as possible. Speak calmly and firmly, or attempt to yell for help, while remaining calm. Do not

make threatening gestures. Try to stay still until the cat leaves, or back away slowly until the cat is out of sight. Don't turn and run.

- DO NOT CLIMB A TREE. Mountain Lions are good climbers and by attempting to climb a tree you can effectively trap yourself; and
- DO NOT RUN. If you run, a mountain lion may identify you as prey and it may actually encourage an attack.

If a cat attacks someone, take the following steps:

- If you are being attacked, fight back; use anything you can, such as rocks, tree branches, tools. Try to remain standing.
- Render first aid and call for professional medical care.

5.1.24 Heat Stress

Observe CB&I Procedure **CMS-710-01-PR-0600**. In addition, observe the following general procedures and practices regarding heat stress:

- Increase number of rest breaks and/or rotate workers in shorter work shifts.
- Watch for signs and symptoms of heat exhaustion and fatigue.
- During hot months, plan work for early morning or evening.
- Use ice vests when necessary.
- Rest in cool, dry areas.

5.1.24.1 Signs, Symptoms, and Treatment

Adverse climatic conditions are important considerations in planning and conducting site operations. High ambient temperature can result in health effects ranging from transient heat fatigue, physical discomfort, reduced efficiency, personal illness, increased accident probability, etc., to serious illness or death. Heat stress is of particular concern when chemical protective garments are worn since they prevent evaporative body cooling. Wearing personal protective equipment places employees at considerable risk of developing heat stress.

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses, regular monitoring and other preventive precautions are vital.

Heat Rash. Heat rash can be caused by continuous exposure to hot and humid air and skin abrasion from sweat soaked clothing. The condition is characterized by a localized red skin rash and reduced sweating. Aside from being a nuisance, the ability to tolerate heat is reduced. To treat, Keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing.

Heat Cramps. Heat cramps are caused by profuse perspiration with inadequate electrolytic fluid replacement. This often robs the larger muscle groups (stomach and quadriceps) of blood which can cause painful muscle spasms and pain in the extremities and abdomen. To treat, remove employee to a cool place and give sips of water or an electrolytic drink. Watch for signs of heat exhaustion or stroke.

Heat Exhaustion. Heat exhaustion is a mild form of shock caused by increased stress on various organs to meet increased demand to cool the body. Onset is gradual and symptoms should subside within one hour. It symptoms include weak pulse; shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; fatigue. To treat, remove employee to a cool place and remove as much clothing as possible. Give sips of water or electrolytic solution and fan the person continuously to remove heat by convection. Do not allow the affected per-son to become chilled—treat for shock if necessary.

Heat Stroke. Heat stroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death. *This is a medical emergency!* Symptoms include red, hot, dry skin; body temperature of 105º Fahrenheit or higher; no perspiration; nausea; dizziness and confusion; strong, rapid pulse. Since heat stroke is a true medical emergency, transport the victim to a medical facility immediately. Prior to transport, remove as much clothing as possible and wrap the victim in a sheet soaked with water. Fan vigorously while transporting to help reduce body temperature. Apply cold packs, if available; place under the arms, around the neck, or any other place where they can cool large surface blood vessels. If transportation to a medical facility is delayed, reduce body temperature by immersing victim in a cool water bath (however, be careful not to over-chill the victim once body temperature is reduced below 102º F). If this is not possible, keep victim wrapped in a sheet and continuously douse with water and fan.

5.1.24.2 Prevention

The implementation of preventative measures is the most effective way to limit the effects of heat-related illnesses. During periods of high heat, adequate liquids must be provided to re-place lost body fluids. Replacement fluids can be a 0.1 percent salt-water solution, a commercial mix such as Gatorade, or a combination of these with fresh water. The replacement fluid temperature should be kept cool, 50o F to 60o F, and should be placed close to the work area. Employees must be encouraged to drink more than the amount required to satisfy thirst. Employees should also be encouraged to salt their foods more heavily during hot times of the year.

Cooling devices such as vortex tubes or cooling vests can be worn beneath impermeable clothing. If cooling devices are worn, only physiological monitoring will be used to deter-mine work activity.

All workers are to rest when any symptoms of heat stress are noticed. Rest breaks are to be taken in a cool, shaded rest area. Employees shall remove chemical protective garments during rest periods and will not be assigned other tasks.

All employees shall be informed of the importance of adequate rest and proper diet including the harmful effects of excessive alcohol and caffeine consumption.

5.1.24.3 Monitoring

Heat stress monitoring will be required when employees are working in environments exceeding 90ºF ambient air temperature. If employees are wearing impermeable clothing, this monitoring will begin at 78ºF. There are two general types of monitoring that the health and safety representative can designate to be used: wet bulb globe temperature (WBGT) and physiological.

Wet Bulb Globe Temperature (WBGT). The WBGT index is the simplest and most suitable technique to measure the environmental factors which most nearly correlate with core body temperature and other physiological responses to heat. When WBGT exceeds 25.9ºC (78ºF), the work regiment in Table 1 and Figure 1 of the section Heat Stress in the latest edition of the “American Conference of Governmental Industrial Hygiene (ACGIH) Threshold Limit Value (TLV) Booklet” should be followed.

Physiological. Physiological monitoring can be used in lieu of, or in addition to, WBGT. This monitoring can be self-performed once the health and safety representative demonstrates appropriate techniques to affected employees. Since individuals vary in their susceptibility to heat, this type of monitoring has its advantages. The two parameters that are to be monitored at the beginning of each rest period are:

- **Heart Rate** – The maximum heart rate (MHR) is the amount of work (beats) per minute a healthy person's heart can be expected to safely deliver. Each individual will count his/her radial (wrist) pulse as early as possible during each rest period. If the heart rate of any individual exceeds 75 percent of their calculated maximum heart rate (MHR = 200 - age) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is be-low 75 percent of their calculated maximum heart rate.
- **Temperature** – Each individual will measure his/her temperature with a thermometer for one minute as early as possible in the first rest period. If the temperature exceeds 99.6^{o}F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work if his/her temperature exceeds 100.4^{o}F

5.1.24.4 Training

Employees potentially exposed to heat stress conditions will be instructed on the contents of this procedure. This training can be conducted during daily tailgate safety meetings.

5.1.25 Cold Stress

Observe CB&I Procedure **CMS-710-01-PR-0700**. In addition, observe the following procedures and practices regarding cold stress:

- Take breaks in heated shelters when working in extremely cold temperatures.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce the susceptibility to cold stress.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Scheduling a work/rest regime to reduce the peak of cold stress; enforcing scheduled work breaks. See Form number **CMS-710-01-FM-00702** (Appendix A).

5.1.26 Inclement Weather

Observe the following procedures and practices regarding inclement weather:

- Stop outdoor work during electrical storms, tornados, hailstorms, and other extreme weather conditions such as extreme heat or cold.
- Take cover indoors or in vehicle.
- Listen to local forecasts for warning about specific weather hazards such as tornadoes, hurricanes, and flash floods.
- Follow **CMS-710-02-PR-06500** when working where lightning is possible in the area

- The site shall implement the tornado warning system in place at the ICL facility. The facility has two tornado shelters. During the plant orientation the tornado sirens and shelter locations will be reviewed with the onsite contractors.

5.1.27 Welding, Cutting, Brazing

Observe CB&I Procedure **CMS-710-02-PR-02300**. In addition, observe the following procedures and practices when welding, cutting, or brazing:

- Conduct fire safety evaluation.
- Complete Safe Work Permit using form from Appendix A.
- Follow AHA guidelines for hot work (see Appendix B) if applicable.
- Ensure flammable materials are protected from hot work, sources of ignition.
- Ensure fire watch/fire extinguisher is on standby by hot work location.
- Implement FMC Policy OS-6 (Appendix F)

5.1.28 Heavy Equipment Decontamination

Observe the following heavy equipment decontamination procedures and practices:

- Wear Level D protection, including a face shield and safety goggles.
- Ensure that other personnel are out of the area prior to decontamination.
- Secure the area around the decontamination pad with cones, caution tape, or barricades.
- Ensure that safe work practices and precautions are taken to minimize the potential for physical injury from high-pressure water spray.
- The pressure washer wand must be equipped with a safety release handle.
- Set up facilities to collect decon water; water may freeze creating slippery working surfaces
- Ensure that the area is clean after equipment is decontaminated. Barricades, cones, or caution tape must be left in place and secured at all times.

5.1.29 Cleaning Equipment

Observe the following procedures and practices when cleaning equipment:

- Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, Alconox, or commercial prepared cleaning wipes.
- Stand upwind to minimize any potential inhalation exposure.
- Dispose of spent cleaning solutions and rinses accordingly.

6.0 Air Monitoring/PPE

6.1 Air Monitoring

Air monitoring at the site must be performed in accordance with CB&I practices. Organic vapor and/or concentrations are monitored in the field with a photoionization detector (PID). Flammable vapors and/or gasses are monitored with a four gas meter (O_2/LEL/CO/H_2S) real-time instrument.

Airborne dust/particulate concentrations are measured with a real-time aerosol monitor (using a scattered light photometric sensing cell). Radiological surveys will be taken with a survey meter. Both area and personal air monitoring readings are to be taken to characterize site activities. Air monitoring results must be documented on the Air Monitoring Forms (see Appendix A) or in the field logbook.

Calibration and maintenance of air monitoring equipment must follow the manufacturer's specifications and must be documented. Re-calibration and adjustment of air monitoring equipment must be completed as site conditions and equipment operation warrant. Record all air monitoring equipment calibration and adjustment information on forms (see Appendix A) or in the field logbook.

Air monitoring action levels (see Table 4) have been developed that stipulate the chemical concentrations in the breathing zone that require an upgrade in level of PPE. Action levels are typically set at one-half of the OSHA Permissible Exposure Limit (PEL), National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL), or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV). The rationale for establishing action levels is based on the available data that characterizes COCs from previous site data.

All on-site workers must be properly fitted with PPE (i.e., respirators) and have been trained in their use (i.e., donning and doffing). Air monitoring measurements will be taken in the breathing zone of the worker most likely to have the highest exposure. Transient peaks will not automatically trigger action. Action will be taken when levels are sustained for a 1-minute time period.

Similarly, if chemical odors are detected that are a nuisance, bothersome, or irritating, an upgrade in respiratory protection can provide an extra level of comfort or protection when conducting site activities. See Section 4.1.1 for guidelines for frequency of air monitoring. See Table 2 for a description of PPE levels. See Table 3 for task-specific protection level and task-specific air monitoring requirements.

6.1.1 Air Monitoring Frequency Guidelines

Conduct periodic monitoring when:

- It is possible that an immediately dangerous to life or health (IDLH) condition or a flammable atmosphere has developed, or
- There is an indication that exposures may have risen over established action levels, permissible exposure limits, or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations:
  - Change in site area - work begins on a different section of the site.
  - Change in contaminants – handling contaminants other than those first identified.
  - Visible signs of particulate or smoke releases from intrusive activities such as excavation.
  - Perceptible chemical odors or symptoms of exposure.
  - Change in on-site activity – one operation ends and another begins.
  - Handling leaking drums or containers.

- Line breaking / line blanking activities.
- Working with obvious liquid contamination (e.g., a spill or lagoon).
- Conduct air monitoring when the possibility of volatilization exists.

6.2 Personal Protective Equipment (PPE)

The minimum level of PPE should be selected according to the hazards that may be encountered during site activities. Only PPE that meets the following American National Standards Institute (ANSI) or American Society for Testing and Materials (ASTM) standards are to be worn. At a minimum, all workers will wear the following protection while working on the site:

- Eye protection - ANSI Z87.1-1989.
- Head protection - ANSI Z89.1-1986.
- Foot protection - ASTM F2412-05.
- High visibility clothing- ANSI/ISEA 107-2010.

6.2.1 Respiratory Protection

Air-purifying respiratory protection may be used for protection against dust and organic vapors during the course of the project. The need for respiratory protection will be determined by air monitoring results and site conditions. However, engineering controls and administrative controls must first be evaluated for use as the primary controls for protection against site respiratory hazards. In the event engineering controls and administrative controls are deemed to not be feasible, respiratory protection will be required.

Site personnel must also understand the limitations of air purifying respirators and the End-of-Service Life cartridge change-out schedule for the particular type of respirator that will be used. Manufacturer's data has been evaluated for three types of respirators (Scott, MSA, and Survivair).

Any site personnel requiring respiratory protection must also adhere to the site-specific respiratory protection program. Personnel using a respirator that is not listed above should contact their HSR to determine the change-out schedule for the particular respirator used. Any questions regarding the site-specific respiratory protection program must be directed to the SHSM or PM.

7.0 Decontamination

7.1 Decontamination Procedures

Operations conducted at this site have the potential to contaminate field equipment and PPE. See Section 7.1.1 for the procedures that must be followed to prevent the transfer of contamination to vehicles, administrative offices, and personnel. Decontamination procedures shall be in accordance with all applicable State of Idaho and Federal EPA environmental regulations and **CMS-710-04-WI-00305** (Hazardous Waste Decontamination).

The following outlines the procedures set forth in Section 5.7.2.1 of CMS-710-04-WI-00305 (Hazardous Waste Decontamination) that site workers must follow in removing their Level D PPE:

- If utilized, an area shall be designated for the removal of disposable gloves and boot covers. Paper towels shall be available for the removal of this equipment.
- A trash barrel at the site shall be provided for all disposable non-contaminated PPE. This material shall be disposed of in a normal trash receptacle before leaving the site.
- Laundering of personal clothing shall be completed as soon as possible once offsite.
- Soap and water or a hand sanitizer shall be used to sanitize hands before eating, drinking or smoking and before using the bathroom.

Prior to entering either the office or the break trailer employees are asked to utilize the boot scrubbers that are located at each entrance. They are also encouraged to use them prior to departing site.

Eating is not permitted in the cabs of equipment. There is an onsite facility (break trailer) available for lunch, which has a sanitizing station. The office trailer is also approved for eating. All personnel are required to wash and /or sanitize their hands prior to eating and smoking.

Smoking is not permitted on the slag pile. Smoking is only allowed on the asphalt surfaces and in the designated lunch and office trailer areas.

Since this is an excavation and grading project there are numerous operators on the site. All activities on the slag pile are conducted inside equipment and there is limited ground labor work occurring. The wheeled equipment operators enter their equipment in a clean parking area prior to traveling to their work areas. The operators have very limited contact outside of their machinery when in the work area.

7.1.1 Decontamination Procedures For Field Equipment and PPE

The Sections below describe decontamination procedures for field equipment, and disposable and non-disposable PPE.

7.1.1.1 Field Equipment

Field equipment can include hand tools and miscellaneous equipment. The SS will manage the decontamination efforts. Observe the following practices and procedures when decontaminating field equipment:

- Machinery will be decontaminated upon demobilization in an area where the water generated will be allowed to percolate into the slag.

- Hand tools and miscellaneous equipment may be decontaminated with commercially prepared equipment wipes or use solution of detergent and water; rinse with water prior to leaving the site.
- Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

7.1.1.2 Disposable PPE

Disposable PPE can include Tyvek suits, inner latex gloves, and respirator cartridges. Observe the following practices and procedures when decontaminating disposable PPE:

- Dispose of according to the requirements of the FMC and state and federal agencies.
- Change out respirator cartridges daily and dispose accordingly.

7.1.1.3 Non-disposable PPE

Non-disposable PPE can include respirators and boots and gloves. When decontaminating respirators, observe the following practices and procedures:

- Wipe out respirator with disinfecting pad prior to donning.
- Decontaminate on site at the close of each day with a solution of an approved sanitizing solution.

When decontaminating boots and gloves, observe the following practices and procedures:

- Decontaminate outside with a solution of detergent and water; rinse with water prior to leaving the site.
- Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

7.2 Example Decontamination Diagram

If Level C or Level B PPE is required, a contamination reduction zone (CRZ) will be constructed in a centralized common area with a travel path from the exclusion zone (EZ) demarcated with 4-foot-high cones. The decontamination procedure for this project site is a two-stage process. See Figure 2 for a depiction of the CRZ.

Stage 1:

1. Remove gross contamination with a brush.
2. Remove outer boots and dispose of in a drum.
3. Remove Tyvek suit and dispose in a drum.
4. Removes outer gloves and dispose of in a drum.
5. Walk to Stage 2.

Stage 2:

1. Remove respirator.
2. Remove cartridge and dispose in a drum.
3. Clean respirator and insert into a bag.

4. Remove inner gloves and dispose.

5. Wipe hands with a toilette and dispose.

6. Walk out of decontamination area.

All water used in decontamination procedures should be stored in portable storage tanks until a sufficient amount is stockpiled for disposal treatment. Disposable sampling and PPE will be placed in plastic bags and temporarily stored in designated drums. These drums shall be disposed of according to regulatory guidelines, if necessary.

8.0 Site Control/Communications

8.1 Site Control

To prevent contamination from migrating from personnel and equipment, work areas will be clearly specified as an EZ, CRZ, or Support Zone (SZ) prior to beginning operations. Each work area will be clearly identified using signs or physical barriers.

A log of all personnel visiting, entering, or working on the site shall be maintained by the SS or SHSM. No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e), (f). Visitors will attend a site orientation given by the SS/SHSR and sign the HASP.

The following are standard safe work practices that apply to all site personnel; they will be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, and smoking is prohibited in the EZ/CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco, and smoking.
- A buddy system will be used. Hand signals will be established to maintain communication.
- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel will provide emergency assistance.
- Visual contact will be maintained between buddies on-site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SS/SHSR, will be immediately dismissed from the site.
- Proper decontamination procedures must be followed before leaving the EZ.

8.1.1 Site Security and Work Zone Definition

This Section contains general guidelines for developing site security measures for working in a street or roadway and excavations.

8.1.1.1 Working In Street or Roadway

Observe the following site control practices and procedures when working in streets or road-ways:

- Wear traffic vest and hardhat when vehicle hazard exists.
- Use cones, flag-mounted cones, caution tape, and/or barricades.
- Use vehicle strobe light and block area with truck.
- Develop traffic flow plan for high traffic situations (as appropriate):
  - use flag person
  - use flashing arrow sign
  - use “MEN WORKING” signs liberally
  - obtain lane closing permits

- engage FMC details

8.1.1.2 Working at Excavation/Trenching Sites

Observe the following site control practices and procedures when working in streets or road-ways:

- "Competent person" is required per OSHA 29 CFR 1926 Subpart P.
- Safeguard open excavations by restricting unauthorized access.
- Highlight work area using prominent warning signs (cones, saw horses/barricades, and signage) placed a minimum of 10 feet back from excavation opening.
- Maintain zone definition along perimeter with a continuous string of yellow or orange caution tape.

8.2 Field Communications

Communications between all CB&I employees and subcontractors at the work site can be verbal and/or non-verbal. Verbal communication can be affected by the on-site background noise and various PPE. See Table 8 for a list of the type of communication methods and equipment to use, depending on site conditions. Communication equipment must be checked daily to ensure proper operation. All project personnel must be initially briefed on the communication methods prior to starting work; communication methods should be reviewed in Daily Tailgate Safety Meetings.

Table 7: Field Communication Methods

Communication Device	Type of Communications	Signal
Telephone On-Site Or Cellular Telephone	Emergency notification	Initiate phone call using applicable emergency numbers
Two-way Radio	Emergency notification among site personnel	Initiate radio communication with Code Red message
Compressed Air Horn	Hailing site personnel for non-emergency	One long blast, one short blast
Compressed Air Horn	Hailing site personnel for emergency evacuation	Three long continuous blasts
Visual	Hailing site personnel for distress, need help	Arms waved in circle overhead
Visual	Hailing site personnel for emergency evacuation	Arms waved in crisscross over head
Visual	Contaminated air/strong odor	Hands clutching throat
Visual	Break, lunch, end of day	Two hands together, break apart

9.0 Emergency Response and Contingency Plan

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the site management supervisory personnel of the contractor, through daily site inspections and employee feedback (CB&I I-CARE Observation Program, daily safety meetings, and job safety analyses) to recognize and identify all hazards that are found at the site. In addition to following the CB&I procedures, FMC procedures will also be followed. (See Appendix F)

See Section 9.1 for pre-emergency situations that warrant implementing the Emergency Response and Contingency Plan (ERCP) or Emergency Preparedness Plan (CMS-710-03-PR-00400). In the event of an emergency, immediate action must be taken by the first person to recognize the event.

Depending on the circumstances, environmental releases caused by the site work may require notification to the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number.
- Name and address of facility.
- Time and type of incident.
- Name and quantity of materials involved, if known.
- Extent of injuries.
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802. If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate site of the emergency.
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

9.1 Pre-emergency Plan for Site Emergencies

The following subsections provide information for a pre-emergency plan for site emergencies.

9.1.1 Evacuation Routes And Procedures

All emergencies require prompt and deliberate action. In the event of an evacuation emergency, it will be necessary to follow FMC procedures. Such established procedures will be followed as closely as possible.

In the event that the FMC Site Representative determines that an evacuation is required, the following procedure will be followed:

- All personnel will be notified by cell phone to evacuate the affected area.

- All personnel will immediately proceed to the assembly checkpoint (Main Gate area) following either the Primary or Alternate evacuation routes described below (Figure 5):

From the Calciner Pond Area and Eastern portions of the Site:

1. Primary Evacuation Route: Drive or walk northerly (downhill) to the Main Gate.

2. Alternate Evacuation Route: Drive or walk south (uphill) proceeding around the Slag Pile and thence to the Main Gate.

From the RCRA Pond Area and Western portions of the Site:

1. Primary Evacuation Route: The main gates are located along the north RCRA fence area as indicated on Figure 5. Drive or walk north to the north site road (staying upwind of any visible emissions), then proceed easterly along the road to the emergency check point area by the Main Gate.

2. Alternate Evacuation Route: Drive or walk south to the south site road then head easterly towards the slag pile (staying upwind of any visible emissions) proceed to the emergency check point area by the Main Gate. Alternate safety areas may be designated by the On-Site Manager if conditions are such that the safety areas or access to the safety areas is not safe. The perimeter road around the plant area and the main access road on the west side of the Site will be used as the main evacuation routes. The west side access road may be used as an alternate evacuation route from the west side of the Site, if necessary. Personnel will remain at the safety area(s) until the reentry alarm is sounded or an authorized individual provides further instructions.

9.1.2 Spill or Leaks

In the event of a spill or leak, personnel shall take the following steps:

- Locate the source of the spillage and stop the flow if it can be done safely, if not, identify the material and, if possible, estimate the quantity;
- Inform the FMC On-Site Manager immediately who will initiate notifications as appropriate; and
- Begin containment and recovery of the spilled materials as directed by the Emergency Site Contact.

The following information must be documented on a spill:

- Date and time of spill;
- Personnel and Contractor associated with the leak or spill;
- Name of the initial responder, and all other response personnel;
- Type and approximate amount of material spill and area impacted;
- Manner in which the spill was contained;
- Manner in which the spill was removed;
- Manner in which the spill materials was disposed;
- Notifications made, including date, time, contact persons and agencies; and
- Root Cause and Lessons Learned. Emergency First Aid Procedures

9.1.3 Emergency Medical Treatment Procedures

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket), unless such action would potentially worsen the condition or result in additional injuries. First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the FMC On-Site Manager.

For chemical exposure incidents, the SHSM or his/her designated assistant will provide the Hospital with SDS information the victim has been exposed to, if necessary.

Observe the following steps in the event of an emergency

See Table 2 for a list of emergency phone numbers. See Figure 1 for the Site Location. See Figure 2 for a map to the nearest hospital. See Figure 3 for a map to the nearest occupational clinic.

1) Survey the situation. Do not endanger your own life. Do not enter a confined space to rescue someone who has been overcome unless properly equipped and trained. Ensure all protocols are followed including that a standby person is pre-sent. If applicable, review SDS to evaluate response actions for chemical exposures.

2) Call 911 (if available) or the fire department immediately. Explain the physical injury, chemical exposure, fire, or release.

3) Decontaminate the victim without delaying life-saving procedures.

4) If the victim's condition appears to be non-critical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical Services (EMS) personnel: let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.

5) Notify the PM, SS, SHSM, and FMC Representative. Complete the appropriate incident investigation reports.

Stop Bleeding and CPR Guidelines

To Stop Bleeding

Perform the following steps to stop bleeding. Responder must have a current certificate to administer first aid.

1) Give medical statement.

2) Assure airway, breathing, and circulation.

3) Use direct pressure over the wound with clean dressing or your hand (use non-permeable gloves). Direct pressure will control most bleeding.

4) Bleeding from an artery or several injury sites may require direct pressure on a pressure point. Use pressure points for 30 to 60 seconds to help control severe bleeding.

5) Continue primary care and seek medical aid as needed.

CPR

Perform the following steps to administer CPR. Responder must have a current certificate to administer CPR.

1) Give medical statement.

2) Arousal: Check for consciousness.

3) Open airway with chin-lift.

4) Look, listen, and feel for breathing.

5) If breathing is absent, give 2 slow, full rescue breaths.

6) Check the pulse for 5 to 10 seconds.

7) If pulse is present, continue rescue breathing: 1 breath every 5 seconds.

8) If pulse is absent, initiate CPR; 30 compressions for each two breaths.

9.1.4 Fire Emergency

A contingency plan should exist for the following situations related to fire emergencies.

- The potential for human injury exists.
- Toxic fumes or vapors are released.
- The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions.
- The use of water and/or chemical fire suppressants could result in contaminated run-off.
- An imminent danger of explosion exists.

9.1.4.1 Fire Contingency Measures

Because flammable/combustible materials are present at this site, fire is an ever-present hazard. The CB&I personnel are not a trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the area and immediately notify the FMC security personnel. A FMC representative will be notified for all fire emergencies.

.

FIGURES

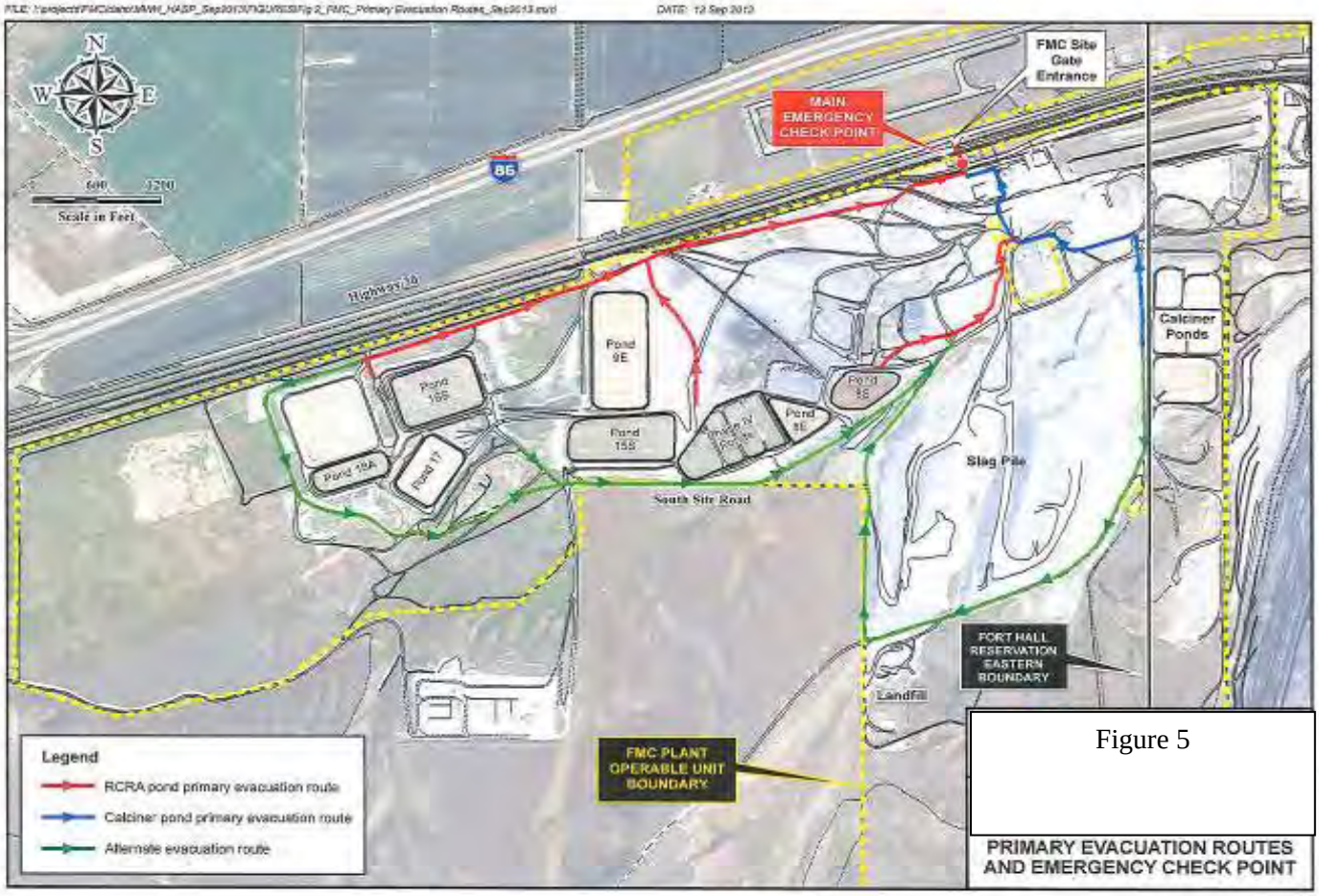
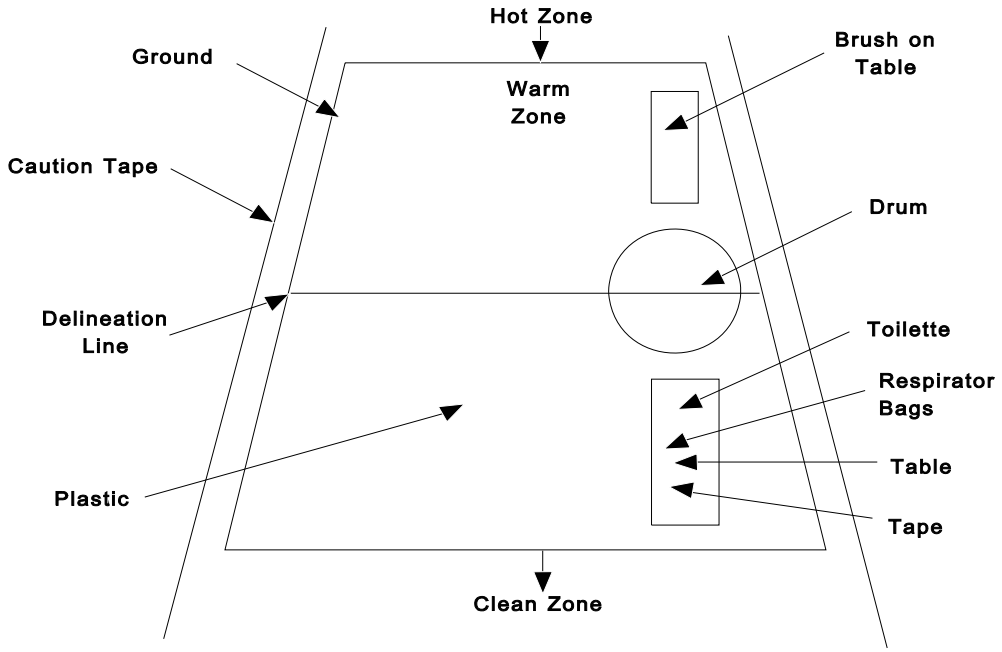
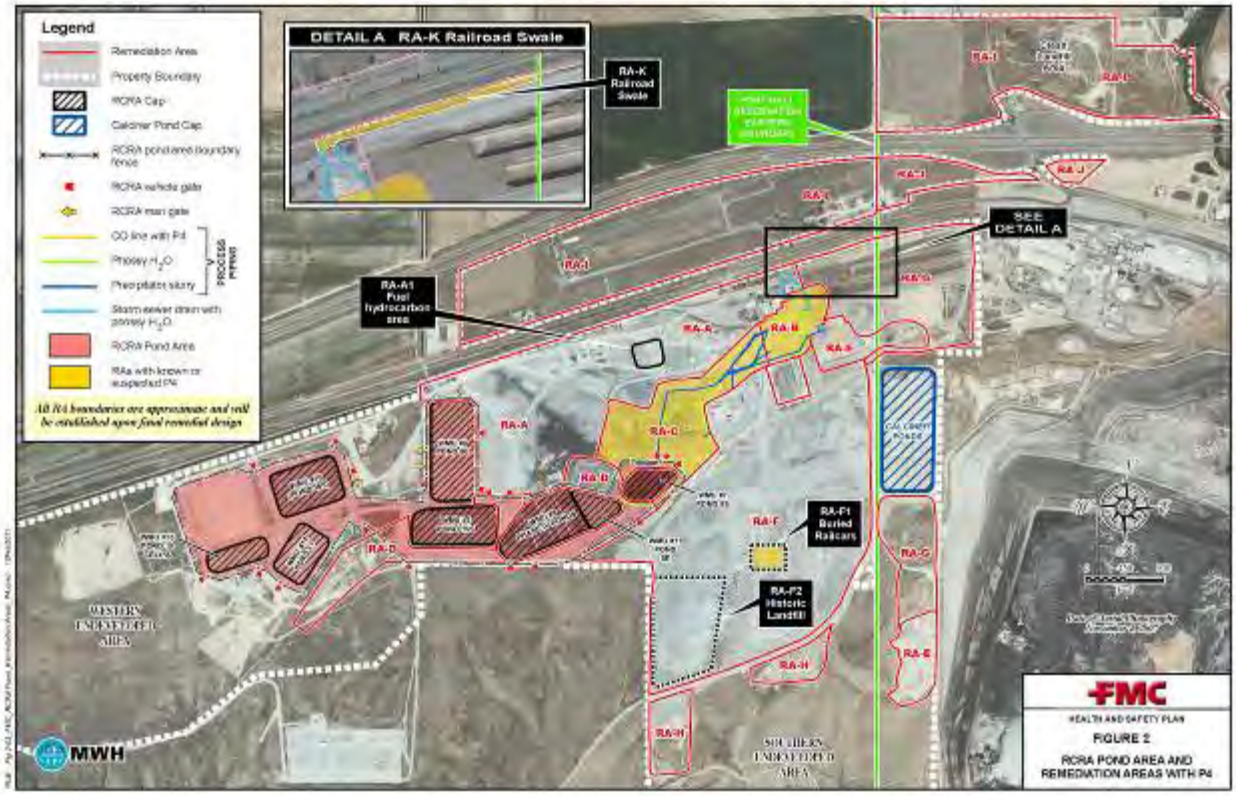


Figure 5

PRIMARY EVACUATION ROUTES AND EMERGENCY CHECK POINT

Figure 4
Contamination Reduction Zone




Legend
Remediation Area
Property Boundary
RCRA Cap
Calciner Pond Cap
RCRA pond area boundary fence
RCRA vehicle gate
RCRA man gate
CO line with P4
Process water H_2O
Precipitation slurry
PROCESS PIPING
Storm sewer drain with process H_2O
RCRA Pond Area
RAs with known or suspected P4
All P4 boundaries are approximate and will be established upon final remedial design
DETAIL A RA-K Railroad Swale
RA-K Railroad Swale
SEE DETAIL A
RA-A1 Fuel hydrocarbon area
RA-F1 Buried Railcars
RA-F2 Historic Landfill
RA-A
RA-B
RA-C
RA-D
RA-E
RA-F
RA-G
RA-H
RA-I
RA-J
RA-K
RA-L
WESTERN UNDEVELOPED AREA
SOUTHERN UNDEVELOPED AREA
MWH
FMC
HEALTH AND SAFETY PLAN
FIGURE 2
RCRA POND AREA AND REMEDIATION AREAS WITH P4

APPENDICES

Appendix *A*
H&S Site Logs and Forms

- HASP Amendment
- Subcontractor HASP Acknowledgement
- Subcontractor Pre –job Briefing
- Visitor's Log
- Site Exclusion Zone Log
- Heavy Equipment Inspection Form
- Air Monitoring Log(s)
- Tailgate Safety Meeting
- Excavation Permit
- Installing Primary Blinds/Blanks
- Daily Excavation Inspection Form
- Ladder Inspection form
- Safe Work Permit
- Daily HSE Inspection Form
- Site HS Inspection Form
- Sample JSA's
- Sample 5X5 Card
- Sample STTART Card

SITE SPECIFIC HEALTH AND SAFETY PLAN
AMENDMENT DOCUMENTATION

Project Name: _____ **Project No.:** _____

Amendment No.: _____ **Date:** _____

Amendment Revises: **Section:**
Page: _____ _____

Task(s) Amendment Affects:* _____

_____

**(Attach new/revised Job Safety Analyses)*

Reason For Amendment:

_____

_____

_____

Amendment: *(Attach separate sheet(s) as necessary)*

_____

_____

_____

_____

_____

Completed by: _____ **Approved by:** _____

SUBCONTRACTOR HEALTH & SAFETY PLAN ACKNOWLEDGEMENT

As a duly authorized representative of _____, under contract with

(name of subcontractor)

CB&I Corporation, I have reviewed and adopt the use of the CB&I Site -Specific Health & Safety Plan* at the _____ site.

_____ _____

(name of subcontractor representative/supervisor) *(date)*

_____

(signature of subcontractor representative/supervisor)

*Note: The Site Specific Health & Safety Plan (SSHASP) referred to above has been designed for the methods presently contemplated by CB&I for the execution of the proposed work. Therefore, this SSHASP may not be appropriate if the work is not performed by or using the methods presently contemplated by CB&I. Therefore, CB&I only makes representations or warranties as to the adequacy of the SSHASP for currently anticipated activities and conditions.

SUBCONTRACTOR PRE-JOB SAFETY CHECKLIST

JOB: SUBCONTRACTOR:

LOCATION: PROJECT NO.

		Yes	No
1.	Standard emergency signals fully understood?	☐	☐
2.	Subcontractor responsibility in time of emergency understood?	☐	☐
3.	Fire and ambulance telephone numbers known?	☐	☐
4.	Areas for possible evacuation designated?	☐	☐
5.	Special safety rules for the plant or area known?	☐	☐
6.	(CB&I will provide printed special rules where available)		
7.	Nature of Chemical or special hazards for area reviewed with safety officer?	☐	☐
8.	Special safety equipment for the area of job known?	☐	☐
9.	Safety shower and eye wash locations known?	☐	☐
10.	Smoking area designated?	☐	☐
11.	Have you been advised of potential hazards, protective		
12.	Measures and availability of hazard information? e.g. Health & Safety Plan	☐	☐
13.	Do you understand you are required to provide your employees with the information in (10) above?	☐	☐
14.	Have you provided MSDSs to CB&I for any hazardous material you intend to bring on site?	☐	☐
15.	Have you submitted training/medical certification records?	☐	☐
16.	Are your subcontractors aware of the above rules?	☐	☐

Remarks: (Explain all No Answers)

_____

_____

_____

_____ _____

Subcontractor's Supervisor Date

_____ _____

Project Manager Date

_____ _____

Project Supervisor Date

_____ _____

Safety Officer Date

VISITOR'S LOG

Date: _____ Client:

Location: Job No.: _____

Name	Representing	Time In	Time Out	Do You Have an Incident to Report Today?	
				YES	NO

EXCLUSION ZONE ENTRY LOG

Date: _____ Client: _____

Location: _____ Job No.: _____

Name	Time In	Time Out	Time In	Time Out	Time In	Time Out	Level of Protection

RESPIRATOR TRAINING
AND FIT TEST RECORD

Employee Name:_____ Date:_____
(Last, First, MI)

Craft or job title: _____ SSN:_____ BADGE #:_____

Project name: _____ Project #: _____

I received basic respirator training consisting of the following elements:

- The reasons for requiring respiratory protection.
- The nature, extent, and effects of respiratory hazards to which I may be exposed.
- An explanation of why engineering controls are not being applied or are not adequate and of what effort is being made to reduce or eliminate the need for respirators.
- An explanation of why a particular type of respirator has been selected for a specific respiratory hazard.
- An explanation of the operation, and the capabilities and limitations, of the respirator selected.
- Instruction in inspecting, donning, checking the fit of, and wearing the respirator.
- An opportunity to handle the respirator, learn how to don and wear it properly, check its seals, and wear it in a safe atmosphere.
- An explanation of how to maintain and store the respirator.
- Instructions in how to recognize and cope with emergency situations.
- Instructions as needed for special respirator use.
- Regulations concerning respirator use.

I was also given the opportunity to wear the respirator described below in a test atmosphere in order to test the fit of the respirator.

Brand:_____ Model:_____ Size:_____

☐ Half Mask ☐ Full Face ☐ Air Purifying ☐ PAPR
☐ Escape ☐ Airline ☐ SCBA

Fit Test Results - Qualitative Parameter

Positive/Negative	☐ Pass	☐ Fail	Isoamyl acetate	☐ Pass	☐ Fail
Irritant Smoke	☐ Pass	☐ Fail	Saccharin solution	☐ Pass	☐ Fail
Quantitative Fit Factor:_____				☐ Pass	☐ Fail

Person administering test:

_____ **Date:**_____

Employee acknowledgement of training and fit test:

_____ **Date:**_____

EQUIPMENT I.D. No.: EQUIPMENT TYPE: WEEK ENDING:

HEAVY EQUIPMENT INSPECTION CHECKLIST							
ITEM INSPECTED	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Falling Object Protective Structure (FOP)							
Roll-over Protective Structure (ROP)							
Seat Belts/Bar(s)							
Side Shields, Screens or Cab (Condition)							
Grab Handles/Steps							
Back-up Alarm Functional?							
Lights Functional? (i.e. Parking, brake, Signal's)							
Guards in place?(i.e. Covers, screen, mud flaps)							
Horn Functional?							
Anti-Skid Tread Steps Clear of Mud?							
Safety Signs (i.e. Counter balance swing area)							
Fire Extinguisher On Board?							
Oil full / no signs of any leaks?							
Clear of Extra Materials							
Controls function properly?							
Hydraulic System (full and no leaks)							
Parking Brake Functional?							
Lift Arm and Bucket Functional?							
Tires/Tracks Clean / in good condition?							
Steering Functional?							
OTHER: Trailer, Container, Roll off							
General Condition: Empty/clean?							
Type of Trailer (i.e. Tanker , Container ,other)							
Spill supplies on board?							
PPE adequate for driver?(i.e. Hard hat, glasses)							
Equipment Hours							
Employee's Initial's and Employee No.							

Instructions: Inspect all applicable items indicated, each shift. If an unsatisfactory condition is observed, suspend operation of the equipment and report the unsatisfactory condition to the site supervisor immediately.

COMMENTS: _____

REVIEWED BY: SUPERVISOR'S SIGNATURE: _____ DATE: _____

LOCK OUT LOG

LOCK/KEY NUMBER	EMPLOYEE NAME	CRAFT	HOME TELEPHONE NO.	SUPERVISOR NAME	LOCATION TAG/LOCKED OUT	DATE TAG/LOCKED OUT	DATE TAG/LOCK REMOVED

PERSONAL PROTECTIVE EQUIPMENT TRAINING RECORD

Instructor	Date	Time
Project Name	**Project #**	**Location**

PPE Training (check type)

☐ Hard Hats	☐ Body Harnesses/Lanyards	☐ Face Shields/Monogoggles	☐ FRC
☐ Safety Glasses	☐ 100% Fall Protection	☐ Welding Hood/Burning Goggles	☐ SCBA
☐ Gloves	☐ Steel Toe Shoes	☐ Respirator	☐ Other

_____

Description of Course_____

Print Name	Signature	Emp. I.D. #	Job Title	Company	Pass (P) / Fail (F)

REAL TIME AEROSOL MONITORING LOG

Project Name_____ Project No._____
Date_____

Sampled By	Instrument Type (Mfg./Model/ Serial No.)	Battery Charged (Y/N)	Zeroed (Y/N)	Sample Time		Sample Readings (mg/m^3)			Comments
				Start	Finish	TWA	Shift Average	Direct	

General Weather Conditions:_____
_____

WORK WARMUP SCHEDULE FOR 4 HOURS WORK SHIFT

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
1.-26° to -28°	-15° to -19°	(Norm. Breaks)	1	(Norm. Breaks)	1	75 min	2	55 min	3	40 min	4
2.-29° to -31°	-20° to -24°	(Norm. Breaks)	1	75 min	2	55 min	3	40 min	4	30 min	5
3.-32°to -34°	-25°to -29°	75 min	2	55 min	3	40 min	4	30 min	5	**Non-emergency work should cease**	
4.-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	**Non-emergency work should cease**		**Non-emergency work should cease**	
5.-38° to -39°	-35° to -39°	40 min	4	30 min	5	**Non-emergency work should cease**		**Non-emergency work should cease**		**Non-emergency work should cease**	
6.-40° to -42°	-40° to -44°	30 min	5	**Non-emergency work should cease**		**Non-emergency work should cease**		**Non-emergency work should cease**		**Non-emergency work should cease**	
7.-43° & below	-45° & below	**Non-emergency work should cease**		**Non-emergency work should cease**		**Non-emergency work should cease**		**Non-emergency work should cease**		**Non-emergency work should cease**	

1. Schedule applies to moderate to heavy work activity with warm-up breaks of ten (10) minutes in a warm location. For light-to-moderate work (limited physical movement), apply the schedule one step lower. For example, at -30 F with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
2. The following is suggested as a guide for estimating wind velocity. If accurate information is not available:
3. 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.
4. If only the Wind-chill Factor is available, a rough rule of thumb for applying it, rather than the temperature and wind velocity factors given above, would be: 1) special warm-up breaks should be initiated at a wind chill of about 1,750 $W/m^2/hr$; 2) all non-emergency work should have ceased at or before a wind chill of 2,250 $W/m^2/hr$. In general, the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the absolute temperatures in the colder ranges, since windy conditions rarely prevail at extremely low temperatures.

* From Occupational Health & Safety Division, Saskatchewan Dept. of Labor

SAFETY INSPECTION FOR LADDERS - MONTHLY

REGULATION: All ladders shall be maintained in good condition at all times. The use of ladders with broken or missing rungs or steps; broken or split side-rails or other faulty or defective construction are prohibited. When ladders with defects are detected, they shall be immediately withdrawn from service. Compliance with these regulations is required by Occupational Safety and Health regulations for Construction Part 1926 Subpart X.

INSTRUCTION: All ladders shall be inspected monthly. Those that are discovered to have a defect shall be tagged "UNSAFE DO NOT USE" and removed from the work area for repair or destruction. Those that are in good condition shall be color coded with the safety color codes of the month (see CMS-710-02-FM-00502 Monthly Color Code). Durable color code material (i.e. colored tape, colored tie-wraps, etc.) shall be placed (one wrap) on the right side rail between the third and fourth rungs or steps. The effective date for color codes shall be the first work day of each month. Complete this inspection form by placing a check under "OK" if the ladder meets requirements of the regulation or a check under "NO" if the ladder is defective and removed from service. Ladders must have an I.D. number.

COLOR CODE FOR THE MONTH: _____ INSPECTION BY: _____ DATE: _____

PURCHASED & JOB BUILT LADDERS															CB&I DESIGNED LADDERS											
TYPE OR DESCRIPTION	STEP LADDER		SINGLE LADDER		EXTENSION LADDER		SECTIONAL LADDER		TRESTLE LADDER		EXTENSION TRESTLE		JOB MADE LADDER		VERT LADDER		HOOK LADDER		ERECTION LADDER		WELDER'S LADDER		FLEXIBLE LADDER		OTHERS	
I..D. NUMBER	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO	OK	NO

REAL TIME AIR MONITORING LOG

PROJECT NAME_____LOCATION_____ PROJECT O._____

Date	Analyst	Time	Instrument (Mfg./Model/ Serial No.)	Concentration (Units)	Location/Activity/Comments

COMBUSTIBLE GAS/OXYGEN METER CALIBRATION LOG

Project Name _____Project No. _____

Date _____Calibrated by _____

Instrument: Mfg./Model/Serial No. _____

Time	Battery Charged (Y/N)	Audible Alarm Check (Y/N)		Zero Checked (Y/N)		Calibration Standard	Calibration Standard (%)		Actual Meter Reading (%)		Ambient Air Re-zero Check	
		LEL	O_2	LEL (0%)	O_2 (20.8%)		LEL	O_2	LEL	O_2	LEL (0%)	O_2 (20.8%)

Comments _____

EXCAVATION PERMIT

Date: _____ Time: _____ Expiration Date: _____

Job description/location/work order number (Be specific.)

_____

_____

Have the individuals assigned to this task been trained in excavation safety? ☐ Yes ☐ No

Before Trenching and Excavating

☐ Soil Classification _____ Distance in feet to utilities, buildings, footings, or pilings

☐ Type C _____ Distance in feet to sources of vibrations

☐ Type B ☐ Yes ☐ No Have the owners of utilities been notified, if applicable?

☐ Type A ☐ Yes ☐ No Has the ground been disturbed previously?

☐ Stable _____ List the allowable slope.

Indicate if the items below are: necessary, adequate, and/or available.	Necessary	Adequate	Available
personal protective equipment (be specific)	_____	_____	_____
shoring material	_____	_____	_____
signs, barricades	_____	_____	_____
machinery	_____	_____	_____

Check known obstructions: ☐ electrical ☐ telephone ☐ water ☐ sewer ☐ steam

☐ alarm ☐ drain ☐ process ☐ footings ☐ pilings

☐ concrete encasement ☐ other (specify) _____

Excavation method: ☐ **Backhoe** ☐ **Hand dig** ☐ **Ditchwitch** ☐ **Other (specify):** _____

_____

Precautions to be taken: ☐ **de-energize lines** ☐ **ground tools** ☐ **insulate operator**

Trenching and Excavating Checklist

Size of the excavation: Depth _____ Width _____ Length _____ Protective system used for excavation:

Are ground conditions changing (particularly after rainfall)? ☐ Yes ☐ No ☐ Sloping

Is there a concern for the development of a hazardous atmosphere? ☐ Yes ☐No ☐ Shoring

Ensure that the shoring and/or sloping remains adequate as excavation progresses. Indicate the shoring method used and applicable appendix.

What method shall be used for entry and exit: ☐ stairway ☐ ladder ☐ ramp [ ] App. C - Timber shoring

Has there been a change in vehicular and machinery operation patterns? _____ [ ] App. E-Alternative to timber shore

Is water removal equipment needed _____ available _____ and operable_____ [ ] App. F-Selection of protect system

Are portable trench boxes or trench shields adequate? ☐ Yes ☐ No [ ] Pre-designed shoring

Note: Protection for excavations greater than 20 feet deep (shoring, benching, and sloping designs) shall be developed by a registered professional engineer.

Signatures and Dates

	Excavation Competent Person	**Client Representative (if applicable)**	**CB&I Supervisor**	**CB&I HSSE Professional**	**Registered Professional Engineer (if applicable)**
Signature					
Date					
	Electrical Superintendent	**Pipe Superintendent**	**Equipment Superintendent**	**Field Engineer**	**Other:** _____
Signature					
Date					

Permit to Work

Date: _____ Time: _____ ☐ AM ☐ PM

Permit issued to: _____

Location: _____

Job description: _____

Permit duration: ☐ 4 hours ☐ 8 hours ☐ 10 hours ☐ Other _____ hours

COLD WORK ONLY	HOT WORK
☐ Hand tools only	☐ Open flame - welding, burning, grinding, etc.
☐ Air tools	☐ Electric tools
☐ Survey only	☐ Vehicle, mobile equipment

Gas test required: ☐ Yes ☐ No If yes, items directly below must be completed

Gas tested by: _____ Time: _____ ☐ AM ☐ PM

LEL reading: _____ Oxygen reading: _____ %

Additional requirements or testing: _____

_____

Personal Protective Equipment and Other requirements

☐ Gloves/type _____	☐ Chemical protective clothing
☐ Respirator/type _____	☐ Burning goggles - cutting operations
☐ Hard hat & Safety glasses	☐ Fresh air equipment - SCBA
☐ Face shield	☐ Radio - communication
☐ Full body harness	☐ Fire extinguisher

☐ Other: _____

Keep all areas clean and remove all trash, tools, and equipment at end of shift or after completion of that task.

Permits must be turned in at end of day or after completion of task (which ever is first).

Only items specifically marked on this form are permitted. Anything else will require an additional work permit.

Number of employees working on job: _____

_____	_____	_____
Signature - Permit Acceptor	Signature - Safety Department	Signature - Start Up Manager

Permit to Work Permit Procedures

Before gas enters the plant, a safety meeting with everyone on site will be held to explain the dangers as well as these permit procedures that must be followed. As soon as gas (flammable or non-flammable) is in the plant, this work permit system will take effect. A work permit (see attached) must be completed for every construction work activity on site. In order to receive a permit, go to the control room and contact the safety supervisor or start up manager. The permit has a duplicate and the duplicate should be turned in to the control room at the end of the day or when the work is completed (which ever is first).

Before any construction work activities start, there must be a valid work permit. These work permits must be issued for all construction work activities which includes hot work as well as cold work. The permit may require gas testing and this will be performed and monitored by the safety department. The permit must be filled out fully and signed by the permit acceptor, the safety department, and the start up manager. Unless all of these constraints marked on the permit are followed, the work permit is not valid. If anything other than what is written and checked on the work permit is needed, a new work permit must be issued designating the changes. All site activities are to be coordinated through the start up manager. The start up manager or safety supervisor may revoke work permits at any time if there is a change in the system which creates a hazard in the area of the work being performed.

Safe Work Permit Form

Job Name:	Job Number:	Company:	Non-permit?	❑ YES	❑ NO
			Permit #:		

Entry Supervisor or Person Requesting Permit:

Location & Description of Confined Space:	
Purpose of Entry:	
Craft or Crafts doing work in confined space:	

Permit Begins: Date: _____ Time: _____ AM/PM **Permit Expires:** Date: _____ Time: _____ AM/PM

METHOD OF COMMUNICATION Describe:

Equipment Required For Entry

Hard Hats	YES	NO
Coveralls	YES	NO
Boots	YES	NO
Safety Glasses	YES	NO
Safety Goggles	YES	NO
Face Shield	YES	NO
Ear Protection	YES	NO
Encapsulated Suit	YES	NO
Gloves	YES	NO
TYPE:_____		
Lighting	YES	NO
TYPE:_____		
Lockout Devices	YES	NO
Ventilation (mechanical)	YES	NO
Warning Lights	YES	NO
Fire Extinguisher	YES	NO
Ventilation/Blower	YES	NO
Non-sparking Tools	YES	NO
Rescue equipment	YES	NO
Other:_____	YES	NO
Other:_____	YES	NO
Special Instructions	YES	NO
List:		

Respirators Required For Entry

ARE RESPIRATORS REQUIRED? YES NO

If YES What Type: _____

Have Employees Been Trained/Fit Tested/ Med. Evaluation? **YES NO**

Air-Purifying: Half-Mask: _____ Full-Face: _____

Type of Filters: _____

Air-Supplied: _____and/or _____and/or _____

Air Bottles Compressor Egress Bottles

SELF-CONTAINED BREATHING APPARATUS (SCBA): _____

*** NOTE: Air-supplied respirators with egress bottles or SCBA respirators are required for atmospheres that are Immediately Dangerous To Life or Health (IDLH)**

List any special:

1. Entry Conditions:
2. Training Required:
3. MSDS reviewed:
4. Chemicals in the area:

Rescue Equipment required For Entry

SCBA	YES	NO
Harness/Lifeline	YES	NO
Wristlets	*YES*	NO
Tripod/Manlift	YES	NO
Winch	YES	NO
First-Aid Kit	YES	NO
Stretcher	YES	NO
Other:		

Emergency Services:

_____

Identify

_____

Method of Communication

_____

Phone Number

Acceptable Entry Conditions

Oxygen: **19.5 - 23.5%**	Flammables/Combustibles **Below 10% LEL**	Other:
Hydrogen Sulfide **0-10 PPM TLV-TWA**	Carbon Monoxide: **0 – 10 PPM TLV-TWA**	Other:

Testing and Monitoring Checklist

Make, Model & Serial # of testing Equipment:

Date Equipment Calibrated:				Intermittent Testing			Continuous Monitoring		
	Test 1	**Test 2**	**Test 3**	**Test 4**	**Test 5**	**Test 6**	**Test 7**	**Test 8**	**Test 9**
Date:									
Time:									
Oxygen	%	%	%	%	%	%	%	%	%
LEL	%	%	%	%	%	%	%	%	%
CO	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
H2S	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Toxic:									
_____									
_____									
Tester Initials:									

Hot Work Permit

Is Hot Work Permit Required? **YES NO** If **YES**, Is it attached to this Permit? **YES NO**

Signature of Person Authorizing Entry: **Date:** **Time:**

Cancellation of Permit

Signature Of Person Cancelling Permit: _____ **Date:** _____ **Time:** _____

Reason _____

Permit was Cancelled:

CBI	**Contract No.** **Installing Primary Blinds/Blanks**	REV #: _____ Date: _____
COMPANY/ORGANIZATION:	Supervisor:	Completed by:
	Plant/Location:	Approved by:

Construction Supervisor to check items required for specific project.
Are Blank(s) to be used? Yes ☐ No ☐ ; If yes, Construction Manager approval required.
Written detailed HSSE procedures and instructions must be issued to the jobsite supervision that address these minimum requirements. Refer to MSDS for the particular products in the lines/tanks for additional hazards and PPE requirements beyond the standard. Primary blinding and blanking includes blinding lines at a valve holding product or product residue. A review of CMS-710-02-PR-01500 Isolation of Structures and Pipelines required before performing this task.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	REQUIRED ACTION OR PRECAUTION
1. Obtain the proper permit to install blinds/blanks.	Open a line that is in service.	Obtain "Initial Opening Permit" and a "Safe Work Permit". Emergency evacuation, assembly points, eyewash and showers are to be noted on permit. Review permits with crew. (Cust. & CB&I)
2. Ensure all electric motor operated valves, mixers, gauges, valves and cathodic protection are shut off, locked out and tagged out.	Fire/explosion/toxic release. Emergency evacuation. Product in eyes or on body.	Refer to CMS-710-02-PR-01500 (Control of Hazardous Energy) (Customer & CB&I)
3. Ensure tank is grounded	Static spark	Proper ground
4. Identify the product within the equipment/pipelines and identify gasket material. 4A Checking insulation for Asbestos containing material.	Hazardous material exposure.	Review the appropriate JSA and MSDS with the crew. If gasket material is asbestos containing, follow the JSA for removal procedures using properly trained personnel. (See CMS-710-01-PR-02500). Customer to remove asbestos containing insulation.

5. Wear the proper personal protective equipment per JSA or MSDS.	Fire and/or explosion	Select the appropriate PPE for the crew. Examples of protection listed below: (Check equipment to be used for this contract or vessel.) ☐ Level "A" – Highest garment, respiratory & eye/face protection (Hydrofluoric acid, benzene, etc.). • Full-face respirator – offers eye & face protection. ☐ Full face SCBA or airline – good for benzene, biphenyl, hydrofluoric acid, etc. at unknown concentrations (airline with escape bottle used in possible IDLH atmosphere). This is a precaution to be taken for certain products that have a low TLV and possible IDLH exposure. This is not a blanket approval for IDLH atmosphere work. **CB&I standard is to work only up to one-third IDLH.** ☐ Full-face respirator – protection for most organic vapors/acid gases (to 50 X TLV). • Chemical suit • Steel-toed rubber boots – good chemical (not all products) and good impact protection. • Chemical gloves – resist specific chemicals, may stop cuts.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION OR PROCEDURE
		☐ Level "B" – Highest respiratory protection & splash protection (Caustic, toluene, etc.) • Full-face respirator – offers eye & face protection. ☐ Full face SCBA or airline – good for benzene, biphenyl, hydrofluoric acid, etc. at unknown concentrations (airline with escape bottle used in possible IDLH atmosphere). This is a precaution to be taken for certain products that have a low TLV and possible IDLH exposure. This is not a blanket approval for IDLH atmosphere work. **CB&I standard is to work only up to one-third IDLH.** ☐ Full-face respirator – protection for most organic vapors/acid gases (to 50 X TLV). • Chemical suit • Steel toed boots – some chemical and impact protection • Chemical gloves – resist specific chemicals, may stop cuts. ☐ Level "C" – Good respiratory & splash protection (catalyst, gasoline, diesel, etc.). • Eye & face protection. ☐ Vapor goggles – protects eye from vapors and splash. ☐ Splash goggles – protects eye from splash and offers no vapor protection for eyes. ☐ Minimum requirement is face shield with safety glasses – protects face from direct splash and has no vapor protection • Respiratory protection. ☐ Full-face respirator – protection for most organic vapors/acid gases (to 50 X TLV). ☐ Minimum requirement is half mask respirator – for dust, vapors and acid gas (for levels up to 10 X TLV). • Rain suit • Leather boots • Leather gloves **(Level "C" is the minimum level PPE required for all CBI Blinding/Blanking).** ☐ Level "D" – General work clothes without respiratory protection.
6. Monitor area for % O_2 and % LFL. Monitor area for toxics if applicable.	Fire / explosion or toxic release in work area.	Use O_2/LFL meter to monitor area. Bump test meter daily. Check for other applicable toxic substances with appropriate sensing device (Drager tube etc.). Secure work and evacuate area if LFL exceeds plan, PPE equipment capabilities, or O_2 level goes below 19.5%.
7. Secure the work area and begin to fill out blinding/blanking checklist. (Checklist will be done through out the blinding/blanking job). **A full time HSSE Supervisor is required from this step to the end of the procedure.**	1. Exposure to workers without proper PPE 2. Spark producing equipment brought into the blinding area causing fire or explosion.	Examine the surroundings for additional hazards: Insure all spark producing work has stopped, 100 ft (30m) minimum up wind and 200 ft (60m) minimum down wind (including internal combustion engines). ❖ Diesel vacuum trucks are the only exception to the distance and must be kept at least 50' (15m) back and must be grounded. A 20 BC rated fire extinguisher shall be placed no more than 25 ft (7.5m) from the equipment to be blinded/blanked. Install barricades where needed (at approx. 50 ft (15m) from work area) and remove all non-essential personnel from the area. (CB&I & Customer)

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION OR PROCEDURE
8. Identify and inspect the blinds/blanks to be installed.	Blinds/blanks not full pressure.	Blinds/blanks must be full pressure and inspected prior to installation by a CBI Representative. Blinds/blanks must be free from cracks, corrosion, holes & defects.
9. Identify the lines and/or tank/vessel to be blinded/blanked. Then close (by customer), lock and tag valves up and down stream of blind/blank location.	Chemical release, fire or explosion. Wrong line/ chemical exposure.	Trace the lines to be blinded/blanked, block valves up stream and locate bleeder valves. Valves to be chained and locked/tagged closed with CB&I and Customer locks. Be sure bleed valves are open (rod out). Identify the condition of the equipment (cleaned, steamed out?). (CB&I & Customer)
10. Provide spill containment.	Product spillage.	Position a metal half barrel or metal splash pan under the flange & use a vacuum truck to clean product leakage. Vacuum truck's hose must be bonded to metal splash pan or half barrel. Like wise, the splash pan or half barrel must be bonded to the tank. Customer to provide disposal of residual product. Truck should be diesel engine. (CB&I & Customer)
11. Obtain the proper wrenches. No crescent or adjustable wrenches.	Tool slippage, hand injury or spark.	Use proper size box end wrenches or socket ratchets and wear appropriate gloves. **(Non-sparking tools may be required by customer).**
12. **HSSE** Supervisor to review the Red Sheet, Safety Plan and blinding/blanking checklist with the crew.	Miscommunication with crew.	The crew and the HSSE Supervisor to fill out blinding/blanking check list together.
13. Check bolts to ensure they are long enough to fit across flanges and the blank being installed and that they are the right bolts for the service. Remove old bolts one at a time and replace and retighten with new bolts as required. This will make it easier to remove bolts when flange is ready to be opened.	Bolt or thread failure/hand injury. Damaged threads hard to work with. Bolt failure could cause the flange connection to fail during reintroduction of product or during normal operation.	Inspect the bolts and ensure they are the proper size for the flange and keep hands in sight. Pull on box end wrench or ratchet with socket instead of pushing on it. Have a firm stance and good personal position. Use leg and arm muscles as much as possible, not the back. Do not use a cheater. Get a bigger wrench or ratchet if needed. If using a knock wrench, must use a knock wrench holder. Start at the bottom of the flange and remove one old bolt and replace with good or a new bolt (tighten completely) one at a time. Continue this procedure until all the old bolts have been checked or replaced. Work the side away from yourself first.
14. Electrically bond the flanges before breaking them apart or dropping a valve.	Static electric spark caused fire or explosion.	Bond across the flanges to prevent interruption of stray current, which might ignite flammables.
15. Drop valve and/or install the blind/blank. CB&I prefers the tank / vessel / pipeline to be completely isolated from the adjacent pipeline. Isolated means there is a space created by dropping a valve or spool piece and installing a blind on the open end of the pipe with the nozzle on the tank/vessel left open for additional ventilation. If the valve is to be left on, the blank should go between the valve and the tank/vessel nozzle flange	Residual pressure or product in the line spraying onto employees. Explosion, Product leakage shifting piping or equipment. Working in an atmosphere with LFL greater than 10% LFL or O_2 level less than 19.5 or greater than 22.5%.	Wear appropriate PPE based on chemical JSA. Loosen the bolts on the flange(s), one turn at a time, starting at the bottom and work to the top so any residual product or pressure will leak out the bottom of the flange away from the workers. By loosening the bolt with out removing them, you'll ensure there is not any spring in the line. Remove the bolts from the flange to install the blind/blank. Use a flange spreader or brass wedges to separate the flanges. If dropping valve, support it properly so it does not fall and have appropriate lifting equipment available. Remove the old gaskets (if asbestos, see asbestos CMS-710-01-PR-02500). Clean the flange face (use gasket remover, if needed, to remove gasket material). Continually check work area near flanges for an atmosphere greater than 10% LFL. If 11% LFL is reached, all work must stop and evacuate area. If O_2 below 19.5% or above 22.5%, all work must stop and evacuate area. Install full pressure blind/blank in the flange with a new gasket(s) (on both sides when installing blanks).
16. Tighten the bolts.	Bolts not tightened properly. If wrench slips, hand/back injury/etc.	Install and hand tighten one bolt in each quarter of the flange and then install remaining bolts. Bolts should be installed hand tight then tightened in a criss-cross pattern. Use correct wrench/socket, keep back straight, keep hands in sight, pull wrench do not push it. Ensure that bolts are tightened to the proper torque value.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION OR PROCEDURE
17. Dispose of any product in the splash pan, rags, etc. and clean up area.	Improper disposal of waste product, fire, etc.	Customer to provide a vacuum truck to dispose of waste product. Vacuum truck must be at least 50 (15m) away from blinding task, and the truck's hose must be bonded to the catch pan. (Customer to supply truck)

	Hotwork / Coldwork Adjacent to Live Pipelines	**Adjacent Pipelines Less than 15 FT (5m)**
Written detailed HSE procedures and instructions must be issued to the jobsite supervision that address these minimum requirements. Refer to MSDS for the particular products in the lines/tanks for additional hazards and PPE requirements beyond the standard.		

WORK CONDITIONS	POTENTIAL HAZARDS	REQUIRED ACTION OR PRECAUTION (when work is Outside the Guidelines)
Hotwork when live pipelines are closer than 15' (5m) of the work area. (excluding adjacent product being fresh/potable water)	Fire/explosion from vapor/gas release from adjacent pipeline contacting ignition source. Toxic gas/vapor release from adjacent pipeline. Material or equipment damaging pipeline and causing a leak. Release from uncontrolled Pressure Relief Valves (vacuum and pressure)	1. Barricade work area such that equipment and material is kept 10 ft (3m) min. from operating pipeline. 2. In addition, monitor the potential spill area by a physical observer checking any pipeline flanged connections within 100 ft. (30m) once an hour. Full time air monitoring in the work area for oxygen, LFL, and applicable toxic substances is to be conducted by the fire watch at their work stations. 3. Spark containment is required for hot work within a piperack. 4. Adjacent pipelines closer than 5 ft. (1.5m) to a hot work area to be covered with fire proof blanket or similar non-flammable material to protect from arc strikes from accidental contact. 5. Do not lay welding leads or grounds across any live pipe lines. Welding leads shall be free of any repairs, where near live lines. 6. Wrap flanges within 50 feet (15m) of hot work or engine driven equipment with a fire retardent material (fire blanket or silicone impregnated fiberglass) to prevent spraying product into the air if a gasket blows. 7. CB&I is to have an immediate means of two way contact with the control room to warn CB&I of any upsets within the system. 8. Fulltime fire watch with applicable equipment is required. 9. If feasible, engine/electrical driven equipment should be kept more than 15 ft. (5m) from live pipelines. If equipment is closer than 15 ft. (5m), spark arresters must be installed on engine driven equipment. 10. Confirm with operations that all pressure relief valves within 300 ft. (90m) are controlled (monitored by customer and maintained at 85% or less of venting pressure) and are not locked open.
	LFL > 1%, product spill or upset in the system.	Stop all work and evacuate area using prearranged evacuation and equipment shut down procedure.
Cold work when live pipelines are closer than 15' (5m) of the work area. (excluding adjacent product being fresh/potable water)	Toxic gas/vapor release from adjacent pipeline. Material or equipment damaging pipeline and causing a leak.	Monitor the potential spill area by: 1. Physically observing any pipeline flanged connections within 100 ft. (30m) once an hour. 2. Full time air monitoring in the work area for oxygen. LFL, and any applicable toxic substances is to be conducted by the confined space attendant or

		fire watch at their workstations. 3. An immediate means of two way contact with the control room to tell CB&I of any upsets in the system.
	LFL > 1%, product spill or upset in the system.	Stop all work and evacuate area using prearranged evacuation and equipment shut down procedure.

Site HS Inspection Form

Project Location _____ ***Type of Project*** _____ ***Contract No.*** _____

Date _____ Your Name _____ Supt._____

	Safe	At Risk	N/A	I/H
1.0 GENERAL				
1.1 All employees receive video HSE orientation and trained in PIP?				
1.2 Safety Rule Book distributed with a sign off sheet retained as evidence of training?				
1.3 HSE meetings held with supervisor and subcontractors every two weeks?				
1.4 HSE meetings held each week with work crews?				
1.5 Minutes of jobsite safety meetings recorded and kept at jobsite?				
1.6 Competent contractor personnel assigned responsibility to inspect jobsite for safety?				
1.7 Government (OSHA) sign posted? Form 300 up-to-date?				
1.8 Safety bulletins, accident prevention material, safety rules posted?				
1.9 Weekly safety inspection reports by subcontractor personnel prepared and kept at jobsite?				
1.10 Minimum two certified First Aid/CPR personnel per shift?				
1.11 Managing an Incident Poster complete and posted?				
1.12 Approved and stocked First Aid Kit on jobsite?				
1.13 Good housekeeping maintained? (all)				
1.14 Employees informed on access to med. & exposure records?				
1.15 Provisions made for vessel to vent during off work hours?				
1.16 Precautions taken to protect customer's property, employees, and visitors from paint spray & abrasive blasting materials?				
1.18 Employees informed of any special site or customer HSE requirements?				
1.19 Subcontractors aware of Employer responsibilities? Complying with CBI				
2.11 Are burning goggles/face shields available & used?				
2.12 Are approved safety harnesses used where required?				
2.13 Approved lanyard connected at waist level or above to approved anchorage?				
2.14 Wire rope, independent lifelines used for each employee on suspended scaffold, painter's boom, air buggy and boatswains chairs?				
2.15 Supplied air helmet or hood used by all operators when abrasive blasting?				
2.16 Preventive injections provided for workers around raw sewage?				
2.17 Airline filtering devices functioning properly? Carbon monoxide monitor installed after filter? Set at 10 PPM? Alarm checked and meter bump checked daily with test gas?				
2.18 Protective skin cream provided and used by painters?				
3.0 HAZARD COMMUNICATION PROGRAM (OR RIGHT TO KNOW PROGRAM)				
3.1 Written program on site?				
3.2 Personnel trained and logged in?				
3.3 All material safety data sheets on site? (Current within 3 yrs.)				
3.4 Containers labeled (other than container that contents will be used up in one shift)?				
4.0 SANITATION / HEALTH / ENVIRONMENT				
4.1 Marked & labeled portable containers used to dispense drinking water?				
4.2 Single service cups used for drinking water, containers provided for new & used cups?				
4.3 Adequate number of toilet facilities provided & maintained?				
4.4 Special washing facilities provided for workers				

	Safe	At Risk	N/A	I/H
requirements?				
1.20 Protection over manways/doorsheets?				
1.21 JSA being used to plan new or hazardous jobs? Employees involved in process?				
1.22 Atmospheric monitoring performed where required? Documented?				
1.23 Vessels and/or pipelines isolated/blinded/blanked?				
1.24 Appropriate manuals and proper instructions on jobsite?				
1.25 Dangerous openings fenced or covered?				
1.26 Test water to come through clean lines?				
1.27 Employees informed of evacuation route?				
1.28 All noise areas posted?				
2.0 PERSONAL PROTECTION				
2.1 Hearing protection provided and worn by all where noise levels are excessive?				
2.2 Hard hats and safety glasses (with ANSI Z87 or equiv. side shields) provided for and worn by all?				
2.3 Appropriate work gloves worn by employees for their assigned work?				
2.4 Additional eye and face protection provided for and worn by all where exposed to potential eye or face injury?				
2.5 Adequate footwear worn by employees for their assigned work?				
2.6 Have respirator users received a medical evaluation? Fit-tested?				
2.7 Written Respiratory Protection Program on site?				
2.8 Are respirators, blast and paint hoods available and used?				
2.9 Fresh air respirators used for internal spray painting?				
2.10 Personnel trained in wearing and inspection of PPE? Is PPE being inspected?				
handling materials which may be harmful to their health?				
4.5 Illumination in work areas (including offices, shops) adequate?				
4.6 Is ventilation adequate?				
4.7 Means provided for waste/scrap removal?				
4.8 Waterless hand cleaner, etc. provided?				
5.0 FLAMMABLE MATERIALS				
5.1 In areas where flammables are stored or where operations present a fire hazard "NO Smoking or Open Flame" sign posted?				
5.2 Fuel containers posted?				
5.3 Indoor and outdoor storage of flammables in approved containers or cabinets with warning signs posted?				
5.4 Form, scrap lumber & all other debris including combustible scrap/debris removed from work areas at regular intervals?				
5.5 Containers provided for collection, separation of waste & trash?				
5.6 Solvent waste, oily rags & flammable liquids kept in fire resistant covered containers until removed from worksite?				
5.7 Required portable fire-fighting equipment available, properly located & maintained? Inspection tags up to date?				
5.8 Fuel operated equipment shut off for refueling & bonded to fuel tank?				
5.9 Are Safety Cans used for flammables?				
5.10 Fire extinguisher operational & available with 75' (23m) of each work area? Have monthly & annual inspection tag?				
5.11 Fire extinguishers available within 50' (15m) of each work area where flammable liquids are used/stored?				
5.12 Safety-shutdown on stoves & excess flow valves on pre-heater lines?				
5.13 Gas manifolds marked & capped?				

5.14 Stationary flammable containers grounded-bonded? Have spill containment?				
5.15 Combustibles kept 50' (15m) from welding areas?				
5.16 Fire extinguishers in cab of crane, hoist, etc.?				
5.17 Non-sparking fans used & bonded to tank for ventilation?				
5.18 Ventilation fans correctly sized for tank volume?				
5.19 Ventilation used to prevent flammable vapors exceeding 10% of LFL (Lower Flammable Limits)?				
5.20 Inside work stopped when flammable vapors exceed 10% LFL?				
5.21 Oxygen (O_2) level not less than 19.5% or greater than 22%?				
5.22 Flammable liquid containers clearly labeled/bonded during use?				
5.23 Paint spillage contained & cleaned up daily?				
5.24 Atmospheric monitoring for oxygen & LFL performed before entry into enclosed spaces? Proper forms completed before starting work & when painting? Tests taken at two-hour intervals, after lunch & monitored?				
6.0 AIR TOOLS OR EQUIPMENT				
6.1 Hand held powered tools (saws, air impact) equipped with guard & ONLY with constant pressure switch?				
6.2 Hand held powered tools (drills, tappers, fastener drivers, disc & belt sanders, power saws and angle grinders) provided with momentary contact "on-off" switch?				
6.3 Devices provided on air power tools to prevent tools from becoming accidentally disconnected from hose?				
6.4 Air hose connections secured? Wired or chained together?				
6.5 Air driven nailers operating at more than 100 psi provided with safety device on the muzzle to prevent nail ejection unless muzzle is in contact with work surface?				
6.6 Airless spray guns (operating at 1000 psi) equipped with safety preventing pulling of trigger until safety device is manually released?				
6.7 Excess flow valves in air lines greater than ½" (12.7mm) diameter?				
6.8 Blast pots tested & certified?				
6.9 Abrasive blasting equipment, hose, nozzles & dead men switch in safe condition? Static dissipating hose used or abrasive pot properly grounded?				
6.10 Air hoses inspected weekly?				
6.11 Airless spray equipment inspected weekly for safe condition? Static dissipating hose used or pump properly grounded?				
6.12 Is air for cleaning being used properly (30 psi max)?				
6.13 Is air receiver test & certified & equipped with pop-off safety valve & pressure gauge?				
6.14 Man ways free from cables & hoses?				
7.0 POWER TOOLS				
7.1 Power actuated tools provided with safety shield/guard & operator has evidence of special training in their use?				
7.2 Do electric portable power tools have grounding conductor or double-insulated?				
7.3 All fixed power woodworking tools provided with a disconnect switch that can be locked or tagged in the off position?				
7.4 Defective tools & equipment tagged as unsafe, or controls locked in off position, or physically removed from site?				
7.5 Correct tools provided & used?				
7.6 Abrasive wheels properly handled & stored?				
8.0 ELECTRICAL				
8.1 On power circuits, exposed or concealed where accidental contact by tools/equipment may be hazardous, warning sign shall be posted and all workers advised of hazard?				
8.2 Regular inspections made to assure effective grounding of noncurrent carrying metal parts of portable and/or plug connected equipment or GFCI's installed on all 110-120 V temporary circuits? MPS Log up to date?				
8.3 Temporary lights equipped with guards to prevent accidental contact with bulb?				
8.4 Receptacles, attachment plugs not interchangeable on circuits of different voltages, current ratings or type of current (AC or DC)?				
8.5 Electrical equipment properly grounded?				
8.6 Approved electrical equipment used where flammable vapors may develop?				
8.7 Electrical service lines greater than 220V elevated or buried?				
8.8 Transformers fenced off or elevated?				
8.9 All electrical power cords handled safely, grounded & in good repair?				
8.10 EPD's or ELCB's installed & working on 220V power sources?				
9.0 LADDERS				
9.1 Ladders regularly inspected properly constructed, in safe condition & destroyed when found defective?				
9.2 Side rails extended 3' (1m) above landing or provision of grab rails?				
9.3 Top of ladders tied to prevent displacement?				
9.4 Double cleat ladders provided for working area having 25 or more workers & two-way traffic is expected?				
9.5 Double cleat ladders not exceeding 24' (7.3m) in length?				
9.6 Single cleat ladders not exceeding 30' (9.1m) in length?				
9.7 Cleats inset into edges of side rails or filler blocks used?				
9.8 No metal ladders used within 15' (4.6m) of electrical lines?				
9.9 Stepladders used only in full open position?				
9.10 Stepladders of sufficient height so that top two steps do not have to be used to perform work?				
9.11 All manufactured single & extension ladders equipped with ladder shoes?				
9.12 Cable ladders properly secured to structure?				
9.13 Permanent ladders used for access have rest platforms every 24' (7.3m) with climb devices installed?				
10.0 SCAFFOLDING				
10.1 All open sides & ends of platforms more than 10' (3.05m) above ground or floor level, provided with top rails (42" high (1.06m), midrail & toe boards (4" high (101mm)? Area below scaffold barricaded?				
10.2 Where workers pass or work under scaffolds; screens or other overhead protection provided?				
10.3 Platform planks laid together tight preventing tools, etc. from falling though?				
10.4 Scaffold guyed or tied to structure every 26' (7.9m) vertically & 30' (9.1m) circumferentially?				
10.5 Scaffolding set plumb with adequate foundation bearing plates?				
10.6 Platform planks extend over end supports not less than 6" (152mm), nor more than 18" (457mm)?				
10.7 Planks secured to prevent dislodgment?				
10.8 Ladders used to gain access to scaffold work platforms?				
10.9 Stairways have handrails?				
10.10 Scaffold trap doors provided & used for access from underneath?				
10.11 Rest platform (or scaffold trap door) provided @ 35' (10.7m) intervals on tank erection ladder?				
10.12 Scaffolds erected properly and tagged?				
10.13 Scaffold boards' ends secure from splitting, tested & properly lapped?				
10.14 Brackets plumb, inspected & good condition? Bracket posts pinned?				
10.15 Tool pails used & secured from falling?				
10.16 Bracket straps welded by qualified welders, inspected & circled by qualified inspector?				
10.17 Handlines erected tight & clamped off?				
10.18 Handlines erected on top angle or wind girders?				
10.19 Third handlines installed where needed?				
10.20 Approved scaffolds used at shaft & column splices?				
10.21 Safety line system installed & used while erecting roof framing & roof plates?				

10.22 Tubular scaffold approved type (2" or 50.8 mm od.)?				
10.23 Tubular scaffold properly erected, braced & guyed with access ladders & toe boards?				
10.24 Suspended scaffolds, suspended work platforms & aerial lifts approved? Used correctly?				
10.25 Insulation link provided when welding from suspended platform or suspended scaffold?				
10.26 Are independent lifelines with correct cable grab device used on suspended work platforms & scaffolds (except when suspended from crane or derrick)?				
10.27 Correct cable grab used on cable ladders?				
10.28 Boatswain chair on job? Approved type?				
10.29 Powered single or double point suspended scaffold have "U.L." approved label & capacity chart?				
11.0 ROLLING SCAFFOLDS (Manually propelled)				
11.1 Wheel brakes set while in use?				
11.2 No riders on work platform while moving?				
11.3 Work level 6' (2m) or more above ground floor level have guard rails and toe boards?				
11.4 All cross & diagonal bracing in place & properly connected?				
11.5 Height does not exceed 4 times least base dimension unless outriggers are used?				
11.6 Ladder access to work platform?				
11.7 Are rolling scaffolds properly assembled, inspected & tagged?				
12.0 SWINGING SCAFFOLDS - 2 points Suspension				
12.1 Roof hooks or irons securely installed & anchored?				
12.2 Sheaves fit size of rope used?				
12.3 Equipped with standard guardrails & toe boards?				
12.4 Load limit marked on each scaffold?				
12.5 Suspension lines inspected before first use & frequently during use? (Record of inspection kept)?				
12.6 Each employee equipped with safety harness & shock absorbing lanyard & attached to life line?				
12.7 Lifeline attached at top to independent support & extending to ground level?				
12.8 Suspension lines capable of supporting six times rated load?				
12.9 Power cables for electric hoist machines secured to platform to prevent snagging between power supply joint & platform?				
13.0 FLOOR & WALL OPENINGS				
13.1 Wall openings 30" (762mm) H, 18" (467mm) W or greater from which there is a drop of 4' (1.2m)or more & bottom of opening less than 3' (1m) above working surface provided with guardrails?				
13.2 Bottom of wall openings less than 4" (102mm) above work surface provided with standard toe board 4" (102mm) high				
13.3 Open sided floors 6' (2m) or more above floor or ground level provided with standard railing & toe board or other equivalent perimeter protection?				
13.4 Stairways when used during construction have handrails on all open sides, guardrails at landings & filler blocks in all recessed treads?				
14.0 MATERIAL HANDLING EQUIPMENT				
14.1 Approved canopy guards on fork lift trucks & roll-over protection on all earth moving equipment?				
14.2 Rated capacity posted on all lifting, hoisting equipment clearly visible to the operator?				
14.3 Wire rope inspection within last 30 days?				
14.4 Where mobile cranes are regularly used, daily inspections made of critical items & records kept?				
14.5 Written tractor, crane, derrick, inspection within last 30 days?				
14.6 Hand signal chart posted?				
14.7 Qualified personnel operating equipment?				
15.0 CRANES - GENERAL				
15.1 Annual inspection made of crane hoisting machinery & record kept of dates & results?				

15.2 On tower cranes, daily inspection made of rigging?				
15.3 On tower cranes, weekly inspections made of supporting parts, safety appliances & record kept of repairs required?				
15.4 Where a crane is used – lift log being maintained?				
15.5 Adequate & safe working conditions?				
15.6 Derrick or crane in safe working condition? Operator certified?				
15.7 Capacity charts at operator's station?				
15.8 Written crane, derrick/wire rope inspection within last 30 days on site? Annual inspection for hoist & crane available?				
15.9 Tail-swing of crane barricaded when within 7' (2.1m) of grade?				
15.10 Signal person designated?				
15.11 No part of crane or load closer than 15' (4.6m) to energized electrical lines?				
16.0 EXCAVATIONS, TRENCHING & SHORING				
16.1 Excavated material effectively stored & retained at least 2' (.6m) or more from edge of excavations & trenches?				
16.2 Utility company contacted & advised of proposed excavation work to determine underground utility exposure or when overhead power lines are involved?				
16.3 Substantial stop logs or barricades installed when mobile equipment working adjacent to excavation?				
16.4 Trenches more than 5' (1.5m) in depth shored to standard, laid back to stable slopes or provided with other equivalent protection where hazard of moving ground exists?				
16.5 Trenches less than 5' (1.5m) protected where hazardous ground movement exists?				
16.6 Trenches in hard or compact soil shored to standard when depth is more than 5' (1.5m) & 8' (2.4) or more in length?				
16.7 In lieu of shoring in hard or compact soil, trench above the 5' (1.5m) level sloped (slope not steeper than a 1' (.3m) rise to each 1.5' (.45m) horizontal)?				
16.8 Trenches 4' (1.2m) deep or more provided with ladder located no more than 25' (7.6m) of lateral travel?				
17.0 WELDING, CUTTING, BURNING				
17.1 Proper PPE provided, in good condition & being used?				
17.2 All oxygen & fuel gas gauges in working condition?				
17.3 All oxygen & fuel gas hoses in good condition & free of grease & oil?				
17.4 Burning torch equipped with back flow prevention devices for both oxygen & fuel gas at the torch?				
17.5 Back flash arrestors on regulators used for flame cutting?				
17.6 Mechanical lighters used for lighting torches?				
17.7 Oxygen & fuel gas cylinders stored in upright position in designated areas with caps in place? Cylinders tied off? Oxygen stored 20' (6.1m) from fuel gas cylinders?				
17.8 Electric arc welding cables in good condition & properly attached by lugs to weld machine?				
17.9 Welder's shields & helper's goggles in good condition & equipped with proper lenses?				
17.10 Fire extinguishers provided within 25' (7.6m) of welding, cutting or burning operations?				
17.11 All welding cable positioned to eliminate tripping hazards?				
18.0 ROOFING				
18.1 Safety harness and life lines or catch platform?				
18.2 Roofing bracket scaffolds secured?				
18.3 Crawl or chicken ladders secured & evenly spaced cleats?				
Flat & Low Pitch Roofs Less than 4/1 Pitch?				
18.4 Warning line 6' (2m) from roof edge in work area?				
18.5 Safety harness & lines in use at perimeter or standard handrails or equivalent?				
18.6 Protective equipment used when handling hot pitch?				

18.7 Ladder access same as for pitch roofs?				
18.8 Materials stored 6' (2m) from edge?				
18.9 All openings covered or protected by guardrails?				
19.0 CONCRETE FORMING & POURING				
19.1 Vertical re-steel & anchor bolts protected by covering when employees working above?				
19.2 Employee wearing safety harness or equivalent when 6' (2m) or more adjacent work surface?				
19.3 Walk & standing boards provided when pouring horizontal surfaces on re-steel?				
19.4 Employees provided with & using PPE, while pouring concrete?				
19.5 No riding concrete buckets?				
19.6 All pump crete lines secured at all joints?				
19.7 Concrete trucks blocked when discharging on a slope?				
19.8 Shoring & re-shoring adequate for support?				
19.9 Properly guarded work platform for walls, columns, beams, etc.?				
19.10 Power troweling machines equipped with positive on/off switch?				
20.0 STEEL ERECTION				
20.1 Decking or safety nets 2 stories or no more than 30' (9.1m) where erection is being performed?				
20.2 Safety railing no less than 1/2" (13mm) wire rope 42" (1.07m) high around the perimeter of all temporary planked or metal docked floors? Minimum of 3 cable clips per interconnecting eye?				
21.0 DEMOLITION				
21.1 Dust controlled by wetting?				
21.2 Employees provided with dust respirators & goggles?				
21.3 Chutes properly erected & drop area barricaded off?				
21.4 Floor openings protected?				
21.5 Employee access to building provided with overhead protection?				
21.6 Stairways in building used for access properly lighted & maintained?				
22.0 RADIATION				
22.1 Radiation operators certified?				
22.2 Are film badges, dosimeters & alarm rate meters worn by all x-ray personnel?				
22.3 Survey meters used? Calibrated?				
22.4 Warning signs & lights installed?				
22.5 Radioactive source properly stored?				
22.6 Alarm rate meters worn where required?				
23.0 RIGGING				
23.1 Adequate equipment available to perform the job safely?				
23.2 Crosby cable clips used, properly installed, correct number, size & torque where required?				
23.3 All ropes, cables & hooks inspected daily before use & are in safe condition?				
23.4 2L43-D is used to hang internal painters rigging from center vent or manhole?				
23.5 Slings proper size, safe condition? Capacity marked?				
23.6 All hooks moused?				
23.7 Guy lines marked where needed?				
23.8 Plate clamps in safe working condition? Capacity marked? Correct inspection color?				
23.9 Plate spreaders marked with capacity & weight?				

REMARKS: (Were At Risk and Imminent Hazard conditions corrected?)

_____

_____

_____

_____

Original: Construction Office Site HS Signature: _____ Date _____

Copy: Site HS File

Copy: Construction Manager File Construction Manager Signature

_____ Date _____

PROJECT/FACILITY AGENDA

WEEKLY
HSE TRAINING MEETING MINUTES

SUPERINTENDENT: _____ **PROJECT/FACILITY** _____

HSE TRAINING MEETING AGENDA & TOPICS

DISCUSSION ITEMS FROM LAST WEEK'S INSPECTION:

PARTICIPANT SUGGESTIONS AND COMMENTS:

COMMENTS FROM TIE OBSERVATIONS, LEADING INDICATOR OBSERVATIONS, ENVIRONMENTAL, HEALTH AND/OR SAFETY QUESTIONS, CONCERNS OR RECOMMENDATIONS & ACTION TAKEN

HSE MTG./TRAINING MTG. MINUTES

NUMBER OF EMPLOYEES ACTIVELY PARTICIPATING IN MEETING:

VIDEOS/DEMONSTRATIONS, ETC. USED IN MEETING:

SIGNATURES:
ORIG: GENERAL FOREMAN -
ORIG: CONSTRUCTION HSE MGR. -
COPY: POST AT SITE

MEETING CONDUCTED BY:
DATE: TIME:

ATTENDANCE

	PRINT NAME HERE (Do not use nicknames)	SIGNATURE	I.D. NUMBER (Empl. # or last 4 digits of SS#)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Total Observations

Category							
Safe							
At Risk							
% Safe							

DAILY HSE INSPECTION FORM

DAILY HSE REPORT	DATE			**PAGE**	**OF**		
	Project Name:						
JSA No.	Project No.						
Area:	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**	**FRI**

Work Performed:

Safety Inspection Items (Corrective Action) Interface Problems

Comments/Recommendations

HSE Professional's Signature: _____ Date: _____

Construction Manager's Signature:_____ Date: _____

File in Site HS files

Appendix B

Job Safety Analysis / Activity Hazard Analysis

Step-back 5 X 5

1. *Step Though the Task*	Yes	No
Is the task new to you?		
Is there potential for uncontrolled movement of equipment?		
Is there restricted access to and around the work area?		
Has the job or job conditions changed from what was originally planned?		
Are there any injury hazards present for which you don't have the adequate controls? **If yes STOP and update the JSA before proceeding.**		
On the back of this card identify the hazards of this task and their controls. Has this step been completed?		
2. *Hazard Checklist*	**Yes**	**No**
Do you have and know the plan of action in case of an emergency?		
Have you read and do you understand the JSA?		
Are your tools and equipment in good condition and correct for the task?		
Have you read and do you understand the requirements of the Work Permits? (if not applicable mark NA)		
Can the task you are about to begin proceed safety? **If no STOP and contact your supervisor.**		
On completion have you left a hazard for those following you? **If yes STOP and contact your supervisor.**		
Review the job on an ongoing basis – stop work and reassess if conditions change.		

CMS-710-05-FM-01706 (Front) 30 JUN 2010

Step-back 5 X 5

HAZARD	CONTROL
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	

Sample STARRT Card

Front

Horton CBI GENERAL STARRT Card Permit # _____

Safety Task Assignment Risk Reduction Talk

Emergency Assembly Area _____

Emergency Meeting Point _____

Emergency Contact # _____

Is Lift Plan Required Y N

Work Scope: _____

**If there is any Crane/Rigging activity, add the Crane/Rigging STARRT Card

**If there is any Radiography activity, complete the Radiography STARRT Card ONLY

SUPERVISOR: Date: Work Scope:

PERMITS	Y	N	N/A
HOT WORK			
CONFINED SPACE			
CRITICAL LIFT PLAN			
ALL PERMIT CONDITIONS MET			
PERMIT DISPLAYED			

HAZARDS	Y	N	N/A
FALL POTENTIAL			
PINCH POINTS			
SLIP-TRIP			
FLYING PARTICLES			
THERMAL BURNS			
MANUAL LIFTING			
SHARP OBJECTS			
OTHER _____			

PPE	Y	N	N/A
WORK GLOVES			
HARD HAT			
SAFETY GLASSES			
FACE SHIELD			
BURNING GOGGLES			
EAR PROTECTION			
SAFETY HARNESS			
RESPIRATOR			
TRAINED IN USE			
INSPECTED/GOOD CONDITION			
OTHER _____			

EMERGENCY	Y	N	N/A
FIRE EXTINGUISHER			
EYEWASH			
TELEPHONE/RADIO			
EVACUATION ROUTE			
OTHER _____			

WELDING	Y	N	N/A
WELDING			
GRINDING			
GOUGING/CUTTING			
PROPER GROUND			
RADIOGRAPHY CARD ATTACHED			

HAZARDS (ENVIRONMENT)	Y	N	N/A
HOT/COLD SURFACES			
AIRBORNE PARTICLES			
VAPORS			
NOISE			
HEAT STRESS			

PROPER EQUIPMENT	Y	N	N/A
HAND TOOLS			
HAND POWER TOOLS			
CHAIN FALL/COME-A-LONG			
JLG. LIFT/OPERATOR TRAINED			
CRANE			
PROPER RIGGING			
PERSONAL BASKET			
INSPECTED/GOOD CONDITION			
QUALIFIED TO USE			
CRANE/HOISTING CARD ATTACHED			

HOUSEKEEPING	Y	N	N/A
AISLE WAYS CLEAR			
SCAFFOLDS CLEAR			
CABLES/HOSES/CORDS NEAT			
TRASH/WASTE CONTAINERS			

STANDBY PERSON	Y	N	N/A
CONFINED SPACE MONITOR			
FIRE WATCH			
OTHER _____			

OVERHEAD WORK / WORKING AT HEIGHTS	Y	N	N/A
HARNESS REQUIRED?			
APPROVED TIE OFF			
FIXED BARRICADES			
SCAFFOLD TAGGED			
WORKERS ABOVE/BELOW			
TAPE (DANGER/CAUTION)			
SIGNS			
HOLE COVER (trap door closed)			

HAZARDS (CHEMICAL)	Y	N	N/A
MSDS'S REVIEWED			
CHEMICAL BURN			
SKIN/EYE IRRITANT			
INHALATION			
OTHER _____			

ELECTRICAL	Y	N	N/A
EXTENSION CORDS INSPECTED			
LOCKED & TAGGED			
TRY & TEST			
GFCI TESTED			

ERGONOMICS	Y	N	N/A
AWKWARD BODY POSITION			
OVER EXTENSION			
SUSTAINED POSITION			
REPETITIVE MOTIONS			
TWISTING MOTIONS			

OTHER _____	Y	N	N/A
_____			
_____			
_____			
_____			

Sample STARRT Card

Back

Safety Task Assignment Risk Reduction Talk

TASK DESCRIPTION (List Steps)	HAZARDS	PLANS TO ELIMINATE

Are you trained / competent to perform the above tasks? ☐ Yes ☐ No

STOP & Think

Learning Opportunities Identified During Shift

Near Miss ☐ / Hazard ☐ / Safety Tip ☐ Location:

Describe Learning Opportunity

Corrective Actions Taken

Follow up actions required? Yes ☐ No ☐

Post Job Questions. Complete at the end of your shift.

Are confined space entries red ribboned off? YES ☐ NO ☐ N/A ☐ Has the area been cleaned up? YES ☐ NO ☐ N/A ☐

Are rigging and hand tools properly stored? YES ☐ NO ☐ N/A ☐ Are there any hazards remaining? YES ☐ NO ☐ N/A ☐

Are compressed cylinders disconnected? YES ☐ NO ☐ N/A ☐ Were there any incidents / injuries? YES ☐ NO ☐ N/A ☐

Ensure you have reviewed this STARRT card before signing.

Crew

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

STARRT Card Quality Audit (Circle)

Is STARRT card current and valid for task? **YES / NO**

Are all hazards Identified; controls in place? **YES / NO**

Has Foreman signed card? **YES / NO**

Comments:_____

_____

Audit Rating

Follow up actions required? Yes ☐ / No ☐

Work Stopped: ☐

Improvements needed / Implemented: ☐

EXCELLENT: ☐

Supervisor Signature:_____

Time of Audit:_____

* Is post job section complete at task/shift end? Yes ☐ ☐

Safety Department / Superintendent Review

Foreman must sign prior to first coffe break.

Foreman (Print) Forman (Signature)

JOB SAFETY ANALYSIS ANALISIS DE SEGURIDAD DE TRABAJO	JOB TITLE:	PAGE:	DATE:	REV:
	TITLE OF PERSON WHO DOES JOB:	SUPERVISOR:		ANALYSIS BY:
	LOCATION:	DEPARTMENT OR PROJECT:		CONTRACT NUMBER:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:				APPROVED BY:

Step 1

If you do not fully understand or believe the steps necessary to SAFELY perform this task have been clearly explained, or if you believe the Hazards have not been properly addressed; then YOU are obligated to STOP WORK, until all hazards have been corrected or the safe method(s) in which to SAFELY perform this task have been clearly explained to you.

Si no comprenden o creen que las medidas necesarias para realizar esta tarea SEGURA no han sido claramente explicadas, o si cree que los peligros no han sido dirigidos debidamente; entonces TU tienes la obligación de PRARA EL TRABAJO hasta que todos los peligros hayan sido corregidos o se te haya explicado claramente la manera SEGURA de cómo realizar esta tarea.

Step 2	Step 3	Step 4
SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION OR PROCEDURE
Sequencia de Pasos Basicos de Trabajo	Peligros Potenciales	Accion o Proceso Recomendado

Step 1

If you do not fully understand or feel that the steps to perform this task safely, or you feel that the Hazards have not been removed <u>YOU</u> have the right to <u>STOP WORK</u> until all hazards have been corrected or the safe way to perform this task has been explained to you. . (*Si no comprendes completamente o sientes que los pasos para ejecutir esta tarea con seguridad no han sido seguidos o los peligros no han sido removidos; <u>TU</u> tienes el derecho de <u>PARAR EL TRABAJO</u> asta que los peligros sean removidos o la manera de como hacer el trabajo con seguridad te ha sido explicado.)*

	PRINT NAME HERE	SIGNATURE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

JSA TRAINING ATTENDANCE

Recommended Improvements in JSA:

Pre-Job Preparation

1. Get Permit for Job 2. Fill out JSA 3. Review JSA (EVERYONE) 4. Sign JSA (EVERYONE)	**Safety Access / Location**	**Employee Authorization to STOP Work**

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

Wind Direction:

Evacuation Route:

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards

Before starting work: *Is this the SAFEST way to do this JOB?*
"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP. (PPE)
☐ Excavation / Trench ("One Call" made)	☐ Flash burns	☐ Electrical Shock	☐ Locked & Tagged out	☐ Fall Potential	☐ Fire Extinguishers	☐ Rubber Gloves
☐ Cold Work	☐ Combustibles	☐ Heat Stress	☐ Try Start / Stop Switch	☐ Pinch Points	☐ Safety Shower	☐ Leather Gloves
☐ Hot Work	☐ Spark Containment	☐ Heavy Objects	☐ GFCI Test	☐ Slip-Trip Potential	☐ Evacuation Route	☐ Special Purpose Gloves
☐ Entry Permit / Confined Space	☐ Shields	☐ Hot / Cold Surf. or Mat.	☐ Assured Grounding	☐ Other	**Lifts / Rigging**	☐ Slicker Suit
☐ Line Breaking	☐ Grounding	☐ Inadequate Lighting	☐ Extension Cord Inspection	**HAZARDS / CHEMICALS**	☐ Critical Lift	☐ Acid Suit
☐ Signed Off When Complete	☐ Fire Extinguisher	☐ Line Breaking –	**OTHER WORK IN AREA**	☐ Chemical Burn Skin	☐ Manual Lifting	☐ Rubber Boots
☐ LO/TO	☐ Water Hose	☐ **Check List attached**		☐ Chemical Burn Eyes	☐ Softeners	☐ Metatarsals
☐ Other	☐ Fire Blanket	☐ Noise	☐ Others Working Overhead	☐ Flammable	☐ Proper Rigging Practices	☐ Respirator
ACCESS	☐ Fire Watch	☐ Sharp Objects	☐ Type Work Others Doing:	☐ Ingestion	☐ Chain fall, Come a long	☐ ½ face
	☐ Leads routed overhead 7' / not in walk way	☐ Other	☐	☐ Other	☐ Inspected - in good condition	☐ Full Face
☐ Scaffold (properly inspected ____)	☐ Sewer Covers	☐ Poor Access / Egress	☐ PPE Due to Other Work	☐ Inhalation	☐ Crane	☐ PAPR
☐ Ladder (Tied off ____)	**OVERHEAD WORK**	**TOOLS**	☐ Other	☐ Skin Contamination	☐ Forklift	☐ Fresh Air
☐ Man lift (inspected)	☐ Barricades	☐ Proper Tools for the Job	**Confined Space Know the Following:**		☐ Operator Certificate	☐ Hearing Protection
☐ Personnel Basket (inspected & approved ____)	☐ Hole Cover	☐ Good Tool Condition	• **Possible hazards within the confined space** • **First signs of exposure** • **How to summons help** • **How to track personnel** • **Entering and exiting the confined space** • **Maintain contact with all entrants by voice or visual**		☐ Condition of Equipment – Inspection Checklist	☐ Safety Harness
	☐ Signs					☐ Approved Anchor Points
☐ Operator Training	☐ Handrail	☐ Qualifications			☐ Rigging and Lifting JSP - Required	☐ Mono Goggles (vented / non-vented)
Worksite Stretches: • Before shift / Pre-task / End of shift		☐ Current Inspection	Do not attempt to rescue unless you are a part of a Trained in confined space rescue.		**Barricades**	☐ Face Shield
• Stretch to a point where you feel a mild tension and relax as you hold the stretch.		☐ Tool Tethers	Remain at entry point; assume no duties that will take you from there.		☐ Tags on all sides	☐ Kevlar Gloves
• **Stretches should be held for 10-30 seconds.**		☐ Tool Lanyards	Signs posted to identify confined space?		☐ Stands Used	☐ Kevlar Sleeves
• Always stretch within your comfort limits, never **to**					☐ 42" high	☐ Fire Retardant Clothing

the point of pain.				
			☐ Caution / Yellow ☐ Danger / Red ☐ Taken down at the end of shift	☐ Safety glasses with ANSI app. Side Shields ☐ Welding hood ☐ Burning Goggles ☐ Other

Consider the following and check the items which apply to the job, then review with the work crew.

Job Safety Analysis

DATE:
JSA No:

PRINCIPAL CONTRACTOR:

CONTRACTOR NAME:

PROJECT:

LOCATION:

THIS JSA IS TO BE REVIEWED ON:

JOB DESCRIPTION:

PLANNED HIGH RISK CONSTRUCTION ACTIVITY:

☐ Work at Heights	☐ Work on Umbrella Roof	☐ Entering Excavation (1 M+ Deep)	☐ Entry into a Confined Space
☐ Using a Hazardous Substance	☐ Demolition Work	☐ Bodily Injury	☐

EMERGENCY ACTION:

In the event of injury is a member of the work team First Aid Qualified? ☐**YES** ☐ **NO** **If yes, their Name?** _____

Point where an injured person may receive treatment: **MINOR INJURY:** **SERIOUS INJURY:**

JSA STATEMENT DEVELOPED BY:

No	Name	Signature	Position	Employee No.
1				
2				
3				
4				
5				
6				

REVIEWED BY THE FOLLOWING PERSONNEL:

No	Name	Signature	Position	Date.
1				
2				
3				
4				
5				
6				

Approved by: _____ **Position:** _____ **JSA Review Date:** _____

IF IT'S NOT SAFE – FIX IT

P.P.E REQUIREMENTS	*PLANT, EQUIPMENT & TOOLS FOR JOB*	*TAGGING & SIGNS*	*PERMITS & INSTRUCTION*
Use ☒	*Use* ☒	*Use* ☒	*Use* ☒

Safety Harness	☐	**Hearing Protection**	☐	**Ladder**	☐	**Fire Blanket**	☐	**Men Working Above**	☐	**MSDSs**	☐
Static Line	☐	**SCBA**	☐	**Hand Tools**	☐	**Excavator**	☐	**Barrier Mesh**	☐	**Instruction Manuals**	☐
Steel Capped Boots	☐	**Airline**	☐	**Shovel**	☐	**Winch**	☐	**Flagging**	☐	**Procedures**	☐
Hard Hat	☐	**Air Purifying Respirator**	☐	**Welding Machine**	☐	**Extension Leads**	☐	**Personal Locks**	☐	**Work Instructions**	☐
Tinted Safety Glasses	☐	**Confined Space Harness**	☐	**Compactor**	☐	**Power Source**	☐	**Personal Danger Tags**	☐	**Hot Work Permit**	☐
Clear Safety Glasses	☐	**Gloves – PVC**	☐	**Drill**	☐	**Crane**	☐	**Out of Service Tags**	☐	**Isolation Permit**	☐
Monogoggles	☐	**Gloves – Hyflex (Nitrile)**	☐	**Grinder**	☐	**EWP**	☐	**Information Tags**	☐	**Excavation Permit**	☐
Face Shield	☐	**Gloves – Leather Riggers**	☐	**Scaffold**	☐	**Fans**	☐		☐	**Confined Space Permit**	☐
Sun Screen	☐		☐	**Fire Extinguisher**	☐	**Scissor Lift**	☐		☐		☐

HAZARD PROMPT – *"check ☒".* *Identify the job hazards and assess the RISK personnel may be exposed to before safeguards are implemented:*

Electrical	☐N/A ☐Low ☐Med ☐High	**Vehicles**	☐N/A ☐Low ☐Med ☐High	**Pressure**	☐N/A ☐Low ☐Med ☐High	**Weather**	☐N/A ☐Low ☐Med ☐High	**Radiation (Hot Work / Sun)**	☐N/A ☐Low ☐Med ☐High	**Heat**	☐N/A ☐Low ☐Med ☐High	**SMF or Asbestos**	☐N/A ☐Low ☐Med ☐High
Chemical	☐N/A ☐Low ☐Med ☐High	**Height**	☐N/A ☐Low ☐Med ☐High	**Access**	☐N/A ☐Low ☐Med ☐High	**Bacteria**	☐N/A ☐Low ☐Med ☐High	**Rotating Equipment**	☐N/A ☐Low ☐Med ☐High	**Dehydration**	☐N/A ☐Low ☐Med ☐High	**Engulfment**	☐N/A ☐Low ☐Med ☐High
Tools	☐N/A ☐Low ☐Med ☐High	**Depth**	☐N/A ☐Low ☐Med ☐High	**Vibration**	☐N/A ☐Low ☐Med ☐High	**Dust**	☐N/A ☐Low ☐Med ☐High	**Moving Equipment**	☐N/A ☐Low ☐Med ☐High	**Hot / Cold Objects**	☐N/A ☐Low ☐Med ☐High	**Lighting**	☐N/A ☐Low ☐Med ☐High
Gases	☐N/A ☐Low ☐Med ☐High	**Weight**	☐N/A ☐Low ☐Med ☐High	**Noise**	☐N/A ☐Low ☐Med ☐High	**Slip / Trip**	☐N/A ☐Low ☐Med ☐High	**Lifting Equipment**	☐N/A ☐Low ☐Med ☐High	**Overhead Hazards**	☐N/A ☐Low ☐Med ☐High	**Manual Handling**	☐N/A ☐Low ☐Med ☐High

RISK SCORE CALCULATOR

Use The Risk Score Calculator To Determine The Level Of Risk Of Each Hazard

What would the **CONSEQUENCE** of an occurrence be?	What is the **LIKELIHOOD** of an occurrence?				
	Almost Certain	**Likely**	**Possible**	**Remotely Possible**	**Practically Impossible**
Disaster Multiple Fatalities	***Very High (1)***	***Very High (1)***	***Very High (1)***	***High (2)***	***Medium (3)***
Very Serious Permanent disability or ill health, Fatality	***Very High (1)***	***Very High (1)***	***High (2)***	***Medium (3)***	***Low (4)***
Serious Serious but non-permanent injury or ill health Work days lost	***Very High (1)***	***High (2)***	***High (2)***	***Medium (3)***	***Low (4)***
Substantial Medical attention needed. No work restrictions.	***High (2)***	***Medium (3)***	***Medium (3)***	***Low (4)***	***Low (4)***
Minor Minor cuts & bruises or sickness	***High (2)***	***Medium (3)***	***Low (4)***	***Low (4)***	***Low (4)***

Hierarchy of Controls

Can the hazard be **eliminated** or removed from the work place?

Can the product or process be **substituted** for a less hazardous alternative?

Can the hazard be **engineered** away with guards or barriers?

Can **Administration Controls** be adopted i.e. procedures, job rotation etc

Can **Personal Protective Equipment & Clothing** be worn to safe guard against hazards?

No.	Job Step *What you do, NOT how you do it*	Hazard / Risk Exposure *What are the hazards of each job step?*	Risk Score	Work Method Statement For Control of Hazard Exposures *What hazard controls will be used?* *Who will check the effectiveness of the controls?* *What checks will be undertaken? E.g. (Inspection & ongoing monitoring)*	New risk score After controls applied	Action By

LABOR

-
-
-
-
-
-

PLANT AND EQUIPMENT

-
-
-
-
-
-

IF IT'S NOT SAFE – FIX IT

CB&I	**Job Safety Analysis** **&** **(Work Method Statement)**	**DATE:** **JSA No:**

SIGN ON SHEET

Date	Name	Signature	Date	Name	Signature

Pre-Job Preparation

Get Permit for Job
Fill out JSA
Review JSA (EVERYONE)
Sign JSA (EVERYONE)

Safety Access / Location

Employee Authorization to STOP Work

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

General site awareness

Wind Direction:

Evacuation Route:

General site awareness

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards

General site awareness	Lack of communicating tasks ideals to field personnel may lead to an injury/illness, environmental hazard, near hit, equipment damage, or rework.	• Site management will conduct a project orientation, HASP and Job Safety Analysis review with field personnel before the start of work. • When visiting client facilities, personnel shall be given a site orientation of the facility or be escorted. • Project personnel shall inspect all equipment before it is used. Equipment that is damaged shall be tagged out of service until it is repaired. • Unsafe acts or conditions shall be reported to the Site Manager/subcontractor site lead and corrected as soon possible. • All site personnel have Stop Work Authority. • Implement the Work Area Hazard Assessment Levels in to the project tasks. See Scope of Work (Step One), Method Statement (Step Two), Job Safety Analysis (Step Three) examples at (CMS-710-05-FM-1704, 1705, 1708), and 5 x 5 Analysis/STARRT (Step Four) example at (CMS-710-05-FM-1707)
Arrival of new personnel at site. Movement of personnel on-site. Prepare for daily operations. Set-up for daily operations. Perform daily operations. Perform inspections. Perform observations. Provide supervision. Handle equipment and materials.	• Newly hired personnel and visitors. Unfamiliarity with: site, general (chemical, physical, environmental) site hazards, project safety rules and hazard control procedures, chain of command, and emergency procedures.	• All personnel working on project sites shall submit HAZWOPER training certificates or equivalent training for the site hazards (40-hour, 8-hour [if applicable], supervisor [if applicable]) to the Project HSSE Manager. All personnel shall attend a site safety orientation. After personnel are trained in the contents of the Site Safety and Health Plan (SSHP) and SSHP Addenda, they shall sign the SSHP Acknowledgment Form. All training certifications held by personnel shall also be made available and kept in on-site personnel files. Review emergency procedures and evacuation plans.
	Medical qualifications.	All personnel working on projects with hazardous waste shall submit current physician's certificate stating that employee is participating in an appropriate medical surveillance program meeting 29 Code of Federal Regulation (CFR) 1910.120.
	Complacency.	All personnel shall attend the daily tailgate meeting so re-focus themselves to hazards, emergency procedures and equipment, operational aspects, and change(s) in site/work conditions. Personnel shall use the CB&I Work Method Hazard Assessments to control these hazards.

	Failure to properly plan daily activities.	A Job Safety Analysis (JSA) and Step Back 5 X 5 assessments as required by CB&I shall be prepared by the crew prior to commencing daily activities. The JSA shall be used as a component of the morning Tailgate Safety Meeting. The Step back 5 X 5 shall be revised at any time throughout the workday when new tasks are initiated, unforeseen circumstances arise, or if working conditions change. Personnel shall implement Work Hazard Assessment Program.
	Heavy lifting, strains, and sprains.	No individual employee is permitted to lift any object that weighs over 50 pounds. Proper lifting techniques shall be used. Multiple employees or the use of mechanical lifting devices are required for lifting objects over the 50-pound limit.
	Slips, trips, and falls.	Keep work areas clear and maintain housekeeping. Do not jump from equipment or elevated surfaces. Daily housekeeping will be implemented at the end of each workday. Use three-point contact rule for entering/exiting trucks and equipment. Use extra caution when walking on wet, muddy, frosty, icy, or snow-covered surfaces. Maintain proper illumination in work areas. Fall protection must be provided and used when personnel are exposed to fall hazards greater than six feet. Project Fall Protection should be reviewed in its entirety as required to ensure that minimum compliance requirements are maintained. Employee compliance with this Fall Protection procedure is mandatory. CB&I have a zero tolerance policy on Fall Protection non-compliance.

	Use of mechanical equipment.	Only qualified personnel shall be permitted to operate equipment. Mechanical equipment shall be inspected daily. Deficiencies in equipment shall be noted on the inspection form. Equipment found to be unsafe shall be taken out of serviced. All equipment shall be operated at safe speeds and in a safe manner. Equipment operators shall wear safety belts and hearing protection (as necessary). Ground personnel shall not position themselves between equipment and stationary objects (stay out of swing radius). Personnel are only permitted to approach equipment after a signal from the operator.
	Hand injuries.	Items to be handled shall be inspected for sharp edges, splinters, burrs, rough surfaces, etc. prior to being handled. Personnel shall wear leather gloves when handling materials with sharp edges, splinters, burrs, rough surfaces, etc. Personnel shall be aware of and avoid pinch point hazards.
	Insect bites and stings.	Review injury and illness potential with workers. Inspect work areas for bee nests and activity prior to commencing work in that area. Wear PPE, such as disposable coveralls, to keep insects away from the skin. Expect to encounter insects when working in warm weather – especially at locations with vegetation present. Use protective insect repellents containing DEET to prevent insect bites, unless individual allergies and sensitivities prevent its use. Check limbs/body for insects/ insect bites upon removing PPE and again during showering. Consider applying Permethrin (Repel Permanone or equivalent) preparations to clothing to repel ticks, chiggers, mosquitoes, and/or spiders. Immediately notify supervisor or SSHO of insect bites, stings, irritations, rashes, or flu-like symptoms.

	Contact dermatitis from poisonous and irritating plants (poison ivy, poison oak, and poison sumac).	Learn to identify poisonous and irritating plants. Identify workers who are known especially sensitive to poisonous and irritating plants and plan work accordingly. Check around work areas to identify if poisonous and irritating plants are present. Wear long-sleeve shirts/trousers or Tyvek® coveralls to avoid skin contact with plants or other skin irritants. Apply protective cream/lotion to exposed skin to prevent poison ivy or similar reactions. Immediately notify the SSHO if you suspect you contacted an irritating plant. Avoid unnecessary clearing of plant/vegetation areas. Follow additional procedures outlined in the SSHP.
	• Severe weather, heat stress, and cold stress.	The SSHO will monitor weather conditions each day in order to plan and prepare for hazardous conditions. The SSHO will identify a suitable storm shelter at each work location. The SSHO will verify that the tornado shelter is accessible and available. Work activities will be suspended prior to weather conditions becoming hazardous so that workers have ample time to seek shelter. Upon seeing lightning or hearing thunder, outdoor activities shall be suspended and personnel shall be evacuated to safe areas (inside vehicles, buildings, or tornado shelters as appropriate). Monitor for heat stress in accordance with CB&I Procedure, “Heat Stress”. Monitor for cold stress in accordance with CB& I Procedure, “Cold Stress” Drink plenty of water and minimal carbonated or caffeine-containing beverages. Perform physiological monitoring as needed. Personnel shall take required breaks to cool down/warm-up as needed. Personnel shall wear insulated clothing based the ambient temperature and wind chill conditions.

	Struck by and against: • Vehicles • Equipment • Flying debris/projectiles • Splashes.	Wear PPE with high visibility vests when walking or working near moving equipment or vehicles. Stay off roads and streets unless necessary; walk on left side of roads facing on-coming traffic. Personnel shall not be permitted in the swing radius of the equipment. Personnel shall maintain a safe distance from operations. Do not assume equipment and vehicle operators have seen you unless operator have made eye contact with you and signalled to you. Warning signs and signalmen may be necessary. Follow MUTCD rules.
• See principal steps above.	Use of operational chemicals.	Read and follow SDS for each chemical used. Do not use any chemical that you have not been trained to safely use. Provide ventilation as necessary. Wear proper PPE. Properly label all containers.
•	Noise.	All personnel shall wear hearing protection when exposed to high noise levels. All personnel shall wear hearing protection when operating powered hand tools or noisy equipment. Personnel working in vicinity of noisy tools or equipment shall wear hearing protection. Noise dosimetry shall be performed to verify hearing protection is adequate.
•	Electrical.	Ground-fault circuit interrupters shall be used on all power tools and extension cords. Extension cords, power tools, and lighting equipment shall be inspected before each use, protected from damage, and kept out of wet areas. Keep extension cords off of ground surface. Only qualified electricians are permitted to work on electrical circuits. Electricians must follow NFPA 70 E (2009) when working on electrical circuits.

•	Tools.	Select the proper tool – do not improvise. Inspect all power and hand tools before each use (do not use damaged tools). Tools shall be appropriate for the task and maintained in good condition. Only trained and authorized personnel will use hand and power tools. Check your position, footing, and grip before tool use. Avoid distraction, keep your focus, and concentrate on the job. Personnel shall maintain a steady pace when using tools and take adequate rest periods. Keep electric cords untangled and out of the way of rotating tools. Use double-insulated power tools when possible. Protect electric tools with ground fault circuit interrupters (GFCI). Minimum PPE will include safety glasses with side-shields, hard hat, safety-toed work boots, and cut-resistant gloves. Store tools carefully to prevent damage to them and to make the proper tool easier to locate.
•	Dust.	Control dust by maintaining equipment operation rates. Control dust by applying water and/or calcium chloride. Personnel shall stay out of dust and work from upwind when possible. Perform dust monitoring to verify dust control is effective.
•	Confined space entry.	No one will be permitted to enter any confined space without proper training, proper PPE, notifying the Project HSSE Manager, and having a Permit-Confined Space Permit issued. Provide written rescue plan and practice prior to commencing work inside confined space. Review hazardous properties of site contaminants with entrants and attendant. Review emergency procedures before work commences. Provide confined space supervisor. Provide attendant outside of confined space. Wear proper level of PPE for the type of atmospheric contaminants. Use full body harness with tripod winch for vertical rescues.

• See principal steps above.	Welding, cutting, and grinding or any other operation producing spark or ignition sources (hot work).	A Hot Work permit must be available and properly completed. Provide a fire watch equipped with a 2-A:20-B:C fire extinguisher during and 30 minutes after welding / cutting. Test atmosphere in enclosed space to be cut or welded for flammable/toxic vapors. Flush lines prior to cutting, welding or grinding. If a tank must be inerted prior to cutting or welding, contact the site safety officer. Prohibit smoking in welding / cutting area. Combustible materials must be screened from slag, heat, and sparks. All torch valves and gas supply shut off when work is suspended. When work is suspended, hoses, torch, etc., shall be removed from confined spaces. The valve wrench or wheel shall be in operating position when cylinder is in use. Cylinders shall be stored in well-ventilated locations. Oxygen cylinders in storage and fuel gases shall be separated by a fire resistive wall or by a distance of 20 feet.

• See principal steps above.	Injury from use of manlift or boom truck.	Inspect the manlift/boom truck, test the operational controls, and familiarize yourself with the equipment before moving it. Verify that the ground-level emergency override controls function properly before using the manlift/boom truck. Walk around the equipment prior to operation to identify any new conditions or obstructions. Verify the absence of overhead obstacles and ensure adequate clearance prior to moving manlift/boom truck. Use a spotter when operating the manlift/boom truck in areas of obstructed vision or in restricted spaces. Review hand signals with spotters. Operate the manlift/boom truck slowly in areas of obstructed vision or restricted spaced. Anticipate others who may be backing out into your pathway and adjust accordingly. Manlift/boom truck occupants shall keep their arms/hands in the basket whenever the manlift/boom truck is in motion. A traffic control plan shall be prepared and implemented when working on or adjacent to roadways All manlift/boom truck occupants shall wear personal fall protection equipment at all times. Lanyards shall be anchored to designated points on the manlift/boom truck basket and never anchored outside of the manlift/boom truck. Manlift/boom truck occupants shall not stand on the mid-rail of the basket or sit on the top-rail of the basket. Review the manlift/boom truck operator's manual prior to use to verify the designed weight capacity. Do not overload the manlift/boom truck. A 360° work zone shall be determined at the manlift/boom truck's maximum working radius. Review overhead utility hazards and controls above. Operate the manlift/boom truck on level ground in accordance with the manufacturer's guidelines. Adequate ground conditions .

	Fire.	• Fire extinguishers shall be available in work areas. The Project HSSE Manager shall establish smoking areas. Smoke only in designated areas. Only discard cigarette butts in proper receptacles – never discard cigarette butts onto the ground. Engines shall be shut off before refueling. A 2-A:20-B:C fire extinguisher shall be available when refueling at the project site. Smoking shall not be permitted within 50 feet of fueling operations. •

Crew Name Signatures

Job Close Out

Any incidents / Injuries / Near miss / STOP work reported? List:	**Job Audited** Time: Supervisor / Auditor Signature:	**Recommendations:**

Before starting work: *Is this the SAFEST way to do this JOB?*

"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP (PPE)
☒ Excavation / Trench ("One Call" made)	☐ Flash burns	☐ Electrical Shock	☐ Locked & Tagged out	☐ Fall Potential	☒ Fire Extinguishers	☐ Rubber Gloves
☐ Cold Work	☐ Combustibles	☒ Heat Stress	☐ Try Start / Stop Switch	☒ Pinch Points	☐ Safety Shower	☒ Leather Gloves
☒ Hot Work	☐ Spark Containment	☒ Heavy Objects	☐ GFCI Test	☒ Slip-Trip Potential	☒ Evacuation Route	☐ Special Purpose Gloves
☒ Entry Permit / Confined Space	☐ Shields	☐ Hot / Cold Surf. or Mat.	☐ Assured Grounding	☐ Other	**Lifts / Rigging**	☐ Slicker Suit
☒ Line Breaking	☐ Grounding	☐ Inadequate Lighting	☐ Extension Cord Inspection	**HAZARDS / CHEMICALS**	☐ Critical Lift	☐ Acid Suit
☐ Signed Off When Complete	☐ Fire Extinguisher	☒ Line Breaking –	**OTHER WORK IN AREA**	☐ Chemical Burn Skin	☐ Manual Lifting	☒ Rubber Boots
☒ LO/TO	☐ Water Hose	☐ **Check List attached**		☐ Chemical Burn Eyes	☐ Softeners	☐ Metatarsals
☐ Other	☐ Fire Blanket	☒ Noise	☐ Others Working Overhead	☐ Flammable	☐ Proper Rigging Practices	☐ Respirator
ACCESS	☐ Fire Watch	☒ Sharp Objects	☐ Type Work Others Doing:	☐ Ingestion	☐ Chain fall, Come a long	☐ ½ face
	☐ Leads routed overhead 7' / not in walk way	☐ Other	☐	☐ Other	☐ Inspected - in good condition	☐ Full Face
☐ Scaffold (properly inspected ____)	☐ Sewer Covers	☐ Poor Access / Egress	☐ PPE Due to Other Work	☒ Inhalation	☐ Crane	☐ PAPR

☐ Ladder (Tied off ____)	**OVERHEAD WORK**	**TOOLS**	☐ Other	☒ Skin Contamination	☐ Forklift	☐ Fresh Air
☐ Man lift (inspected)	☐ Barricades	☒ Proper Tools for the Job	**Confined Space Know the Following:**		☐ Operator Certificate	☒ Hearing Protection
☐ Personnel Basket (inspected & approved ____)	☐ Hole Cover	☒ Good Tool Condition	• **Possible hazards within the confined space** • **First signs of exposure** • **How to summons help** • **How to track personnel** • **Entering and exiting the confined space** • **Maintain contact with all entrants by voice or visual**		☐ Condition of Equipment – Inspection Checklist	☐ Safety Harness
	☐ Signs					☐ Approved Anchor Points
☐ Operator Training	☐ Handrail	☐ Qualifications			☐ Rigging and Lifting JSP - Required	☐ Mono Goggles (vented / non-vented)
Worksite Stretches: • Before shift / Pre-task / End of shift		☒ Current Inspection			**Barricades**	☐ Face Shield
• Stretch to a point where you feel a mild tension and relax as you hold the stretch.		☐ Tool Tethers	Do not attempt to rescue unless you are a part of a Trained in confined space rescue.		☐ Tags on all sides	☐ Kevlar Gloves
• **Stretches should be held for 10-30 seconds.**		☐ Tool Lanyards	Remain at entry point; assume no duties that will take you from there.		☐ Stands Used	☐ Kevlar Sleeves
• Always stretch within your comfort limits, never **to** the point of pain.			Signs posted to identify confined space?		☐ 42” high	☐ Fire Retardant Clothing
					☐ Caution / Yellow	☐ Safety glasses with ANSI app Side Shields
					☐ Danger / Red	☐ Welding hood
					☐ Taken down at the end of shift	☐ Burning Goggles ☐ Other

Pre-Job Preparation

1. Get Permit for Job 2. Fill out JSA 3. Review JSA (EVERYONE) 4. Sign JSA (EVERYONE)	**Safety Access / Location**	**Employee Authorization to STOP Work**

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

FACILITY / STRUCTURE DEMOLITION

Wind Direction:

Evacuation Route:

FACILITY DEMOLITION

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards
Facility/ Structure Demolition	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals • Cease operations for electrical storms, high winds, severe weather

	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use 'heavy duty industrial' (type IA) ladders • Install and inspect scaffolds according to manufacturer's requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straight/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,000 pounds for each worker • Halt roof, exterior scaffold work in high winds, severe weather
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings

	Fire/ Explosion	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers for all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum
	Premature structural Collapse	• Barricade or enclose the demolition area • Restrict entry to the work area to authorized personnel during demolition activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review posted hand signals
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with CB&I HSE and FMC F Procedures

	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA
	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Review MSDS information with entrants and safety observer • Wear proper level of PPE for the type of atmospheric contaminants • Review contaminant MSDS before beginning work • Use body harness, safety belt with tripod winch for possible rescue • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide trained safety observer outside vessel • Provide written rescue plan Review emergency procedures before work commences
		•
		•
		•

Crew Name Signatures

Job Close Out

Any incidents / Injuries / Near miss / STOP work reported? List:	**Job Audited** Time: Supervisor / Auditor Signature:	**Recommendations:**

Before starting work: *Is this the SAFEST way to do this JOB?*

"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP (PPE)
☒ Excavation / Trench ("One Call" made)	☐ Flash burns	☐ Electrical Shock	☐ Locked & Tagged out	☐ Fall Potential	☒ Fire Extinguishers	☒ Rubber Gloves
☐ Cold Work	☐ Combustibles	☒ Heat Stress	☐ Try Start / Stop Switch	☒ Pinch Points	☐ Safety Shower	☒ Leather Gloves
☒ Hot Work	☐ Spark Containment	☒ Heavy Objects	☐ GFCI Test	☒ Slip-Trip Potential	☒ Evacuation Route	☐ Special Purpose Gloves
☒ Entry Permit / Confined Space	☐ Shields	☐ Hot / Cold Surf. or Mat.	☐ Assured Grounding	☐ Other	**Lifts / Rigging**	☐ Slicker Suit
☐ Line Breaking	☐ Grounding	☐ Inadequate Lighting	☐ Extension Cord Inspection	**HAZARDS / CHEMICALS**	☐ Critical Lift	☐ Acid Suit
☐ Signed Off When Complete	☐ Fire Extinguisher	☐ Line Breaking –	**OTHER WORK IN AREA**	☐ Chemical Burn Skin	☐ Manual Lifting	☐ Rubber Boots
☐ LO/TO	☐ Water Hose	☐ **Check List attached**		☐ Chemical Burn Eyes	☐ Softeners	☐ Metatarsals
☐ Other	☐ Fire Blanket	☐ Noise	☐ Others Working Overhead	☐ Flammable	☐ Proper Rigging Practices	☐ Respirator
ACCESS	☐ Fire Watch	☐ Sharp Objects	☐ Type Work Others Doing:	☐ Ingestion	☐ Chain fall, Come a long	☐ ½ face
	☐ Leads routed overhead 7' / not in walk way	☐ Other	☐	☐ Other	☐ Inspected - in good condition	☐ Full Face
☐ Scaffold (properly inspected ____)	☐ Sewer Covers	☐ Poor Access / Egress	☐ PPE Due to Other Work	☐ Inhalation	☐ Crane	☐ PAPR
☐ Ladder (Tied off ____)	**OVERHEAD WORK**	**TOOLS**	☐ Other	☐ Skin Contamination	☐ Forklift	☐ Fresh Air
☐ Man lift (inspected)	☐ Barricades	☒ Proper Tools for the Job	**Confined Space Know the Following:**		☐ Operator Certificate	☐ Hearing Protection
☐ Personnel Basket (inspected & approved ____)	☐ Hole Cover	☒ Good Tool Condition	• **Possible hazards within the confined space** • **First signs of exposure** • **How to summons help** • **How to track personnel** • **Entering and exiting the confined space** • **Maintain contact with all entrants by voice or visual**		☐ Condition of Equipment – Inspection Checklist	☐ Safety Harness
	☐ Signs					☐ Approved Anchor Points
☐ Operator Training	☐ Handrail	☒ Qualifications			☐ Rigging and Lifting JSP - Required	☐ Mono Goggles (vented / non-vented)
Worksite Stretches: • Before shift / Pre-task / End of shift		☒ Current Inspection			**Barricades**	☐ Face Shield
• Stretch to a point where you feel a mild tension and relax as you hold the stretch.		☐ Tool Tethers	Do not attempt to rescue unless you are a part of a Trained in confined space rescue.		☐ Tags on all sides	☐ Kevlar Gloves
• **Stretches should be held for 10-30 seconds.**		☐ Tool Lanyards	Remain at entry point; assume no duties that will take you from there.		☐ Stands Used	☐ Kevlar Sleeves
• Always stretch within your comfort limits, never **to** the point of pain.			Signs posted to identify confined space?		☐ 42" high	☐ Fire Retardant Clothing
					☐ Caution / Yellow	☐ Safety glasses with ANSI app Side Shields
					☐ Danger / Red	☐ Welding hood
					☐ Taken down at the end of shift	☐ Burning Goggles ☐ Other

Pre-Job Preparation

1. Get Permit for Job 2. Fill out JSA 3. Review JSA (EVERYONE) 4. Sign JSA (EVERYONE)	**Safety Access / Location**	**Employee Authorization to STOP Work**

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

SOIL EXCAVATION

Wind Direction:

Evacuation Route:

SOIL EXCAVATION

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards
Excavation of Soil	Underground/ Overhead Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955 (high voltage >700 kv) 15 feet phase to ground clearance; 31 feet phase to phase clearance • Review CB&I CMS HSE and FMC Safety Procedures

	Excavation Wall Collapse	• Construct diversion ditches or dikes to prevent surface water from entering excavation • Provide good drainage of area adjacent to excavation • Collect ground water/rain water from excavation and dispose of properly • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth • Place ladders no more than 25 feet apart laterally • Treat excavations over 4 feet deep as confined spaces • Complete confined space permit entry procedure • Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency • Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required • Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, any time conditions change • Provide at least two means of exit for personnel working in excavations
	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads

	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use Aheavy duty industrial≅ (type IA) ladders • Install and inspect scaffolds according to manufacturer's requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straight/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants • Dampen soil using light water spray to prevent fugitive dust emissions • Cover stockpiled soil with plastic sheeting to prevent fugitive dust emissions • Conduct air monitoring / sampling to determine exposure levels

	Low / High Ambient Temperature	• Monitor for Cold/Heat stress in accordance with CB&I CMS HSE Procedure of cold stress • Provide fluids to prevent worker dehydration • Follow work/rest schedule in the HASP

Crew Name Signatures

Job Close Out

Any incidents / Injuries / Near miss / STOP work reported? List:	**Job Audited** Time: Supervisor / Auditor Signature:	**Recommendations:**

Before starting work: *Is this the SAFEST way to do this JOB?*

"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP (PPE)
☒ Excavation / Trench ("One Call" made)	☐ Flash burns	☐ Electrical Shock	☐ Locked & Tagged out	☐ Fall Potential	☒ Fire Extinguishers	☒ Rubber Gloves
☐ Cold Work	☐ Combustibles	☒ Heat Stress	☐ Try Start / Stop Switch	☒ Pinch Points	☐ Safety Shower	☒ Leather Gloves
☐ Hot Work	☐ Spark Containment	☒ Heavy Objects	☐ GFCI Test	☒ Slip-Trip Potential	☒ Evacuation Route	☐ Special Purpose Gloves
☐ Entry Permit / Confined Space	☐ Shields	☐ Hot / Cold Surf. or Mat.	☐ Assured Grounding	☐ Other	**Lifts / Rigging**	☐ Slicker Suit
☐ Line Breaking	☐ Grounding	☐ Inadequate Lighting	☐ Extension Cord Inspection	**HAZARDS / CHEMICALS**	☐ Critical Lift	☐ Acid Suit
☐ Signed Off When Complete	☐ Fire Extinguisher	☐ Line Breaking –	**OTHER WORK IN AREA**	☐ Chemical Burn Skin	☐ Manual Lifting	☒ Rubber Boots
☐ LO/TO	☐ Water Hose	☐ **Check List attached**		☐ Chemical Burn Eyes	☐ Softeners	☐ Metatarsals
☐ Other	☐ Fire Blanket	☒ Noise	☐ Others Working Overhead	☐ Flammable	☐ Proper Rigging Practices	☐ Respirator
ACCESS	☐ Fire Watch	☒ Sharp Objects	☐ Type Work Others Doing:	☐ Ingestion	☐ Chain fall, Come a long	☐ ½ face
	☐ Leads routed overhead 7' / not in walk way	☐ Other	☐	☐ Other	☐ Inspected - in good condition	☐ Full Face
☐ Scaffold (properly inspected ____)	☐ Sewer Covers	☐ Poor Access / Egress	☐ PPE Due to Other Work	☒ Inhalation	☐ Crane	☐ PAPR
☐ Ladder (Tied off ____)	**OVERHEAD WORK**	**TOOLS**	☐ Other	☐ Skin Contamination	☐ Forklift	☐ Fresh Air
☐ Man lift (inspected)	☐ Barricades	☐ Proper Tools for the Job	**Confined Space Know the Following:**		☐ Operator Certificate	☐ Hearing Protection
☐ Personnel Basket	☐ Hole Cover	☐ Good Tool Condition	• **Possible hazards within the confined space**		☐ Condition of	☐ Safety Harness

(inspected & approved ____)	☐ Signs		• **First signs of exposure** • **How to summons help** • **How to track personnel** • **Entering and exiting the confined space** • **Maintain contact with all entrants by voice or visual** Do not attempt to rescue unless you are a part of a Trained in confined space rescue. Remain at entry point; assume no duties that will take you from there. Signs posted to identify confined space?	Equipment – Inspection Checklist	☐ Approved Anchor Points
☐ Operator Training	☐ Handrail	☒ Qualifications		☐ Rigging and Lifting JSP - Required	☐ Mono Goggles (vented / non-vented)
Worksite Stretches: • Before shift / Pre-task / End of shift		☒ Current Inspection		**Barricades**	☐ Face Shield
• Stretch to a point where you feel a mild tension and relax as you hold the stretch.		☐ Tool Tethers		☐ Tags on all sides	☐ Kevlar Gloves
• **Stretches should be held for 10-30 seconds.**		☐ Tool Lanyards		☐ Stands Used	☐ Kevlar Sleeves
• Always stretch within your comfort limits, never **to** the point of pain.				☐ 42” high	☒ Fire Retardant Clothing
				☐ Caution / Yellow	☐ Safety glasses with ANSI app Side Shields
				☐ Danger / Red	☐ Welding hood
				☐ Taken down at the end of shift	☐ Burning Goggles ☐ Other

Pre-Job Preparation

1. Get Permit for Job 2. Fill out JSA 3. Review JSA (EVERYONE) 4. Sign JSA (EVERYONE)	**Safety Access / Location**	**Employee Authorization to STOP Work**

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

Integration of RCRA Monitoring Systems

Wind Direction:

Evacuation Route:

Integration of RCRA Monitoring Systems

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards

Review of work plan and JSA with crew	The Failure to Communicate task ideals to the crew may lead to an injury, illness, environmental spill, and rework of task or other negative occurrences	• SM and Project SHSM will review all aspects of work plan and AHA prior to beginning any work tasks. • SDS sheets will be reviewed with the crew. • Review emergency procedures with the crew. • Stage spill equipment and supplies in the work area. • All crewmembers will sign off on JSA acknowledgement form verifying that all stipulations will be followed. • JSA will be amended to reflect changes that need to be made to activities prior to the implementation of the change, by both Operations and HSE • Applicable FMC procedures shall be enforced.
Prepare work area	Improper Setup of Work Area	• Ensure the work areas are secured and separate from other operations. • Inspect the sumps to become familiar. • Keep other non-essential personnel out of the area. • Wear the minimum PPE in construction zones; extra PPE is determined by the Project SS or SHSM, or SR on a daily basis as conditions change.
	Possible injury due to using a tool that is unfamiliar	• Select the right tool for the job. • Training and documentation on all non-routine tools. • Inspect tools for serviceability and remove any damaged tools from service. • Tools will not be altered, and they will be used only for their intended purposes and within the manufacturer's guidelines • Guards will not be removed from tools.

Raising of Wells and Sump installation	Chemical exposure	• Review blue prints prior to installation or raising • Understand sign off on the FMC rules for working in RCRA Ponds • Wear the proper PPE
Determine if the process line contains product	Chemical exposure, Scalding, Struck by/ Against, Burned, or Punctured	• Speak with the FMC facility representative(s) to understand Lockout / Tagout procedures for the tank / pipeline system. • SLOWLY open adjacent valves on the UP and Down Stream ends of the pipe that is designated for cold cutting / dismantlement. • Turning a valve to the left is opening the valve (ball valve handles are in line with the pipe when open). • If one end of pipe is already open place a catch basin underneath of the open end of pipe and catch fluids being released from the pipe. • If valves are not in the line of sight, then your Buddy needs to verify that the valve is open. • DO NOT STAND in front of any pipe that valve has been designated to be opened.

Pipeline / sewer line cleaning	Injected by high pressure water; Falls into piping; skin contact with pipe line contaminants, high noise levels	• Train personnel to operate pressure washer and lance/wand properly. • Don PPE to prevent skin contact, exposure to noise chemical hazards. • Before maintenance or repair activities are conducted, depressurize the system appropriately to bring it to a zero state prior to routine maintenance or repairs. • The lancing/jetting head shall have a minimum two foot rigid stinger to prevent the head from turning in the pipeline. • The lance's flexible hose shall have a visible line/mark eight feet from the head. Once the mark becomes visible during removal, the removal operation shall be stopped and the unit depressurized for the complete lance removal. • **Water injection incidents with pressurized water are medical emergencies. Personnel shall be medically evaluated for waterborne infections.** • **All lance/wand operators shall don aluminum or Turtleskin® protective foot and leg guards.** • **Establish guardrail around opening to pipe cleaning area.** • Use a vacuum truck or similar to capture wash fluids and sediment form inside pipe.

Line Breaking / Cold Cutting	Chemical exposure, Struck by/Against, Cuts and Punctures; Pipes Under Stress/ Pinch Points Strains and Sprains, Slips, Trips and Falls, Splash and Spills	• NO ONE will work directly underneath a pipe that is being dismantled • All pipes will be cut to a manageable length (maximum of 8 feet) • Whenever possible start removal from an already open end • Relieve stress on all pipes by cutting into smaller sections, or securing the pipe, or relieving by other means • DO NOT ever cut a pipe hanger that is under a great deal of stress (relieve the stress by elevating or lowering the pipe prior to making the cut) • Always be aware of other activities that are going on around you • All pipes need to be supported by some safe means • NO pipes will be allowed to free fall unless a drop area has been approved by FMC and CB&I • Do not stand underneath of any pipe being lowered • Handle pipes with Aluminized Carbon/Kevlar PPE • Survey pipes / sediment for radiological materials. • Handle pipes properly, DO NOT grasp pipes at the cut ends or rough edges • Keep travel paths and walkways clear of debris and tripping hazards
Placement of Pipe / debris into Staging Area	Cuts and Punctures Struck by/ Against Pinch Points Strains and Sprains	• Use proper lifting techniques. Do not attempt to handle large pieces of pipe by your self • Use mechanical means whenever possible • Do not throw pipes at or to anyone • Ensure that the staging area has been delineated to prevent tripping hazards

Crew Name Signatures

Job Close Out

Any incidents / Injuries / Near miss / STOP work reported? List:	**Job Audited** Time: Supervisor / Auditor Signature:	**Recommendations:**

Before starting work: *Is this the SAFEST way to do this JOB?*

"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP (PPE)
☐ Excavation / Trench ("One Call" made)	☐ Flash burns	☒ Electrical Shock	☒ Locked & Tagged out	☐ Fall Potential	☒ Fire Extinguishers	☒ Rubber Gloves
☐ Cold Work	☐ Combustibles	☐ Heat Stress	☐ Try Start / Stop Switch	☐ Pinch Points	☐ Safety Shower	☒ Leather Gloves
☐ Hot Work	☐ Spark Containment	☐ Heavy Objects	☐ GFCI Test	☐ Slip-Trip Potential	☒ Evacuation Route	☐ Special Purpose Gloves
☒ Entry Permit / Confined Space	☐ Shields	☐ Hot / Cold Surf. or Mat.	☐ Assured Grounding	☐ Other	**Lifts / Rigging**	☐ Slicker Suit
☒ Line Breaking	☐ Grounding	☐ Inadequate Lighting	☐ Extension Cord Inspection	**HAZARDS / CHEMICALS**	☐ Critical Lift	☐ Acid Suit
☐ Signed Off When Complete	☐ Fire Extinguisher	☒ Line Breaking –	**OTHER WORK IN AREA**	☐ Chemical Burn Skin	☐ Manual Lifting	☒ Rubber Boots
☒ LO/TO	☐ Water Hose	☐ **Check List attached**		☐ Chemical Burn Eyes	☐ Softeners	☐ Metatarsals
☐ Other	☐ Fire Blanket	☒ Noise	☐ Others Working Overhead	☒ Flammable	☐ Proper Rigging Practices	☐ Respirator
ACCESS	☐ Fire Watch	☒ Sharp Objects	☐ Type Work Others Doing:	☐ Ingestion	☐ Chain fall, Come a long	☐ ½ face
	☐ Leads routed overhead 7' / not in walk way	☐ Other	☐	☐ Other	☐ Inspected - in good condition	☐ Full Face
☐ Scaffold (properly inspected ____)	☐ Sewer Covers	☐ Poor Access / Egress	☐ PPE Due to Other Work	☒ Inhalation	☐ Crane	☐ PAPR
☐ Ladder (Tied off ____)	**OVERHEAD WORK**	**TOOLS**	☐ Other	☒ Skin Contamination	☐ Forklift	☐ Fresh Air
☐ Man lift (inspected)	☐ Barricades	☐ Proper Tools for the Job	**Confined Space Know the Following:**		☐ Operator Certificate	☒ Hearing Protection
☐ Personnel Basket (inspected & approved ____)	☐ Hole Cover	☐ Good Tool Condition	• **Possible hazards within the confined space** • **First signs of exposure** • **How to summons help** • **How to track personnel** • **Entering and exiting the confined space** • **Maintain contact with all entrants by voice or visual** Do not attempt to rescue unless you are a part of a Trained in confined space rescue.		☐ Condition of Equipment – Inspection Checklist	☐ Safety Harness
	☐ Signs					☐ Approved Anchor Points
☐ Operator Training	☐ Handrail	☐ Qualifications			☐ Rigging and Lifting JSP - Required	☐ Mono Goggles (vented / non-vented)
Worksite Stretches: • Before shift / Pre-task / End of shift • Stretch to a point where you feel a mild tension and relax as you hold the stretch.		☐ Current Inspection			**Barricades**	☐ Face Shield
		☐ Tool Tethers			☐ Tags on all sides	☐ Kevlar Gloves

• **Stretches should be held for 10-30 seconds.** • Always stretch within your comfort limits, never **to** the point of pain.	☐ Tool Lanyards	Remain at entry point; assume no duties that will take you from there. Signs posted to identify confined space?	☐ Stands Used ☐ 42” high	☐ Kevlar Sleeves ☒ Fire Retardant Clothing
			☐ Caution / Yellow ☐ Danger / Red ☐ Taken down at the end of shift	☐ Safety glasses with ANSI app Side Shields ☐ Welding hood ☐ Burning Goggles ☐ Other

Pre-Job Preparation

1. Get Permit for Job 2. Fill out JSA 3. Review JSA (EVERYONE) 4. Sign JSA (EVERYONE)	**Safety Access / Location**	**Employee Authorization to STOP Work**

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

Contractor Oversight

Wind Direction:

Evacuation Route:

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards
Contractor Oversight	Lack of communicating tasks ideals to field personnel may lead to an injury/illness, environmental hazard, near hit, equipment damage, or rework.	• Site management will conduct an project orientation, HASP and Job Safety Analysis review with field personnel before the start of work on a new task. • Project personnel shall inspect all equipment before it is used. Equipment that is damaged shall be tagged out of service until it is repaired. • Unsafe acts or conditions shall be reported to the Site Manager/subcontractor site lead and corrected as soon possible. • All site personnel have Stop Work Authority .

	Struck By/ Against Motor Vehicles/ Operating Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Avoid/isolate activities in high traffic areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Emphasize The Buddy System where injury potential exists
	Inhalation and Contact with site contaminants	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants • Maintain the buddy system in areas where sudden releases of toxic vapors may occur • Follow industry standard safety work practices.
	Slips, Trips, Falls	• Clear walkways, work areas of equipment and tools • Mark, identify, or barricade other obstructions
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Close doors, windows on heavy equipment to prevent injuries from tree branches and other vegetation

	Insect/ Animal Bites	• Review injury potential with workers • Avoid insect nests areas, habitats outside work areas • Emphasize The Buddy System where such injury potential exists • Use insect repellent to protect against sting injuries
	Contact Dermatitis	• Wear long sleeve shirts / trousers to avoid skin contact with plants or other skin irritants • Identify and review poisonous plants with workers • Avoid unnecessary clearing of plant/vegetation areas • Apply protective cream/lotion to exposed skin to prevent poison ivy or similar reactions
	High / Low Ambient Temperature	• Monitor for Heat and/or Cold stress in accordance with CB&I CMS HSE Procedure • Provide fluids to prevent worker dehydration • Follow work/rest schedule in the HASP

Crew Name Signatures

Job Close Out

Any incidents / Injuries / Near miss / STOP work reported? List:	**Job Audited** Time: Supervisor / Auditor Signature:	**Recommendations:**

Before starting work: *Is this the SAFEST way to do this JOB?*

"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP (PPE)
☐ Excavation / Trench ("One Call" made)	☐ Flash burns	☐ Electrical Shock	☐ Locked & Tagged out	☐ Fall Potential	☒ Fire Extinguishers	☒ Rubber Gloves
☐ Cold Work	☐ Combustibles	☒ Heat Stress	☐ Try Start / Stop	☐ Pinch Points	☐ Safety Shower	☒ Leather Gloves

- ☒ Hot Work
- ☒ Entry Permit / Confined Space
- ☒ Line Breaking
- ☐ Signed Off When Complete
- ☒ LO/TO
- ☐ Other

ACCESS

- ☐ Scaffold (properly inspected ____)
- ☐ Ladder (Tied off ____)
- ☐ Man lift (inspected)
- ☐ Personnel Basket (inspected & approved ____)
- ☐ Operator Training

- ☐ Spark Containment
- ☐ Shields
- ☐ Grounding
- ☐ Fire Extinguisher
- ☐ Water Hose
- ☐ Fire Blanket
- ☐ Fire Watch
- ☐ Leads routed overhead 7' / not in walk way
- ☐ Sewer Covers

OVERHEAD WORK

- ☐ Barricades
- ☐ Hole Cover
- ☐ Signs
- ☐ Handrail

- ☒ Heavy Objects
- ☐ Hot / Cold Surf. or Mat.
- ☐ Inadequate Lighting
- ☐ Line Breaking –
- ☐ **Check List attached**
- ☒ Noise
- ☐ Sharp Objects
- ☐ Other
- ☐ Poor Access / Egress

TOOLS

- ☒ Proper Tools for the Job
- ☒ Good Tool Condition
- ☒ Qualifications
- ☒ Current Inspection
- ☐ Tool Tethers
- ☐ Tool Lanyards

- Switch
- ☐ GFCI Test
- ☐ Assured Grounding
- ☐ Extension Cord Inspection

OTHER WORK IN AREA

- ☐ Others Working Overhead
- ☐ Type Work Others Doing:
- ☐
- ☐ PPE Due to Other Work
- ☐ Other

- ☐ Slip-Trip Potential
- ☐ Other

HAZARDS / CHEMICALS

- ☐ Chemical Burn Skin
- ☐ Chemical Burn Eyes
- ☐ Flammable
- ☐ Ingestion
- ☐ Other
- ☒ Inhalation
- ☒ Skin Contamination

Worksite Stretches:

- Before shift / Pre-task / End of shift
- Stretch to a point where you feel a mild tension and relax as you hold the stretch.
- **Stretches should be held for 10-30 seconds.**
- Always stretch within your comfort limits, never **to** the point of pain.

Confined Space Know the Following:

- **Possible hazards within the confined space**
- **First signs of exposure**
- **How to summons help**
- **How to track personnel**
- **Entering and exiting the confined space**
- **Maintain contact with all entrants by voice or visual**

Do not attempt to rescue unless you are a part of a Trained in confined space rescue.
Remain at entry point; assume no duties that will take you from there.
Signs posted to identify confined space?

- ☒ Evacuation Route

Lifts / Rigging

- ☐ Critical Lift
- ☐ Manual Lifting
- ☐ Softeners
- ☐ Proper Rigging Practices
- ☐ Chain fall, Come a long
- ☐ Inspected - in good condition
- ☐ Crane
- ☐ Forklift
- ☐ Operator Certificate
- ☐ Condition of Equipment – Inspection Checklist
- ☐ Rigging and Lifting JSP - Required

Barricades

- ☐ Tags on all sides
- ☐ Stands Used
- ☐ 42" high
- ☐ Caution / Yellow
- ☐ Danger / Red
- ☐ Taken down at the end of shift

- ☐ Special Purpose Gloves
- ☐ Slicker Suit
- ☐ Acid Suit
- ☐ Rubber Boots
- ☐ Metatarsals
- ☐ Respirator
- ☐ ½ face
- ☐ Full Face
- ☐ PAPR
- ☐ Fresh Air
- ☐ Hearing Protection
- ☐ Safety Harness
- ☐ Approved Anchor Points
- ☐ Mono Goggles (vented / non-vented)
- ☐ Face Shield
- ☐ Kevlar Gloves
- ☐ Kevlar Sleeves
- ☐ Fire Retardant Clothing
- ☐ Safety glasses with ANSI app Side Shields
- ☐ Welding hood
- ☐ Burning Goggles
- ☐ Other

Pre-Job Preparation

5. Get Permit for Job 6. Fill out JSA 7. Review JSA (EVERYONE) 8. Sign JSA (EVERYONE)	**Safety Access / Location**	**Employee Authorization to STOP Work**

Eye Wash / Safety Shower:
I have been given authorization, without fear of reprimand or retaliation, to immediately **STOP** any work activity that presents a danger to me, my co-worker or the public; get involved, question and rectify any situation that is identified as not being in compliance with our safety and health policies; to report any unsafe conditions or acts to supervision and question any activity that involves violation of established Safety and Health policies.

JOB SAFETY ANALYSIS FOR VEHICLE OPERATION

Wind Direction:

Evacuation Route:

VEHICLE OPERATION JSA

Assembly Point:

Job Tasks: (What are you doing?)	Potential Hazards:	Recommended Action or Procedure to eliminate / mitigate Hazards
Vehicle Operation	Backing	• Back into parking spaces upon arrival, whenever possible. • Walk around the vehicle before backing to identify any new conditions or obstructions. • Use a spotter when backing whenever possible. • Understand hand signals. • Sound horn prior to backing. • Check the rear-view and side mirrors prior to backing (Note: All vehicles, other than automobiles, must have small convex mirrors attached to the side mirrors.) • Back slowly in areas of obstructed vision. • Anticipate others who may be backing out into your pathway and adjust accordingly

	Unfamiliar with the vehicle	• Familiarize yourself with the vehicle before moving. • Review the dashboard controls, steering radius, overhead and side clearances. • Properly adjust mirrors and seat. • Locate windshield wipers and lights.
Vehicle Operation (continued)	Speed	• Obey all posted speed limits. • Radar detectors are prohibited in all company owned, leased or rented vehicles. • Reduce travel speed during hazardous conditions (i.e. rain, fog, snow). • Identify if your vehicle has Anti-Lock Brakes (ABS). If it does, DO NOT pump the brakes to stop when the vehicle has begun to skid. Apply steady pressure to the brakes. If the vehicle does not have ALB, you will want to pump the brakes to stop during slippery conditions.
	Distances/Spacing Tire Concept →	• Follow the 3 second rule. • Increase the 3 second rule as necessary during hazardous travel conditions. • Always leave yourself an “out” during travel. • When stopping, make sure that you leave enough distance between you and the car in front of you. You should be able to see the rear tires of the vehicle in front, when stopped. • Drive defensively. • When at a red light, and it turns green, use the “delayed start” technique, by counting to three before you take your foot off the brake. • DO NOT TAILGATE
	Skids	• If the vehicle has begun to skid out of control, turn the steering wheel in the direction of the skid and re-adjust the wheel, as necessary. • Slow travel speeds during hazardous travel conditions. • Use 4-wheel drive, if available, when driving vehicles off road, on steep inclines, muddy conditions, etc. • Do not take vehicles “off road” if they cannot be operated safely.

Vehicle Operation (continued)	Blind Spots	• Become familiar with any blind spots associated with your vehicle. • Adjust mirrors properly. • Make sure you use your directional signals. • Always look over your shoulder to assure the lane is clear when changing lanes. • Be cautious when approaching other driver's blind spots.
	Cellular Phones	• Do not use handheld cellular phones while driving • Pull over to the side of the road when making a call or texting
	Accidents	• In the event of an accident: Stop; call for medical assistance; notify police; complete Vehicle Accident Report and submit to you supervisor. • If an CB&I employee is injured, the CORE forms, Return to Work, Medical Release and Treatment of Injury/Illness, must completed at the health clinic or Emergency Room.
	Equipment failure	• Perform daily inspections of your vehicle. • Any vehicle with mechanical defects that may endanger the safety of the driver, passengers or the public shall not be used. • Ensure safety equipment is in the vehicle. Safety equipment should include a spare tire, jack, first-aid kit, fire extinguisher and flashlight. Flares and/or reflective triangles should be available in larger trucks. • Ensure the proper documentation is in the vehicle. Documentation should include an operations manual for the vehicle, insurance card, vehicle registration and CB&I Accident forms.

Vehicle Operation (continued)	Influenced by drug and alcohol	• NEVER DRIVE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL. • Disciplinary action, including termination, will be taken against anyone who is convicted of or pleads no-contest to the charges of driving under the influence in accordance with CB&I Health and Safety Procedure. • Project-assigned hourly employees are not permitted to operate company owned, leased or rented vehicles after 10:00 p.m. without written authorization from their supervisor.
	Driver attitude	• Do not operate any vehicle when abnormally tired, temporarily disabled or under the influence of drugs or alcohol. • Keep an even temper when driving. Do not let the actions of others affect your attitude. • No employee is authorized to operate a company vehicle (including rentals) after having been on-duty for a period of 16 hours. • No employee may drive for more than 12 hours in a single on-duty period.
	Vehicle Loading	• DO NOT OVERLOAD the vehicle • Secure all equipment within the body of the vehicle • Do not block side view mirrors with load • Do not transport DOT manifested hazardous materials without a commercial driver's license (CDL) • Dispatch all equipment and personnel with proper forms and identification
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
• Valid driver's license for the class of vehicle driven • Seatbelt • A spare tire and jack, • First-aid kit, fire extinguisher, and flashlight • Operations manual for the vehicle • Insurance card, vehicle registration and CB&I Accident forms.	• Inspect vehicles daily	• Review JSA with all site personnel • Review CB&I Health and Safety Procedure • Talent Connection Defensive Driver Training

Crew Name Signatures

Job Close Out

Any incidents / Injuries / Near miss / STOP work reported? List:	**Job Audited** Time: Supervisor / Auditor Signature:	**Recommendations:**

Before starting work: *Is this the SAFEST way to do this JOB?*

"I will not put myself or let my co-workers perform any task that I would not allow my son or daughter in, on or around."

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS	WELDING	HAZARDS (ENVIRONMENTAL)	ELECTRICAL	HAZARDS / BODY	EMERGENCY EQUIPMENT	PERSONAL PROTECTIVE EQUIP (PPE)
☐ Excavation / Trench ("One Call" made)	☐ Flash burns	☐ Electrical Shock	☐ Locked & Tagged out	☐ Fall Potential	☒ Fire Extinguishers	☐ Rubber Gloves
☐ Cold Work	☐ Combustibles	☐ Heat Stress	☐ Try Start / Stop Switch	☐ Pinch Points	☐ Safety Shower	☐ Leather Gloves
☐ Hot Work	☐ Spark Containment	☐ Heavy Objects	☐ GFCI Test	☐ Slip-Trip Potential	☐ Evacuation Route	☐ Special Purpose Gloves
☐ Entry Permit / Confined Space	☐ Shields	☐ Hot / Cold Surf. or Mat.	☐ Assured Grounding	☐ Other	**Lifts / Rigging**	☐ Slicker Suit
☐ Line Breaking	☐ Grounding	☐ Inadequate Lighting	☐ Extension Cord Inspection	**HAZARDS / CHEMICALS**	☐ Critical Lift	☐ Acid Suit
☐ Signed Off When Complete	☐ Fire Extinguisher	☐ Line Breaking –	**OTHER WORK IN AREA**	☐ Chemical Burn Skin	☐ Manual Lifting	☐ Rubber Boots
☐ LO/TO	☐ Water Hose	☐ **Check List attached**		☐ Chemical Burn Eyes	☐ Softeners	☐ Metatarsals
☐ Other	☐ Fire Blanket	☐ Noise	☐ Others Working Overhead	☐ Flammable	☐ Proper Rigging Practices	☐ Respirator
ACCESS	☐ Fire Watch	☐ Sharp Objects	☐ Type Work Others Doing:	☐ Ingestion	☐ Chain fall, Come a long	☐ ½ face
	☐ Leads routed overhead 7' / not in walk way	☐ Other	☐	☐ Other	☐ Inspected - in good condition	☐ Full Face
☐ Scaffold (properly inspected ____)	☐ Sewer Covers	☐ Poor Access / Egress	☐ PPE Due to Other Work	☐ Inhalation	☐ Crane	☐ PAPR
☐ Ladder (Tied off ____)	**OVERHEAD WORK**	**TOOLS**	☐ Other	☐ Skin Contamination	☐ Forklift	☐ Fresh Air
☐ Man lift (inspected)	☐ Barricades	☐ Proper Tools for the Job	**Confined Space Know the Following:**		☐ Operator Certificate	☐ Hearing Protection
☐ Personnel Basket (inspected & approved ____)	☐ Hole Cover	☐ Good Tool Condition	• **Possible hazards within the confined space** • **First signs of exposure**		☐ Condition of Equipment – Inspection Checklist	☐ Safety Harness
	☐ Signs					☐ Approved Anchor Points

☐ Operator Training	☐ Handrail	☒ Qualifications	• **How to summons help** • **How to track personnel** • **Entering and exiting the confined space** • **Maintain contact with all entrants by voice or visual** Do not attempt to rescue unless you are a part of a Trained in confined space rescue. Remain at entry point; assume no duties that will take you from there. Signs posted to identify confined space?	☐ Rigging and Lifting JSP - Required	☐ Mono Goggles (vented / non-vented)
Worksite Stretches: • Before shift / Pre-task / End of shift		☒ Current Inspection		**Barricades**	☐ Face Shield
• Stretch to a point where you feel a mild tension and relax as you hold the stretch.		☐ Tool Tethers		☐ Tags on all sides	☐ Kevlar Gloves
• **Stretches should be held for 10-30 seconds.**		☐ Tool Lanyards		☐ Stands Used	☐ Kevlar Sleeves
• Always stretch within your comfort limits, never **to** the point of pain.				☐ 42” high	☐ Fire Retardant Clothing
				☐ Caution / Yellow	☐ Safety glasses with ANSI app Side Shields
				☐ Danger / Red	☐ Welding hood
				☐ Taken down at the end of shift	☐ Burning Goggles ☐ Other

Appendix C
Accident Forms

Incident Reporting and Management Procedure – Commercial & State/Local Programs

Action	Who? When?	Under what circumstances?	How?	Notes:
1. Notify Supervisor for all incidents (no matter how minor)	Injured person, first person recognizing incident, driver/passenger, or employee causing damage Immediately	All incidents no matter how minor	In person or by telephone	
2. For *life-threatening injuries/illnesses* - contact local emergency personnel For *non life-threatening injuries/illnesses* - transport injured person to doctor at an occupational medical facility For *vehicle accidents* – make scene safe, notify police, aid injured parties For *equipment/property damage* - make scene safe, prevent further damage or injuries	Site Supervisor Immediately (concurrently with next step if injury or illness) Site Supervisor Immediately (concurrently with next step if injury or illness) Driver/passenger Immediately Employee causing damage Immediately	In case of serious injury or illness requiring off-site medical care	Via ambulance Via vehicle	Site Supervisor or Site Safety Officer must immediately go to emergency care facility. Site Supervisor or Site Safety Officer must transport and stay with injured person until released from care
3. Notify CORE (for injuries/illnesses to CB&I employees only)	Site Supervisor *Immediately, prior to transporting the injured employee, unless injuries are life threatening*	♦ Serious injury requiring off-site medical care ♦ If employee states that he/she has been exposed to any chemical or biological substance	877-347-7429	♦ Not required for temporary agency and contract labor ♦ Provide name of injured employee, name and phone # of treating medical facility, description of the incident ♦ CORE will help with medical facility coordination and follow-up care

Incident Reporting and Management Procedure – Commercial & State/Local Programs

Action	Who? When?	Under what circumstances?	How?	Notes:
4. Notify Regional EHS Manager	Site Supervisor *Immediately (concurrently with providing transportation to occupational medical facility or EMS transport to hospital)*	All incidents	See C&S/L Incident Notification and Communication Contact List (attached)	♦ Contact should be made prior to sending the individual for medical care ♦ Regional EHS Manager will notify Troy Allen as appropriate
5. Contact CB&I Notification Hotline/Help Desk	Site Supervisor *As soon as possible. Prior to sending an individual for medical treatment*	♦ Illness and/or injury (doctors cases and above) ♦ Property damage (damage > $2,500.00) ♦ Vehicle accidents (All) ♦ Criminal activity (i.e. bomb threat, theft) ♦ Natural disaster (all) ♦ Explosion and/or fires (damage > $2,500.00 or result in injury) ♦ Environmental spills/releases (incidents that requires regulatory notification or have an offsite impact) ♦ Regulatory agency visit ♦ Fatalities	CB&I Notification Hotline/Help Desk Phone Number 866-299-3445 Note: Outside the Continental US call 225-215-5056	

Incident Reporting and Management Procedure – Commercial & State/Local Programs

Action	Who? When?	Under what circumstances?	How?	Notes:
6. Complete forms: I*njuries and illnesses* ♦ Authorization for Release of Protected Medical Information ♦ Authorization for Treatment of Occupational Injury/Illness ♦ Return-To-Work Examination Form *and* fax to CORE *and* fax to Loss Prevention Manager (Casey Parker)	Injured employee and medical facility personnel (Site Supervisor is responsible for verifying forms are completed) *Prior to leaving medical facility*	♦ Serious injury requiring off-site medical care ♦ If employee states that he/she has been exposed to any chemical or biological substance	Fax to CORE Medical at 225-756-2673 Fax to Loss Prevention Manager (Melanie Felker 225-987-8101)	Site Supervisor or Site Safety Officer must take these forms with him/her to occupational medical facility or hospital
7. Call Project Manager and notify of incident	Site Supervisor *As soon as reasonably possible*			Project Manager will report incident to upper levels of Operations/Business Line Management
8. Call back Regional EHS Manager to report on status of *injured/ill employee*	Site Supervisor *Prior to employee leaving medical facility*	All injuries and illnesses requiring off-site medical care	See C&S/L Incident Notification and Communication Contact List (attached)	
9. Complete forms: *OSHA Recordable Cases* Supervisor's Employee Injury/Illness Report Form Injured Employee Statement Witness Statement Form(s) *First Aid Cases* Supervisor's Employee Injury/Illness Report Injured Employee Statement Witness Statement Form(s) Fax completed forms to CB&I Corporate Claims and Regional EHS Manager and CORE.	♦ Site Supervisor ♦ Witnesses *As soon as possible – no later than 24 hours*	All injuries, illnesses, and first aid cases	CB&I Corporate Claims Department Fax (225-932-2636) CORE Fax 225-756-2673 See C&S/L Incident Notification and Communication Contact List (attached)	Site Supervisor should have these forms with him/her at all times

Incident Reporting and Management Procedure – Commercial & State/Local Programs

Action	Who? When?	Under what circumstances?	How?	Notes:
10. Complete forms: *Chargeable Vehicle Accidents* Vehicle Accident Report Witness Statement Form(s) Driving Record Certification *Non-Chargeable Vehicle Accidents* Vehicle Accident Report Witness Statement Form(s) Equipment, Property Damage and General Liability Incidents Equipment, Property Damage and General Liability Loss Report Witness Statement Form(s) Fax completed forms to CB&I Corporate Claims and Regional EHS Manager.	♦ Site Lead / Supervisor ♦ Witnesses *As soon as possible – no later than 24 hours*	All vehicle accidents and /or all property damage	CB&I Corporate Claims Department (225-932-2636) See C&S/L Incident Notification and Communication Contact List (attached)	Supervisor should have these forms with him/her at all times
11. Complete forms: *OSHA Recordable Cases* Incident Investigation Report *First Aid Cases* Incident Investigation Report *Chargeable Vehicle Accidents* Incident Investigation Report *Non-Chargeable Vehicle Accidents* Incident Investigation Report Equipment, Property Damage and General Liability Incidents Incident Investigation Report *Near Miss* Incident Investigation Report Fax completed forms to Regional EHS Manager	Site Supervisor *As soon as possible – no later than 72 hours of incident*		CB&I Corporate Claims Department (225-932-2636) See C&S/L Incident Notification and Communication Contact List (attached)	Supervisor should have these forms with him/her at all times

Incident Reporting and Management Procedure – Commercial & State/Local Programs

Action	Who? When?	Under what circumstances?	How?	Notes:
12. Perform "Accident Review Board" (ARB) and fax to Regional EHS Manager.	Site Supervisor/Project Manager *Within 10 days of incident*	OSHA Recordable Cases Chargeable Vehicle Accidents		ARB must include: Regional Manager, Project Manager, Employee's Direct Supervisor, Regional EHS Manager, and

CB&I Accident / Incident Terminology

Tier I Minor Incident

An event that causes or had potential to cause only minor damage or injury requiring only first aid treatment.

- A small fire not requiring assistance to extinguish.
- Near misses where injury or damages could have occurred, but are limited to first-aid injuries and property damage of less than $5,000.
- Motor Vehicle Accident with damage less than $5,000
- Fall into water or resulting in deployment of lanyard.
- Environmental spill less than 25 gallons;
  - o That does not violate any reportable quantity
  - o And does not contact a navigable waterway.

Tier II Serious Incident

Any event that required or had the potential to require emergency services for treatment of an injury or control of hazards to personnel or the environment to include:

- Recordable injuries/illnesses
- Restricted workday injuries/illnesses
- Any incident that causes damage to equipment requiring extensive repair or causes a disruption in work progress
- Near misses where injury or damages could have occurred, but are limited to recordable injuries, restricted work injuries, or property damage of $5,000 to $50,000
- Serious environmental consequences (any quantity of release to the environment requiring reporting to relevant governmental agencies).
- Reputation or community relations affected
- Environmental spill of 25 to 1,000 gallons,
  - o That does not contact a navigable waterway
  - o but is in violation of a reportable quantity
- High potential incidents as defined above
- Could affect reputation or community relations

Tier III Major Incident

Any event causing or having the potential to cause multiple injured/ill personnel requiring emergency services, permanently disabling injuries/illness, fatalities, property damage in excess of $50,000, disruption of critical plant systems, or environmental impacts requiring regulatory notifications to include:

- Injuries/illnesses that cause lost work time
- Fatality
- Hospital admittance (excluding emergency room outpatient care)
- Major fire or chemical spill, greater than 1,000 gallons, or a spill of any amount that contacts a navigable waterway,
- Radiation exposure
- Lost radioisotope
- Bomb threat, weapons discharge, terrorist act, NGO confrontation
- ISOS evacuation
- Any injury or illness meeting the definition of lost time
- Any incident causing damage to equipment or resources that will disrupt work activities
- Near misses where injury/illness or damages could have occurred, but are limited to lost time injuries/illnesses, multiple injury medical services, permanent disability, fatality, or property damage greater that $50,000
- Any incident requiring use of outside services
- *Any incident receiving news coverage*

Tier IV Crisis

Tier IV Reporting—Any event requiring initiation of the Crisis Management Plan.
The Trigger Point for any natural crisis is loss of life, hospitalization of multiple personnel, significant destructive impact to work activities, or a delay in the resumption of work activities for 24 hours or more. In addition to the Natural Crisis, many of the countries in which CB&I operates have actual or potential areas of risk due to political instability, war, terrorism, or high crime rates, these include:

- **Airline Incident—**The Trigger Point is any airline accident with CBI employees or assets involved.
- **Bomb Threat—**The Trigger Point is any direct or indirect bomb threat against employees, the facility, or its assets.
- **War or Military Conflict—**The Trigger Point is any war or military conflict that directly or indirectly affects personnel and assets.
- **Acts of Terrorism—**The Trigger Point is any act of terrorism that directly or indirectly affects personnel and assets.
- **Civil Disturbances (including demonstrations, protests, and other confrontations)—**The Trigger Point is any civil disturbance that directly or indirectly affects personnel and assets.
- **Kidnap and Ransom—**The Trigger Point is any act of kidnap and/or ransom demand that directly or indirectly affects personnel and assets.
- **Extortion Demands—**The Trigger Point is any act of extortion made against CB&I personnel to perform acts of kidnapping, injury, and assassination.
- **Detention by Host Government—**The Trigger Point is any act of detention by a host government that directly or indirectly affects personnel and assets.

First Aid Report

Date of Report: _____
Date & Time Injury/Illness occurred: _____
_____
Time In: _____
Time Out: _____

Name of Working Partner: _____
_____
Job Title: _____
Experience of Working Partner: _____
_____
How Long on This Site: _____

Employee Name: _____
SS#: _____
Date of Hire: _____
Job Title: _____
Experience: _____
How Long on This Site: _____

Subcontractor: _____
Foreman: _____
Supervisor: _____

Work Location/Area: _____

Location of injury/illness: _____

Description of injury/illness: _____
_____
_____
_____
_____

Description of first aid administered: _____

Allergies: _____

Physician referral? _____ (Y) yes, (N) no, or (U) unknown
Return to work? (Y) yes (N) no, or (U) unknown
Tetanus up to date? _____ (Y) yes, (N) no, or (U) unknown
Restricted duty? _____ (Y) yes, (N) no, or (U) unknown
Recordable? _____ (Y) yes, (N) no, or (U) unknown
Workman's comp? _____ (Y) yes, (N) no, or (U) unknown
Any related previous injury/illness? _____ (Y) yes, (N) no, or (U) unknown

If yes, describe: _____
_____

Name of person/persons giving treatment:_____

Reviewed by: _____

RETURN TO WORK AUTHORIZATION

Date: _____

Time: _____

Date of injury:_____

To:_____
(*Supervisor*)

_____
Was seen in the first aid office today for

treatment of _____

_____

_____

_____

_____

Treated by:
_____

***The employee is being released to return to work without restrictions*.**

Please sign and <u>return to the CB&I Safety office</u>.

_____
Contractor Safety

_____

Foreman _____

Employee_____

_____
HSE Manager

Medical Forms

Authorization for Release of Protected Medical Information

Printed Name: _____ Date of Birth: _____

Address: _____

Home Telephone: _____

Authority to Release Protected Health Information

I hereby authorize the release of medical information, identified in this authorization form, and provide such information to:

_____		**CB&I**
_____	**AND**	_____
_____		_____
_____		_____
_____ _____		_____

The information to be released includes the following:

Complete health record	Discharge summary	Progress notes
History and physical exam	Consultation reports	X-ray films / images
Laboratory test results	X-ray & Image reports	Itemized bill
Diagnosis & treatment codes	Complete billing record	

Other (specify) _____

Purpose of the Requested Disclosure of Protected Health Information

I am authorizing the release of my protected health information.

Drug and/or Alcohol Abuse, and/or Psychiatric, and/or Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) Records Release

I understand if my medical or billing record contains information in reference to, psychiatric care, sexually transmitted disease, hepatitis B or C testing, previous drug and/or alcohol abuse and/or other sensitive information, I agree to its release.

Check One: ☐ **Yes** ☐ **No**

I understand if my medical or billing record contains information in reference to HIV/AIDS testing and/or treatment I agree to its release.

Check One: ☐ **Yes** ☐ **No**

Right to Revoke Authorization

Except to the extent that action has already been taken in reliance on this authorization, the authorization may be revoked at any time by submitting a written notice to ***The Corporate Claims Dept.*** **at** ***2103 Research Forest Drive, The Woodlands, TX 77380***. Unless revoked, this authorization will expire at which time completion of treatment for the injury or illness has been accomplished.

Re-disclosure

I understand the information disclosed by this authorization may be subject to re-disclosure by the recipient and no longer be protected by the Health Insurance Portability and Accountability Act of 1996.

Signature of Patient or Personal Representative Who May Request Disclosure

I understand that I do not have to sign this authorization. However, if health care services are being provided to me for the purpose of providing information to a third-party (*e.g.*, fitness-for-work test), I understand that services may be denied if I do not authorize the release of information related to such health care services to the third-party. I can inspect or copy the protected health information to be used or disclosed. **I hereby release and discharge** ***CB&I*** **of any liability and the undersigned will hold** ***CB&I*** **harmless for complying with this Authorization.**

Signature: _____ Date: _____

Description of relationship if not patient: _____

Near Miss Report

Incident Date	Reported By	Work Unit	Project Name	Incident Number

Description (What, Where, When, Who, How)

Please check all that apply:

- ☐ Unsafe Act
- ☐ Unsafe Condition
- ☐ Improper PPE
- ☐ Unsafe Equipment
- ☐ Unsafe Use of Equipment
- ☐ Housekeeping

Why was the unsafe act committed, and/or why was the unsafe condition present?

What Corrective Actions have/will be taken to prevent similar incidents?

Person responsible for follow-up	Expected completion date	Actual completion date

Verified By:	
Supervisor Name:	
Signature:	

CBI Incident Report

NOTIFICATION		
* Required Fields		
*Incident Date:	*Incident time:	*Location:
* City	State (Province):	* Country
* Client name:	Employee type:	
Involved parties:	If other involved parties, please specify:	Project Manager
Construction Manager	Superintendent	Foreman
* Project type:	* Project type subcategory:	
* Incident summary:		
* Incident detailed description:		
Immediate actions taken:		Responsible Supervisor:
Tier 1		
Project HSSE Manager	District HSSE Manager	Area HSSE Manager
Onsite Senior Operations Manager		
Tier II		
Corporate Manager HSSE Systems	Global VP HSSE	VP Project Services
Country/District/Unit Operations Manager	CBI Lummus Construction/Fabrication VP CBI SPS Area Operations VP	CBI Lummus/SPS Sector VP of Operations
Sector President	Sector HSSE Director	
Tier III		
Chief Executive Officer	Chief Operating Officer	
Additional People to Notify:		

INCIDENT DETAILS

* Required Fields

* Occupation:

* All Consequences of the Incident:

- ☐ Environmental
- ☐ Residual Hazard/Effect
- ☐ Near Miss
- ☐ Equipment Damage or Loss
- ☐ Injury or Illness
- ☐ Security
- ☐ Fire
- ☐ Motor Vehicle Accident

Initial Risk Assessment:

Consequence:	Probability:
☐ Insignificant	☐ Rare
☐ Minor	☐ Unlikely
☐ Moderate	☐ Possible
☐ Major	☐ Likely
☐ Catastrophic	☐ Almost Certain

ILLNESS/INJURY (IF APPLICABLE)

* Required Fields

☐ Injury ☐ Illness	* Injury summary:

Injury detailed description:

* Injured or Ill person:	* Employee Type:	Privacy Concern: ☐

* Employer:

*** Classification:**	☐ First Aid	☐ Medical Treatment Injury – Recordable		☐ Restricted Work Duty
	☐ Lost Time Injury	☐ Occupational Illness	☐ Non Work Injury or Illness	☐ Fatality ☐ N/A

***Justification for injury classification:**

*** Days Lost/ Restricted Duty**	Time Period:	No. of days lost/restricted:	Type: ☐ Days lost	☐ Restricted Duty

*** Bodily Location:**	☐ Abdomen	☐ Feet	☐ Lower Arm	☐ Spinal - Thoracic
	☐ Ankle	☐ Fingers	☐ Lower Leg	☐ Toes
	☐ Back	☐ Genitals	☐ Mouth	☐ Tooth/Teeth
	☐ Chest	☐ Groin	☐ Neck	☐ Upper Arm
	☐ Ears	☐ Hands	☐ Shoulders	☐ Upper Leg
	☐ Elbow	☐ Head	☐ Spinal - Cervical	☐ Wrist
	☐ Eyes	☐ Hips	☐ Spinal - Lumbar	
	☐ Face	☐ Knees	☐ Other: _____	

*** Nature:**	☐ Amputation – including Enucleation – loss of eyeball	☐ Bruise, Contusion
	☐ Bite, Sting	☐ Cancers
	☐ Burn – Hot, Cold, Chemical, Radiation, Frostbite	☐ Crushing Injury
	☐ Concussion, Unconscious	☐ Dermatitis
	☐ Cut, Laceration, Puncture	☐ Disorder Due to Physical Agents – other than toxic agents
	☐ Disorders Associated with Repeated Trauma	☐ Exhaustion, Heat Stroke
	☐ Electric Shock	☐ Fracture, Chip – excluding vertebral column
	☐ Foreign Body/Sliver/Chip, Dust	☐ Fracture, Chip – including vertebral column
	☐ Hearing Loss	☐ Infectious and Parasitic Diseases
	☐ Ingestion	☐ Internal Injury, Hernia
	☐ Intracranial Injury – including concussion	☐ Joint Dislocation
	☐ Loss of Senses, Faculties, Shock	☐ Lung Problem, Dust Related
	☐ Lung Problem, Toxic Agent Related	☐ Massive Trauma, Other
	☐ Poisoning and Toxic Effects	☐ Scratch, Abrasion, Irritation
	☐ Skin Disease, Disorder	☐ Sprain, Strain, Torn
	☐ Suffocation, Inhalation	☐ Superficial Injury
	☐ All Others: _____	

***Mechanism:**	☐ Being hit by moving objects	☐ Contact or exposure to heat and cold
	☐ Contact with electricity	☐ Contact with/or exposure to biological factors
	☐ Exposure to mechanical vibration	☐ Exposure to mental stress factors
	☐ Exposure to particles or contaminants	☐ Exposure to radiation
	☐ Exposure to sharp, sudden sound	☐ Exposure to variations in pressure – other than sound
	☐ Falls from height	☐ Falls on the same level – including trips and slips

	☐ Hitting objects with part of a body ☐ Long term exposure to sounds ☐ Pinch points ☐ Single contact with chemical or substance –excludes insect and spider bites ☐ Unspecified mechanism or injury/illness	☐ Long term contact with chemical or substance ☐ Repetitive movement with low muscle loading ☐ Slide or cave-in ☐ Vehicle accident ☐ All others: _____
***Source of Injury**	☐ Biological Source ☐ Human Source ☐ Live animals ☐ Mobile plant ☐ Non-metallic substances ☐ Non-powered equipment ☐ Outdoor environment ☐ Road transport ☐ Unspecified source	☐ Chemicals ☐ Indoor environment ☐ Machinery and fixed plant ☐ Non-living animals ☐ Non-physical source ☐ Non-powered hand tools ☐ Powered equipment, tools and appliances ☐ Underground environment ☐ Other: _____

Information about the Physician or other Health Care Professional			
Name of Physician or other Health Care Professional:			
Facility where treatment given:		Street Address:	
City:	State:	Zip Code:	
Was employee treated in emergency room? ☐ Yes ☐ No		Was employee hospitalized overnight as an in-patient? ☐ Yes ☐ No	
Information about the Case			
Time the employee began work:	What was the employee doing before the incident occurred?		
How did the injury occur?			
What was the injury or illness?			
What object or substance directly caused harm?		If fatality, date of death:	

ENVIRONMENTAL (IF APPLICABLE)

* Required Fields

* Type Of Ecological Loss

☐ Fauna ☐ Flora ☐ Habitat/Wetland ☐ Archaeological ☐ Other

If Other Type of Ecological Loss, please specify:	Impact Initiating Event:	If other Impact Initialing Event, please specify
Contaminants (Spill or Release Only)		
Contaminant type:		
Volume release (number): Unit:	Volume recovered (number): Unit:	Sensitivity type: Unit:

Area/Distance			
Area impacted:	Unit:	Km from sensitive area:	Mi from sensitive area:
Sensitivity type – Area:			
Flora/Fauna			
Species impacted:	Common name:	Number of species:	
CITES Species:		Protected species:	
Comments:			
Documents:			

EQUIPMENT DAMAGE OR LOSS (IF APPLICABLE)

* Required Fields

* Equipment damage or loss classification: ☐ Damage ☐ Loss ☐ Theft	Operator name:	Owner details: ☐ CBI ☐ Non CBI ☐ Facility ☐ Other
Equipment description:		
Model:	Year:	Serial number:

FIRE (IF APPLICABLE)

* Required Fields

* Description:		
Materials involved:		
Source of fuel:	Type of fuel:	Source of ignition:
Source of oxygen:	Method of extinguishment:	

RESIDUAL HAZARD/EFFECT (IF APPLICABLE)

* Required Fields

Specific hazard location:	
* Hazard category:	Hazard subcategory:
* Summary:	
Detailed Description:	

MOTOR VEHICLE ACCIDENT (IF APPLICABLE)

* Required Fields

Company driver name:	Non-company driver name:	Weather conditions:
Time of day:	Road type:	Road surface condition:
Vehicle type:	Vehicle model:	Vehicle make:
Vehicle year:	Registration plate number:	Site permit number:
License expiry date:	Work hours (number):	Company Vehicle: ☐ Yes ☐ No
Approximate vehicle speed at impact:	Length of skid marks:	
Vehicle direction of travel:	Number of passengers:	
3rd Party involved? ☐ Yes ☐ No	3rd Party driver/passenger:	Driver license number:

NEAR MISS (IF APPLICAPLE)

* Required Fields

High Potential (HIPO) ☐

* Possible Consequences of the Incident:

☐ Environmental	☐ Equipment Damage or Loss	☐ Fire
☐ Residual Hazard/Effect	☐ Injury or Illness	☐ Motor Vehicle Accident
☐ Security		

What happened? (Description of the incident)

What unsafe acts and/or conditions contributed to this incident? (Immediate cause).

Initial Risk Assessment:

Consequence:	Probability:
☐ Insignificant	☐ Rarer
☐ Minor	☐ Unlikely
☐ Moderate	☐ Possible
☐ Major	☐ Likely
☐ Catastrophic	☐ Almost Certain

SECURITY (IF APPLICABLE)

* Required Fields

Type of security:	If other type of security incident, please specify:

Security Details:

Victim Details

Is the victim an employee: ☐ Yes ☐ No Security victim:

Name of victim, if non-employee:	Address of victim, if non-employee:

Offender/Suspect Details

Is the offender/suspect an employee: ☐ Yes ☐ No Security Offender or Suspect:

Name of Offender/Suspect, if non-employee: Gender:

Resolution

Resolution outcome:	Resolution property:

Further Details:

INVESTIGATION

* Required Fields

* Start date:	End Date:	Investigation Team Leader:

Investigation Team:	Detailed description of investigation findings:

Final Risk Assessment:

Consequence:	Probability:
☐ Insignificant	☐ Rarer
☐ Minor	☐ Unlikely
☐ Moderate	☐ Possible
☐ Major	☐ Likely
☐ Catastrophic	☐ Almost Certain

Direct cost:	Est. indirect cost:	Est. total cost impact:

Additional people to notify:

Click here if Causal Analysis is required: ☐	Was a Tap Root Analysis required?	Date Tap Root completed:
Is the Investigation complete? ☐ Yes ☐ No	☐ Yes ☐ No	

Documents:

ACTIONS (IF APPLICABLE)		
* Required Fields		
* Location:		Country:
* Assigned by:	* Due Date:	* Due Opened:
* Action category:	* Action source:	* Consequence as source of action:
* Assigned to:		Work Order number:
Notice of Violation/Disciplinary Action Required: ☐ Yes ☐ No		IDLH Situation? ☐ Yes ☐ No
* Action Title:	Action description:	
Attachments:		

NOV/DISCIPLINARY ACTIONS (IF APPLICABLE)		
* Required Fields		
* Date of Incident/Inspection:	* Date that Notice was received:	Person disciplined:
Employer:	* Location/Plant name:	
Type:	Regulation/Standard:	
Description:		
Original proposed fine:	* Date resolved:	Actual $ paid:
Running comments:		
Update Date:		
* Name of Government Agency:		If other Agency, please specify:
Contact information for person at agency:		

CAUSAL ANALYSIS (IF APPLICABLE)

IMMEDIATE CAUSAL FACTORS

Were ACTIONS adequate? ☐ **Yes** ☐ **No**	**Were CONDITIONS adequate?** ☐ **Yes** ☐ **No**
If no, reasons actions not adequate	***If no, reasons not conditions not adequate***
☐ **Following Procedures**	☐ **Protective Systems**
☐ Individual ☐ Group ☐ Supervision ☐ Operating equipment w/o authority ☐ Improper position/posture ☐ Overexertion – physical capabilities ☐ Work or motion at improper speed ☐ Improper loading ☐ Shortcuts	☐ Guards/safety device utilization ☐ Guards/safety device functionality ☐ PPE utilization ☐ PPE functionality ☐ Warning systems effectiveness ☐ Warning systems functionality ☐ Isolation (LOTO)
☐ **Use of Tools or Equipment**	☐ **Tools, Equipment & Vehicles**
☐ Use of tools ☐ Use of equipment ☐ Use of defective tools ☐ Use of defective equipment ☐ Improper placement of tools/equipment ☐ Operating equipment at improper speed ☐ Servicing of equipment in operation	☐ Equipment/tools utilization ☐ Equipment/tools functionality ☐ Equipment/tools preparation ☐ Defective vehicle ☐ Proper vehicle for purpose ☐ Vehicle preparation
☐ **Use of Protective Methods**	☐ **Work Exposure To:**
☐ Prescribed PPE not used ☐ PPE used improperly ☐ Servicing energized equipment ☐ Lack of knowledge of job hazards ☐ Equipment/materials not secured ☐ Disabled guards/warning systems ☐ Removed guards/warning devices ☐ PPE not available	☐ Fire or explosion ☐ Noise ☐ Energized electrical systems ☐ Energized systems (non-electrical) ☐ Radiation ☐ Temperature extremes ☐ Hazardous chemicals/substances ☐ Mechanical hazards ☐ Clutter or debris ☐ Storms of acts of nature ☐ Slippery floors or walkways
☐ **Inattention/Lack of Awareness**	☐ **Workplace Environment**
☐ Horseplay ☐ Acts of violence ☐ Failure to warn ☐ Decisions/judgment ☐ Distracted by other concerns ☐ Inattention to footings/surroundings ☐ Routine activity (complacency) ☐ Use of drugs or alcohol ☐ Use of prescribed medications	☐ Congestion or restricted motion ☐ Lighting ☐ Ventilation ☐ Clearance ☐ Layout (ergonomics)

CAUSAL ANALYSIS (IF APPLICABLE) cont.

CONTRIBUTORY CAUSAL FACTORS

Were PERSONAL FACTORS adequate? ☐ **Yes** ☐ **No**

If no, reasons personal factors not adequate

☐ **Physical Capability**
- ☐ Vision
- ☐ Hearing
- ☐ Other sensory impact (smell/touch)
- ☐ Respiratory capacity
- ☐ Physical disabilities
- ☐ Temporary disability (broken leg)
- ☐ Inability to sustain body positions
- ☐ Restricted range – body movement
- ☐ Substance sensitivities or allergies
- ☐ Size or strength
- ☐ Medication

☐ **Physical Condition**
- ☐ Previous injury or illness
- ☐ Fatigue (workload, lack of rest)
- ☐ Performance loss (temp., 0_2 level)
- ☐ Blood sugar deficiency
- ☐ Impairment (drug or alcohol use)

☐ **Behavioral Aspects**
- ☐ Examples by supervision
- ☐ Critical behaviors not identified
- ☐ Critical behaviors not reinforced
- ☐ Unsafe behaviors not identified
- ☐ Response to unsafe acts
- ☐ Productivity incentives
- ☐ Time and cost constraints

☐ **Skill Level**
- ☐ Assessment of required skills
- ☐ Practice of required skills
- ☐ Performance of skills
- ☐ Skill

☐ **Other**
- ☐ Judgment
- ☐ Memory
- ☐ Poor condition or reaction time
- ☐ Emotional upset
- ☐ Fears and phobias
- ☐ Preoccupied with problems/concerns
- ☐ Conflicting directions/demands
- ☐ Confusing directions/demands
- ☐ Frustration

Were JOB FACTORS adequate? ☐ **Yes** ☐ **No**

If no, reasons job factors not adequate

☐ **Training/Knowledge Transfer**
- ☐ Knowledge transfer
- ☐ Recall of training
- ☐ Training provided for work

☐ **Leadership (Mgmt)**
- ☐ Conflicting roles or responsibilities
- ☐ Leadership practices
- ☐ Correct of reported hazard
- ☐ Identification of hazards
- ☐ Management of change
- ☐ Incident reporting/invest.
- ☐ Safety meetings
- ☐ Performance Measurement

☐ **Contractor Selection/Oversight**
- ☐ Contractor pre-qualifications
- ☐ Contractor selection
- ☐ Non-approved contractor
- ☐ Oversight

☐ **Engineering/Design**
- ☐ Technical design
- ☐ Standards/specs/criteria
- ☐ Assessment of potential failures
- ☐ Ergonomic design
- ☐ Monitoring of construction
- ☐ Assessment/operational readiness
- ☐ Monitoring of initial operation
- ☐ Evaluation/documentation change

☐ **Work Planning**
- ☐ Work planning
- ☐ Preventative maintenance
- ☐ Repairs
- ☐ Wear and tear
- ☐ Reference materials
- ☐ Audit/inspection/monitoring
- ☐ Job placement (personnel)

☐ **Purchasing/Material Handling**
- ☐ Item(s) received
- ☐ Research on requirements
- ☐ Mode or route of shipment
- ☐ Handling of materials
- ☐ Storage of materials/parts

☐ **Purchasing/Material Handling (Cont)**
- ☐ Material packing
- ☐ Material shelf-life exceeded
- ☐ Ident. of hazardous material
- ☐ Salvage and/or waste disposal
- ☐ Use of ES&H data

☐ **Tools and Equipment**
- ☐ Assessment of needs/risks
- ☐ Ergonomic considerations
- ☐ Standards/specifications
- ☐ Availability (Tools/equipment)
- ☐ Adjustment/repair/maintenance
- ☐ Salvage and reclamation
- ☐ Removal/replaced wrong item
- ☐ Equipment record history

☐ **Policies/Standards/Procedures**
- ☐ PSP for the work performed
- ☐ Development of PSP
- ☐ Implementation of PSP
- ☐ Enforcement of PSP
- ☐ Communication of PSP

☐ **Communication**
- ☐ Horizontal (peer-to-peer)
- ☐ Vertical (employee to super)
- ☐ Between organizations
- ☐ Between work groups
- ☐ Between shifts
- ☐ Communication methods
- ☐ Communication method available
- ☐ Instructions
- ☐ Job turnover
- ☐ Communication of ES&H data
- ☐ Standard terminology
- ☐ Verification practices
- ☐ Language differences

CHECKLIST FOR INCIDENT INVESTIGATIONS

Name/Subject: _____

Badge #: _____ Date:_____

Foreman's Name:_____ DOC #:_____

File #: _____

(These forms must be attached to each accident or injury report)

☐	Formal Near Miss/Incident Investigation Report	(5050-24.003)	Page 1 of 9
☐	Employee Statement		Page 2 of 9
☐	Foreman's Statement		Page 3 of 9
			Page 4 of 9
☐	Copy of JSA for the date of injury. (Attach to Foreman' Statement)		
☐	Copy of Safety Work Permit. (If, applicable)		
☐	Witness Statement (if, applicable)		Page 5 of 9
☐	Vehicle Accidents (if applicable)		Page 6 of 9
☐	Environmental of chemical hazard incident	(if applicable)	Page 7 of 9
☐	Utility Damage (if applicable)		Page 8 of 9
☐	HSE Professional's Summary		Page 9 of 9
☐	Safety Investigation Report	(for Document Control)	
☐	W/C Worksheet		
☐	Drug Screen (if required)	Date:_____	
☐	Entered on Accident/Incident Log (if required)	Date:_____	

(Attach only if, medical treatment is refused)

☐ Refusal of Medical Treatment (if applicable)

MEDICAL (INCLUDES ALL OF THE ABOVE AND THE FOLLOWING)

☐ Insurance Claim Form or (E –1)
☐ Medical Authorization for Medical Care or Testing
☐ Release for Medical Opinion and Return to Work (if applicable)
☐ Any Medical information from Doctors office.

Equipment/Property Damage

☐ Equipment Inspection Type of Equipment:_____

Notifications

☐ Reported to Carrier on Date: _____ Via: _____
Reported by :_____Contact Name: _____ Ext #: _____

☐ Reported to Site Manager Date: _____ Via: _____
Reported by:_____

☐ Reported to Director HSE Date: _____ Via: _____
Reported by:_____

Reviewed for Completeness

(Make sure that all forms have signatures along with date and times are correct.)

Reviewed by: _____ Date: _____
Reviewed by: _____ Date: _____
Reviewed by: _____ Date: _____

Appendix D
Hazard Communication, Safety Data Sheets (SDS)

HAZARD COMMUNICATION WRITTEN PROGRAM

Contract # _____

This program has been prepared to comply with the requirements of CMS-710-PR-00400 (as well as the US Federal OSHA standard 1926.59) and to insure that information necessary for the safe use, handling and storage of hazardous chemicals is provided to and made available to employees.

This program includes guidelines on identification of chemical hazards and the preparation and proper use of container labels, placards and other types of warning devices.

A. Chemical Inventory

1. An inventory of all known chemicals in use on the worksite. A chemical inventory list is available from the SHSM

2. Hazardous chemicals brought onto the worksite by this Company will be included on the hazardous chemical inventory list.

B. Container Labeling

1. All chemicals on site will be stored in their original or approved containers with a proper label attached, except small quantities for immediate use. Any container not properly labeled should be given to Steve Wall for labeling or proper disposal.
   (Name or Title)

2. Workers may dispense chemicals from original containers only in small quantities intended for immediate use. Any chemical left after work is completed must be returned to the original container or Richard Wolfson for proper handling.
   (Name or Title)

3. No unmarked containers of any size are to be left in the work area unattended.

4. The site will rely on manufacturer applied labels whenever *(Company Name)* possible, and will ensure that these labels are maintained. Containers that are not labeled or on which the manufacturer's label has been removed will be relabeled with NFPA labels.

5. The site will ensure that each container is labeled with
   (Company Name)
   the identity of the hazardous chemical contained and any appropriate hazard warnings.

C. Safety Data Sheets (SDS)

1. Employees working with a Hazardous Chemical may request a copy of the material safety data sheet (SDS). Requests for SDS's should be made to the SHSM.

2. SDS's will be available to all employees on the site to provide immediate reference to chemical safety information

D. Employee Training

Employees will be trained to work safely with hazardous chemicals. Employee training will include:

(1) Methods that may be used to detect a release of a hazardous chemical in the workplace,
(2) Physical and health hazards associated with chemicals,
(3) Protective measure to be taken,
(4) Safe work practices, emergency responses and use of personnel protective equipment,
(5) Information on the Hazard Communication standard including
   - Labeling and warning system,
   - An explanation of Material Safety Data Sheets.

E. Personal Protective Equipment (PPE)

Required PPE is available from the safety department. Any employee found in Violation of PPE requirements may be subject to disciplinary action up to and including discharge.

F. Emergency Response

1. Any incident of over exposure or spill of a hazardous chemical/substance must be reported to the SHSM at once.

2. The SS or the immediate supervisor will be responsible for insuring that proper emergency response actions are taken in leak/spill situations.

G. Hazards of Non-Routine Tasks

1. Supervisors will inform employees of any special tasks that may arise which would involve possible exposure to hazardous chemicals.

2. Review of safe work procedures and use of required PPE will be conducted prior to the start of such tasks. Where necessary, areas will be posted to indicate the nature of the hazard involved.

H. Informing Other Employers

1. Other employers, if working in this facility, are required to adhere to the provisions of the Hazard Communication Standard.

2. Information on hazardous chemicals known to be present will be exchanged with other employers working in this facility. These employers will be responsible for providing necessary information to their employees.

3. Other employers, if working in this facility, will be provided with a copy of this hazard communication plan.

I. Posting

The project has posted information for employees at this facility on the Hazard Communication Standard. This information can be found in main CB&I office on site.

See PDF File Appendix *D*

Appendix E

CB&I Health Safety & Environmental Procedures

(Table of Contents)

CB&I Policies and Procedures Table of Contents

(An electronic file of all policies will be kept on site and accessible as needed)

SAFETY	
CMS-710-02-PR-02900	Abrasive Blasting
CMS-710-02-PR-00400	Barricades, Signs and Signals
CMS-710-02-PR-03800	Basic Work Clothing
CMS-710-02-PR-05600	Cellular Device Use
CMS-710-02-PR-04200	Competent Person Procedure
CMS-710-02-PR-01700	Confined Space
CMS-710-02-PR-02000	Construction Tower Crane Safety
CMS-710-02-PR-01500	Control of Hazardous Energy
CMS-710-02-PR-07200	Drill Rig Operations
CMS-710-02-PR-01400	Employee Electrical Safety
CMS-710-02-PR-02800	Equipment Operator Verification
CMS-710-02-PR-01600	Excavation and Trenching
CMS-710-02-PR-05300	Extra Hazardous and Repair Work
CMS-710-02-PR-03200	Eye Protection
CMS-710-02-PR-00900	Fall Protection
CMS-710-02-PR-02400	Fire Protection and Prevention
CMS-710-02-PR-03600	Flagmen and Traffic Vests
CMS-710-02-PR-03300	Foot Protection
CMS-710-02-PR-05900	General Crane and Derrick Safety
CMS-710-02-PR-03400	Hand Protection
CMS-710-02-PR-01100	Hand Tools
CMS-710-02-PR-03100	Head Protection
CMS-710-02-PR-00100	Housekeeping
CMS-710-02-PR-05800	Hoist and Derrick Safety
CMS-710-02-PR-00200	Illumination
CMS-710-02-PR-00500	Ladders
CMS-710-02-PR-01800	Lift Planning
CMS-710-02-PR-00800	Lift Trucks, Forklifts and Powered Industrial Trucks
CMS-710-02-PR-06500	Lightning Protections Procedure
CMS-710-02-PR-04600	Location of Temporary Facilities and Portable Buildings
CMS-710-02-PR-00300	Materials Storage and Handling
CMS-710-02-PR-05700	Mechanized and Marine Equipment
CMS-710-02-PR-04900	Mechanical Ventilation
CMS-710-02-PR-02500	Office Safety
CMS-710-02-PR-05200	Overhead and Gantry Cranes
CMS-710-02-PR-04800	Painting Safety
CMS-710-02-PR-06400	Permit to Work
CMS-710-02-PR-03700	Personal Flotation Devices

CMS-710-02-PR-03000	Personal Protective Equipment
CMS-710-02-PR-00700	Powered Aerial Work Platforms
CMS-710-02-PR-01200	Power Tools
CMS-710-02-PR-01300	Powder Activated Tools
CMS-710-02-PR-06200	Process Safety Management
CMS-710-02-PR-03500	Respiratory Protection
CMS-710-02-PR-02100	Rigging Plan and Rigging Safety
CMS-710-02-PR-06300	Safety During Civil Works
CMS-710-02-PR-04700	Safety Management for Transportation Activities
CMS-710-02-PR-00600	Scaffolds
CMS-710-02-PR-04400	Subcontractor Selection Evaluation and Monitoring
CMS-710-02-PR-02600	Safety Instrument Calibration
CMS-710-02-PR-06000	Tools and Equipment Electrical Safety
CMS-710-02-PR-02700	Vehicle Safety
CMS-710-02-PR-02300	Welding, Cutting, and Heating
CMS-710-02-PR-06600	Working Around Overhead Power lines with Mobile Cranes and Derricks
HEALTH	
CMS-710-01-PR-02500	Asbestos on the Job
CMS-710-01-PR-02900	Arsenic Exposure Control Program
CMS-710-01-PR-00300	Bloodborne Pathogens
CMS-710-01-PR-00700	Cold Stress Prevention and Control
CMS-710-01-PR-01900	Care of Injured and Ill Employees
CMS-710-01-PR-02100	Claim Reporting
CMS-710-01-PR-03000	CB&I Benzene Safety Program
CMS-710-01-PR-02700	Construction Lead Hazard Abatement Program
CMS-710-01-PR-03700	Ergonomics
CMS-710-01-PR-01800	Eye Wash and Safety Showers
CMS-710-01-PR-01100	Fitness for Duty Program
CMS-710-01-PR-01600	First Aid and Medical Services
CMS-710-01-PR-03800	Hexavalent Chrome
CMS-710-01-PR-02600	Hydrogen Sulfide Exposure Control Program
CMS-710-01-PR-00400	Hazard Communication
CMS-710-01-PR-00600	Heat Stress Prevention and Control
CMS-710-01-PR-00100	Industrial Hygiene Sampling Methods
CMS-710-01-PR-02200	Injury and Illness Case Management
CMS-710-01-PR-00800	Malaria Control
CMS-710-01-PR-03500	Medical and Exposure Records
CMS-710-01-PR-00900	Noise Control and Hearing Conservation
CMS-710-01-PR-02300	Occupational Health Plan
CMS-710-01-PR-004000	Radiation Safety Program

CMS-710-01-PR-01700	Return to Work Program
CMS-710-01-PR-01000	Sanitation and Potable Water
CMS-710-01-PR-03600	Substance Abuse Program
CMS-710-01-PR-01300	Travel Immunization/Prophylaxis
CMS-710-01-PR-03900	Working in High Altitude Environments
Emergency Response Procedure	
CMS-710-03-PR-00400	Project Emergency Preparedness Plan
Environmental Procedures	
CMS-710-04-PR-04102	Chemical Storage and Compatibility
CMS-710-04-PR-00400	Construction Environmental Management Plan
CMS-710-04-PR-05105	Equipment Fueling
CMS-710-04-PR-00300	Hazardous Waste Operations
CMS-710-04-PR-01000	MSDS, Inventory and Form R Reporting
CMS-710-04-PR-01100	Risk Management Plan
CMS-710-04-PR-05100	Spill Prevention Control and Countermeasure
CMS-710-04-PR-04113	Waste Characterization
CMS-710-04-WI-00305	Hazardous Waste Decontamination
Common Tools	
CMS-710-05-PR-00300	Communication Procedure
CMS-710-05-PR-00200	Disciplinary Action Program
CMS-710-05-PR-04000	HSE Assessments
CMS-710-05-PR-01500	HSE Compliance Audits
CMS-710-05-PR-01600	HSE Corrective Action Tracking Register
CMS-710-05-PR-02800	HSE Planning and Development
CMS-710-05-PR-02500	HSE Reporting
CMS-710-05-PR-01300	HSE Request for Variance
CMS-710-05-PR-02600	I CARE HSE Process
CMS-710-05-PR-02300	Incident Investigation
CMS-710-05-PR-02200	Incident Notification
CMS-710-05-PR-01800	Informational Postings
CMS-710-05-PR-01400	Project/Facility Inspections
CMS-710-05-PR-02000	Site HS Committee
CMS-710-05-PR-02400	Recordkeeping for Occupational Injuries and Illnesses
CMS-710-05-PR-04100	Regulatory Inspections
CMS-710-05-PR-01900	Safety Education and Training
CMS-710-05-PR-01700	Work Area Hazard Assessment

Appendix *F*

FMC Site Specific Occupational Safety, Health, Industrial Hygiene, and Environmental Operating Standards and Inspection Checklist

Policy / Standard Title	***Standard Number***
Confined Space Standard (11-02-12)	***OS-8***
Contractor Safety Standard (02-21-14)	***OS-12***
Effective Injury and Illness Case Management Guideline	***OH-1***
EHS Incident Reporting Standard (08-23-12)	***EHS-1***
Electrical Safety Standard (08-27-12)	***OS-5***
Personal Protective Equipment	***OS-11***
Ground Transportation Safety for People (05-09-13)	***OS-9***
Hazard Assessment and Mitigation Standard	***OS-10***
Hot Work Standard (10-12-12)	***OS-6***
Line Breaking and Equipment Opening Standard (9-21-12)	***OS-7***
Energy Isolation, Lockout/Tagout (LOTO)	***OS-1***
Elevated Work Standard (8-3-12)	***OS-2***

1.0 Purpose

1.1 The purpose of this standard is to protect all individuals from hazards associated with entering Permit Required Confined Spaces.

2.0 Scope

2.1 This standard applies at all FMC locations with Permit Required Confined Spaces as defined below. This standard contains requirements for protecting employees and contractors required to enter Permit Required Confined Spaces.

3.0 Definitions

3.1 Acceptable entry conditions: conditions required in a Permit Required Confined Space to allow safe entry by employees or contractors.

3.2 Attendant: individual stationed outside permit spaces who monitors authorized entrants and performs attendant's duties assigned in the FMC's Permit Required Confined Space program.

3.3 Authorized entrant: employee authorized to enter a Permit Required Confined Space.

3.4 Blanking or blinding: absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

3.5 Confined space:

3.5.1 A space large enough and configured so that someone can enter and perform assigned work;

3.5.2 A space that has limited or restricted means for entry or exit; and

3.5.3 A space that is not designed for continuous employee occupancy.

3.6 Double block and bleed: the closure of a line, duct, or pipe by closing and locking two in-line valves and by opening and locking a drain or vent valve in the line between the two closed valves.

3.7 Emergency: any event (including any failure of hazard control or monitoring equipment) internal or external to the Permit Required Confined Space that might endanger entrants.

3.8 Engulfment: surrounding and capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

3.9 Entry: a person passing through an opening into a Permit Required Confined Space. Entry occurs as soon as any part of the body enters an opening into the space.

3.10 Entry permit (permit): document provided by FMC site to allow and control employee or contractor entry into a Permit Required Confined Space.

3.11 Entry supervisor: person responsible for determining whether Permit Required Confined Space conditions are acceptable to allow entry. Entry supervisors are also responsible for overseeing entry operations and for terminating entry when necessary.

Note: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

3.12 Hazardous atmosphere: atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

3.12.1 Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL);

3.12.2 Airborne combustible dust at a concentration that meets or exceeds its LFL;

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

3.12.3 Atmospheric oxygen concentration below 19.5% or above 23.5%;

3.12.4 Atmospheric concentration of a toxic substance greater than the Threshold Limit Value (TLV) published in the most recent edition of the American Conference of Governmental industrial Hygienist (ACGIH) TLV booklet or the government regulatory exposure limit published for the country in which the Permit Required Confined Space is located, whichever is lower. That is, toxic and/or hazardous substances at atmospheric concentrations, which could result in employee exposure to greater than the specific substances threshold limit value or permissible exposure limit;

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

3.12.5 Any other atmospheric condition that is immediately dangerous to life or health.

3.13 Hot work permit: written approval method to perform operations capable of becoming a source of ignition.

3.14 Immediately dangerous to life or health (IDLH): condition posing threat to life, would cause irreversible adverse health effects, or would interfere with an individual's ability to escape unaided from a Permit Required Confined Space.

3.15 Inerting: displacement of atmospheric oxygen in a Permit Required Confined Space by a noncombustible gas (such as nitrogen) such that the resulting atmosphere is noncombustible.

Note: This method of inerting produces an IDLH oxygen-deficient atmosphere.

3.16 Isolation: process by which the potential for energy or material is prevented from entering a confined space. The confined space is completely protected from previous connections to hazardous energy or material sources by: 1) blanking or blinding; 2) misaligning or removing sections of lines, pipes, or ducts; 3) a double block and bleed system; 4) lockout or tagout of all sources of energy; or 5) blocking or disconnecting all mechanical linkages.

3.17 Line breaking: intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

3.18 Non-permit confined space: confined space that does not contain or have potential to contain any hazards capable of causing death or serious physical harm.

3.19 Oxygen deficient atmosphere: atmosphere containing less than 19.5% oxygen by volume.

3.20 Oxygen enriched atmosphere: atmosphere containing more than 23.5% oxygen by volume.

3.21 Permit-required confined space: confined space with one or more of the following characteristics:

3.21.1 Contains or has a potential to contain a hazardous atmosphere;

3.21.2 Contains a material that has the potential for engulfing an entrant;

3.21.3 Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

3.21.4 Contains any other recognized serious safety or health hazard.

3.22 Permit-required confined space program: program for identifying, controlling, and, protecting employees from hazards they may encounter in Permit Required Confined Spaces.

3.23 Permit system: written procedure for preparing and issuing permits for entry into a Permit Required Confined Space.

3.24 Prohibited condition: any condition in a Permit Required Confined Space not allowed by the permit during the period when entry is authorized.

3.25 Rescue service: personnel designated to rescue employees from Permit Required Confined Spaces.

3.26 Retrieval system: equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

3.27 Testing: process by which hazards that may confront entrants of a permit space are identified and evaluated, including specifying tests to be performed in permit space.

Note: Testing enables FMC to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

4.0 Evaluating spaces and signage

4.1 Each site shall evaluate all Confined Spaces to determine if it is a Permit Required Confined Space.

4.2 Each site shall identify all Permit Required Confined Spaces with a sign. The site's signs shall be standardized with appropriate signage such as, "DANGER – CONFINED SPACE – ENTER BY PERMIT ONLY" or similar language to identify each permit-required confined space. In some cases, it will be an activity within the confined space which creates the hazard that will make the space a Permit Required Confined Space. In this situation the sign must be displayed when the hazardous activity is planned or underway.

4.2.1 There may be situations where it is not feasible to hang a sign on a Permit Required Confined Space (*i.e.,* manhole covers). In these cases, the site shall ensure that all affected personnel are informed.

5.0 Employee Protection

5.1 This standard must be followed at all sites with Permit Required Confined Spaces in which individuals will enter.

5.2 If individuals are prohibited from entering Permit Required Confined Spaces, the site shall take measures to prevent its employees from entering, including the following:

5.2.1 Evaluate the workplace to determine if any spaces are permit-required confined spaces;

5.2.2 Identify the spaces according to section 4.0 of this standard;

5.2.3 If conditions change in a non-permit confined space, space must be re-evaluated and reclassified as a Permit Required Confined Space; and

5.2.4 If contractors enter Permit Required Confined Spaces, section 9.0 must be followed.

6.0 Reclassification of a Permit Required Confined Space When the only known hazards are atmospheric (Scenario 1)

6.1 FMC sites can choose to reclassify a Permit Required Confined Space to a non-Permit Required Confined Space by 2 methods.[1]

6.2 The first method allows reclassification to a non-Permit Required Confined Space if the only hazard in the confined space is an atmospheric hazard (i.e., oxygen concentrations are less than 19.5% or greater than 23.5%, flammable vapors, gases or mist present in quantities that cause the atmosphere to exceed 10% of the Lower Flammable Limit (LFL), or the presence of toxic materials are in the atmosphere above the limits indicated in 3.12.4 above) and the atmospheric hazard can be controlled by continuous forced air ventilation alone.

6.3 If continuous forced air only is used to eliminate the atmospheric hazards in the confined space in accordance with the requirements indicated below, then the site does not need to comply with sections: 10.0, 11.0, 13.0, 14.0, and 15.0. To use this reclassification method, FMC site management must demonstrate the following:

6.3.1 The only hazard posed by the otherwise Permit Required Confined Space is an actual or potential hazardous atmosphere.

6.3.2 Continuous forced air ventilation alone is sufficient to maintain the otherwise Permit Required Confined Space safe for entry.

6.3.3 Monitoring and inspection data is available that supports that the only hazard in the space is an actual or potential hazardous atmosphere.

6.3.4 If an initial entry into the Permit Required Confined Space is necessary to determine there are no non-atmospheric hazards, then the entry shall be done following all of the requirements for a Permit Required Confined Space entry, sections 10.0 through 18.0 of this standard.

6.3.5 Data required to support paragraphs 6.3.1, 6.3.2, and 6.3.3 above is documented and made available to each employee who enters the space.

6.3.6 Any condition making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

6.3.7 When an entrance cover is removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent

---

[1] The first method is set forth in section 6.0 and the second is in section 7.0.

people from falling through the opening and that will protect each employee working in the space from foreign objects entering the space.

6.3.8 Before the first employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, flammable gases, vapors and mists and for potentially toxic air contaminants.

6.3.9 An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.

6.3.10 Forced air ventilation shall be directed to the area where employees will be present within the space and shall continue until all employees have left the space.

6.3.11 The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

6.3.12 The atmosphere within the space shall be periodically tested to ensure that the forced air ventilation is preventing the accumulation of a hazardous atmosphere. Periodic testing data shall be available to employees who enter the space. Prior to the initial entry, site management shall determine the frequency of periodic monitoring for the specified confined space.

6.3.13 If a hazardous atmosphere is detected through periodic testing:

- Employees shall leave the space immediately;
- The space shall be evaluated to determine how the hazardous atmosphere developed; and
- Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry take place.

6.3.14 FMC site management shall verify that a space is safe for entry through pre-testing and shall issue a written certification that contains the date, location of the space, and the signature of the person providing the certification. The certification shall be made before the first entry and be made available to each employee entering the space.

7.0 Re-classification of a Permit Required Confined Space to a non-Permit Required Confined Space when all hazards atmospheric and non-atmospheric have been eliminated (Scenario 2)

7.1 If a Permit Required Confined Space contains no actual or potential atmospheric hazards and if all other hazards within the space are eliminated without entry into the space, the Permit Required Confined Space may be reclassified as a non-Permit Required Confined Space for as long as the non-atmospheric hazards remain eliminated.

7.2 If it is necessary to enter the Permit Required Confined Space to eliminate hazards, the entry shall be performed as a Permit Required Confined Space and in compliance with section 10.0 through 18.0 of this standard.

7.3 If forced air ventilation is required to eliminate an atmospheric hazard in the space, then the space cannot be reclassified under this section.[2]

7.4 FMC management shall document the basis for determining that all hazards in the space have been eliminated. The certification shall contain the date, location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space.

7.5 If hazards arise within a Permit Required Confined Space that has been declassified to a non-Permit Required Confined Space, each employee in the space shall exit the space immediately. FMC site management shall then reevaluate the space and determine whether it must be reclassified as a Permit Required Confined Space.

8.0 Reclassification from a non-Permit Required Confined Space to a Permit Required Confined Space (Scenario 3)

8.1 When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, FMC site management shall reevaluate the space and, if necessary, reclassify it as a Permit Required Confined Space.

9.0 Contractors

9.1 If contractors will enter permit-required confined spaces, the site shall:

9.1.1 Inform the contractor that the workplace contains Permit Required Confined Spaces and that Permit Required Confined Space entry is allowed only through compliance with a permit space program;

9.1.2 Inform the contractor of all aspects and hazards of the Permit Required Confined Space;

9.1.3 Inform the contractor of any precautions or procedures that are required for the protection of employees in or near the Permit Required Confined Space;

9.1.4 Coordinate entry operations with the contractor, when both FMC personnel and contractor personnel will be working in or near Permit Required Confined Spaces; and

---

[2] Note: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazard. This is the key difference between this reclassification scenario and the reclassification scenario in section 6.

9.1.5 Conduct a debrief meeting with the contractor at the conclusion of the entry operation to discuss any hazards confronted or created in permit spaces during entry operations.

10.0 Written Permit Required Confined Space program

10.1 Each FMC site with a Permit Required Confined Space shall establish a written program.

10.2 The written program shall include the following:

10.2.1 Measures necessary to prevent unauthorized entry into Permit Required Confined Spaces;

10.2.2 Permit Required Confined Space identification, hazard assessment and identification;

10.2.3 Procedures necessary for safe Permit Required Confined Space entry;

10.2.4 Confined Space Entry Equipment;

10.2.5 Permit required Confined Space entry conditions;

10.2.6 Permit system;

10.2.7 Duties of Entrants, Attendants and Supervisors;

10.2.8 Management of Contractors who enter Permit Required Confined Spaces;

10.2.9 Employee Training;

10.2.10 Rescue and emergency service;

10.2.11 Program Evaluation; and

10.2.12 Employee participation.

11.0 Procedures necessary for safe Permit Required Confined Space entry

11.1 Each FMC site shall develop and implement procedures and practices necessary for safe Permit Required Confined Space entry operation to include but not limited to the following:

11.1.1 Specifying acceptable entry conditions;

11.1.2 Providing each authorized entrant with an opportunity to observe monitoring or testing of Permit Required Confined Spaces;

11.1.3 Isolation of the Permit Required Confined Space;

11.1.4 Purging, inerting, flushing or ventilating the permit space as necessary to eliminate or control atmospheric hazards; and

11.1.5 Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards, and

11.1.6 Verifying that conditions in the Permit Required Confined Space are acceptable for entry throughout the duration of an authorized entry.

12.0 Permit Required Confined Space Entry Equipment

12.1 Each FMC site shall provide the following equipment and ensure that it is maintained and used properly by employees for the specific entry:

12.1.1 Testing and monitoring equipment needed to test and monitor Permit Required Confined Spaces;

12.1.2 Ventilation equipment needed to obtain acceptable entry conditions;

12.1.3 Communication equipment necessary for attendants to communicate with entrants and emergency rescue services;

12.1.4 PPE as required

12.1.5 Lighting equipment needed to enable employees to see well enough to work safely and to exit the Permit Required Confined space quickly in an emergency;

12.1.6 Barriers or shields as required by 10.2.3.5 above;

12.1.7 Ladders needed for safe ingress and egress by Authorized Entrants;

12.1.8 Rescue and emergency equipment except when this equipment is provided by outside rescue services; and

12.1.9 Any other equipment necessary for safe entry into and rescue from a Permit Required Confined Space

13.0 Permit Required Confined Space Entry Conditions

13.1 The FMC site program shall establish Permit Required Confined Space conditions as follows:

13.1.1 Test conditions in the permit space to determine acceptable entry conditions exist before entry is authorized to begin, except that, if Isolation of the space

is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized and entry conditions shall be continuously monitored in area where authorized entrants are working;

13.1.2 Test or monitor the Permit Required Confined Space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations;

13.1.3 When testing for atmospheric hazards, test first for Oxygen, then for combustible gasses and vapors, and then for toxic gasses and vapors;

13.1.4 Reevaluate the Permit Required Confined Space when requested by any Authorized Entrant;

13.1.5 Provide each Authorized Entrant with the results of any testing conducted;

13.1.6 At least one Attendant shall be provided outside the Permit Required Confined Space for the duration of entry operations;

13.1.7 If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the Permit Required Confined Spaces being monitored without distraction from the attendant's other responsibilities;

13.1.8 Designate the persons who are to have active roles (as, for example, Authorized Entrants, Attendants, Entry Supervisors or persons who test or monitor the atmosphere in a Permit Required Confined Space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required;

13.1.9 Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from Permit Required Confined Spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

13.1.10 Develop and implement a system for the preparation, issuance, use and cancellation of Permit Required Confined Space entry permits;

13.1.11 Develop and implement procedures to coordinate entry operations when FMC and one or more group of contract employees are working simultaneously as Authorized Entrants in a Permit Required Confined Space, so that employees of one employer do not endanger the employees of any other employer;

13.1.12 Develop and implement procedures (such as closing off a Permit Required Confined Space and canceling the permit) necessary for concluding the entry after entry operations have been completed.

14.0 Permit system

14.1 Each FMC site shall establish a permit system for entry into Permit Required Confined Spaces.

14.2 Each site shall use the permit in Appendix B or equivalent. If the site uses an equivalent permit, the permit must contain, at least, all sections listed in the permit included in Appendix B.

14.3 Before entry is authorized, the Authorized Entry Supervisor shall document the completion of measures required for entry on the permit and sign it.

14.4 The completed permit shall be made available, at the time of entry, to all Authorized Entrants.

14.5 The duration of the permit shall not exceed the time required to complete the assigned task or job identified on the permit.

14.6 The Authorized Entry Supervisor shall terminate entry and cancel the entry permit when:

14.6.1 The entry operations covered by the permit have been completed; or

14.6.2 A condition that is not allowed by the entry permit arises in or near the permit space.

14.7 The FMC site shall retain each canceled entry permit for at least 1 year to facilitate the review of the Permit Required Confined Space program required by section 20.0.

14.8 The permit shall identify:

14.8.1 The Permit Required confined Space to be entered;

14.8.2 The purpose of the entry;

14.8.3 The date and the authorized duration of the entry permit;

14.8.4 The identity of the Authorized Entrants by name or other designation;

14.8.5 The name(s) of the Attendant(s);

14.8.6 The name of the Authorized Entry Supervisor;

14.8.7 The hazards of the Permit Required Confined Space to be entered;

14.8.8 The measures used to isolate the Permit Required Confined Space and to eliminate or control hazards in the Permit Required Confined Space;

14.8.9 The test results of the initial and periodic atmospheric testing shall be recorded on the permit and offered to each authorized entrant for review;

14.8.10 The rescue and emergency services that can be summoned and the means for summoning those services;

14.8.11 The communication procedure to be used to maintain contact between the Authorized Entrant and the Attendant; and

14.8.12 Required equipment, such as PPE, testing, communication, alarm systems, and rescue equipment to be used during the respective entry.

15.0 Training

15.1 The site shall provide training so that all employees involved in confined space entry develop understanding, knowledge, and skills necessary for safe confined space entry.

15.2 Training shall be provided to each affected employee:

15.2.1 Before the employee is first assigned confined space entry duties;

15.2.2 Before there is a change in assigned duties;

15.2.3 Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

15.2.4 Whenever FMC site management has reason to believe that there have been deviations from the Permit Required Confined Space entry procedures;

15.2.5 Whenever FMC site management determines that there are inadequacies in the employee's knowledge or use of the confined space entry procedures;

15.3 The FMC site shall certify the training required by this standard has been completed. The certification shall contain each employee's printed name and signature, the printed name and signatures of the trainers, and the dates of training.

16.0 Duties of Authorized Entrants

16.1 The FMC site shall ensure that all authorized entrants:

16.1.1 Know all of the hazards of the specific confined space;

16.1.2 Know the signs and symptoms of exposure to high and low concentrations of oxygen and to potential air contaminants.

16.1.3 Know how to properly use equipment;

16.1.4 Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert authorized entrants of the need to evacuate the space as required; and

16.1.5 Alert the authorized attendant whenever the entrant recognizes any warning signs or symptoms of exposure to high or low oxygen or an atmospheric contaminant or the entrant detects a prohibited condition.

16.1.6 Exit from the permit space as quickly as possible whenever:

16.1.6.1 An order to evacuate is given by the attendant or the entry supervisor;

16.1.6.2 The entrant recognizes any warning sign or symptom of exposure to high or low oxygen or an atmospheric contaminant;

16.1.6.3 The entrant detects a prohibited condition; or

16.1.6.4 An evacuation alarm is activated.

17.0 Duties of Authorized Attendants

17.1 The FMC site shall ensure that each attendant:

17.1.1 Knows the atmospheric hazards the entrant may be encounter during entry, including information on the signs or symptoms and consequences of exposures to low or high oxygen or atmospheric contaminants;

17.1.2 Is aware of possible behavioral effects of exposure to high or low oxygen concentrations and atmospheric contaminants;

17.1.3 Continuously maintains an accurate count of authorized entrants in the permit space and ensures that there are means to identify authorized entrants in the permit space;

17.1.4 Remains outside the permit space during entry operations until relieved by another attendant[3];

17.1.5 Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;

17.1.6 Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the entrants to evacuate the Permit Required Confined Space immediately under any of the following conditions:

17.1.6.1 If the attendant detects a prohibited condition;

17.1.6.2 if the attendant detects the behavioral effects of exposure high or low oxygen or an atmospheric contaminant;

17.1.6.3 If the attendant detects a situation outside the space that could endanger the entrants; or

17.1.6.4 If the attendant cannot effectively and safely perform all of his assigned duties as an attendant.

17.1.7 Summon rescue and other emergency services as soon as the attendant determines that entrants may need assistance to escape from Permit Required Confined Space;

17.1.8 Take the following actions when unauthorized persons approach or enter a permit space while entry is underway;

17.1.9 Warn he unauthorized persons that they must stay away from the permit space;

---

[3] Note: When the permit entry program allows an attendant to enter a confined space for rescue purposes, the attendants may enter the Permit Required Confined Space for rescue if they have been trained and equipped for rescue operations and have been relieved by another qualified attendant.

17.1.10 Advise the unauthorized persons that they must exit immediately if they have entered the permit space;

17.1.11 Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

17.1.12 Performs non-entry rescues as specified by the FMC site's rescue procedure; and

17.1.13 Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

18.0 Duties of Authorized Entry Supervisors

18.1 Prior to the first entry each Authorized Entry Supervisor ensures the following before signing the permit:

18.1.1 The Authorized Entry Supervisor knows the hazards that may be faced during entry, including information on the signs or symptoms of exposure to high or low oxygen concentrations or atmospheric contaminants;

18.1.2 Verifies by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before signing the permit and allowing entry to begin;

18.1.3 Verifies that rescue services are available and that the means for summoning them are operable;

18.1.4 Terminates the entry and cancels the permit as required;

18.1.5 Ensures that unauthorized individuals do not enter the Permit Required Confined Spaces; and

18.1.6 When an Authorized Entry Supervisor leaves the area he/she ensures that responsibility for a Permit Required Confined Space entry operation is transferred to another Authorized Entry Supervisor. The new Authorized Entry Supervisor ensures that the Permit Required Confined Space entry operation remains consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

19.0 Rescue and Emergency Services

19.1 FMC sites that designates non-FMC rescue and emergency services, shall:

19.1.1 Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazards identified[4];

19.1.2 Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces;

19.1.3 Select a rescue team or service from those evaluated that:

19.1.3.1 Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s); and

19.1.3.2 Is equipped for and proficient in performing the needed rescue services;

19.1.4 Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

19.1.5 Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

19.2 If FMC employee has been designated to provide Permit Required Confined Space rescue and emergency services, the FMC site shall ensure the following measures are followed:

19.2.1 Provide employees selected to provide rescue services with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees;

19.2.2 Train affected employees to perform assigned rescue duties;

19.2.3 Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR), and at least one available member of the rescue team or service holding a current certification in first aid and CPR; and

---

[4] Note: What will be considered timely will vary according to the specific hazards involved in each entry.

19.2.4 Ensure that affected FMC employees practice making permit space rescues at least every 12 months, by simulated rescue operations in which they remove articles of appropriate size and weight from the actual permit spaces or from representative permit spaces.

19.3 To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:

19.3.1 Each authorized entrant shall use a chest or full body harness, with a retrieval line attached to the center of the entrant's back near shoulder level, above the entrant's head, or at another point, which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of the wristlets is the safest and most effective alternative.

19.3.2 The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 m) deep.

19.3.3 If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, the SDS or written information shall be made available to the medical facility treating the exposed entrant.

20.0 Program Evaluation

20.1 FMC site management shall review entry operations when they have reason to believe that the measures taken under the site confined space entry program may not protect employees and revise the program to correct deficiencies found.

20.2 FMC site management shall review the Permit Required Confined Space program using canceled permits required to be retained for 1 year by this standard and revise the program as necessary, to ensure that employees are adequately protected from Permit Required Confined Space hazards.

Note: FMC site management may perform a single annual review covering all entries performed during a 12 month period. If no entry is performed during a 12 month period, no review is necessary.

21.0 Employee Participation

21.1 FMC site management shall consult with affected employees on the development and implementation of all aspects of the Permit Required Confined Space program.

21.2 FMC site management shall make available to affected employees all information required to be developed by this standard.

22.0 References

22.1 U.S. Occupational Safety and Health Administration 29 CFR 1910.146.

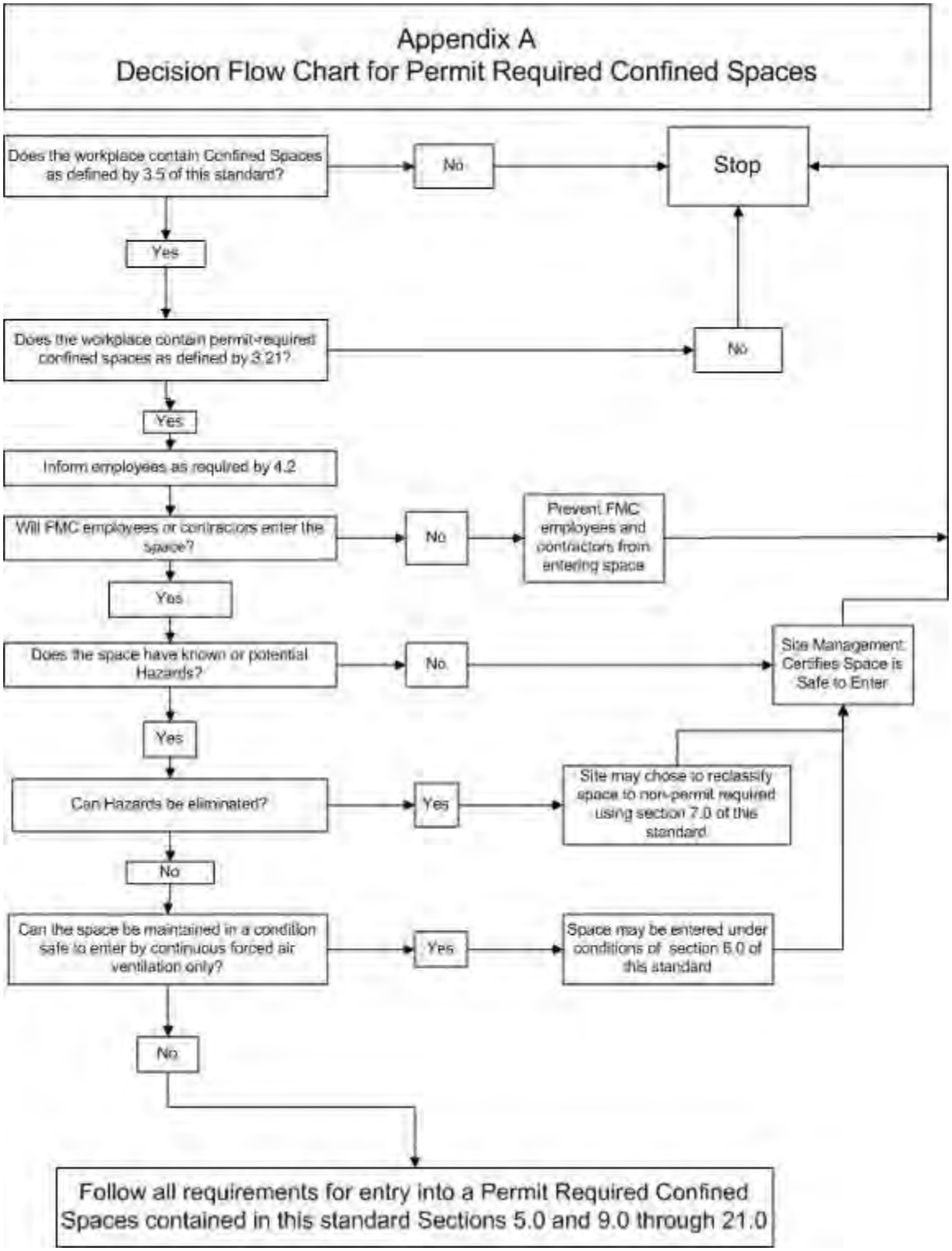
23.0 Effective Date

The effective date of this Standard is November 5, 2012, at which time all FMC sites are expected to be in compliance within 3 months of issue except if an extension is specifically granted. This standard will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

24.0 Revision History

This Standard was originally issued on November 5, 2012 at Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date (MM/DD/YYYY)	Approval
0	Initial Release	11/5/2012	Rob Haire



Appendix B – Confined Space Entry Permit Form

1. **Authorized Entry Supervisor** (print name): _____

2. **Authorized Work Start:** Date: _____ Time: _____ **Authorized Work Stop**: Date: _____Time: _____

3. **Confined Space Id and Location:** _____

(Include Bldg. # & Tank or Vessel ID # if applicable)

4. Purpose of Entry: _____

(Scope of the job being performed in the space)

5. Confined Space Hazards (indicate specific hazards below) (Initial by Entry Supervisor):

____Oxygen deficiency (less than 19.5%)
____Flammable vapors (greater than 10%)
____Mechanical hazards
____Engulfment
____Toxic materials- skin contact
____Oxygen enrichment (greater than 23.5%)
____Airborne combustible dust
____Electrical shock
____Entrapment
____Toxic material- inhalation
____Other hazards (list below)

_____

6. Hazard Control Checklist- What Is Required/completed (Initial by Entry Supervisor):

Req'd	Done		Req'd	Done	
____	____	Pre-entry atmospheric testing completed	____	____	Continuous atmospheric monitoring
____	____	Periodic atmospheric monitoring	____	____	Lockout/tagout completed
____	____	All lines disconnected or blanked	____	____	Space has been purged/ flushed/ cleaned
____	____	Continuous ventilation	____	____	Hot work permit
____	____	Entrance barrier	____	____	Appropriate lighting
____	____	Communication with all effected departments complete- operator, supervisor, safety coordinator, environmental etc.			
____	____	Other (list)_____			

_____

7. Personal Protective Equipment Required (list type, be specific): _____

_____

_____

8. Emergency Rescue Service

Name_____ Phone or Radio #_____

Name_____ Phone or Radio #_____

Emergency Rescuers Notified (**Initial by Entry Supervisor**):_____

___ About confined space entry time and place
___ They are available to respond
___ About potential hazards they may encounter if rescue is needed
___ Communication method has been verified

9. Authorized Attendants print name(s)**:** _____

10. Entrant Entry & Exit Times	**In / Out**	**In / Out**	**In / Out**	**In / Out**
_____	____/___	____/___	____/___	____/___
_____	____/___	____/___	____/___	____/___
_____	____/___	____/___	____/___	____/___
_____	____/___	____/___	____/___	____/___

11. Atmospheric Testing completed by (print name) _____

Test For:	**Acceptable Levels:**	**Pre-Entry**	**Time**	**Time**	**Time**	**Time**	**Time**	**Time**
%Oxygen:	19.5-23.5%	_____	_____	_____	_____	_____	_____	_____
Flammable Vapors:	<10%	_____	_____	_____	_____	_____	_____	_____
CO:	<25ppm	_____	_____	_____	_____	_____	_____	_____
H_2S:	<10 ppm	_____	_____	_____	_____	_____	_____	_____
Toxic Substances:	ACGIH TLV	_____	_____	_____	_____	_____	_____	_____

Testing Equipment:_____ Last Equipment Calibration (date)_____

12. Items Checked By the Entrants (**Initial by Entrant(s)**):_____

___Confined space has been properly prepared
___Adequate rescue equipment and personnel
___Entrant has reviewed and understands permit
___Entrant has locked out equipment
___Adequate PPE

13. Authorized Entry Supervisor Has Completed the Following (Initial by Entry Supervisor):_____
___Pre-entry safety meeting with entrants and attendants to ensure everything is complete and everyone understands their role.

14. Authorization by Entry Supervisor(s) for Entrants to Proceed:

_____
Print Name Signature Date Time

15. Outside Contractor
I certify that I have observed the conditions listed on this permit and that they are as indicated and I understand that they may change. My company is responsible for additional atmospheric testing of the confined space, and we will contact FMC personnel immediately if testing indicates a hazard. I understand and agree to follow the terms of this permit.

_____ _____
(Signature) (Date)

16. Entry Cancellation

_____ _____
(Name) *(Time)*

_____ _____
(Signature) (Date)

Reason for Cancellation

☐ *Entry Operation Complete*
☐ *Prohibited Condition Arose (Specify):* _____
_____
_____

NOTE: Return Completed Permits to the Plant Safety Coordinator or other designated site personnel when the job is complete! This permit is only good for the time authorized (time and date on the front of the form).

1.0 Purpose

1.1 The purpose of this standard is to establish FMC requirements for the selection and management of contract companies and their employees while working at FMC's worldwide Sites. The purpose is also to protect FMC and contract employee from injuries and to prevent process safety incidents that could result from the actions of contractors while working at FMC Sites.

1.2 The purpose of this standard is not to make FMC in any way responsible for the safety and health programs and training each contract company shall have in place for the protection of their own employees.

2.0 Scope

2.1 This standard covers all companies and their employee under contract to perform work at FMC owned or operated sites. This includes, but is not limited to, contract companies performing: construction, maintenance, repair, inspection, turnaround activities, and other specialized functions involving FMC facilities and equipment. It also includes contractors performing environmental work at FMC locations where FMC has regulatory obligations to complete remediation.

2.2 Section 15.0 of this standard covers individuals hired on a contract basis to perform task directly under the supervision of FMC managers, supervisors or employee (Contract Employees). This category includes, but is not limited to seasonal or temporary employees.

2.3 Designated portions of this standard apply to individuals contracted by FMC to performing specialized work at FMC facilities but who are not directly supervised by FMC managers or employees.

2.4 This standard does not apply to the following companies and individuals even though they are sometimes also referred to as contractors:

2.4.1 Engineering or consulting contractors when not doing work at an FMC Site.

2.4.2 Companies and individuals making deliveries to FMC sites or whose work is incidental to FMC operations. Companies and individual coming into FMC plants and facilities solely for the purpose of stocking

or servicing vending machines, removing and delivering uniforms or removing, delivering, or servicing other non-production or maintenance-related items.

2.4.3 Companies and individuals contracted by FMC customers to pick up FMC products at FMC plants or facilities.

2.5 This standard does not supersede any government regulatory requirements concerning the selection or management of contractors at FMC sites.

3.0 Definitions

3.1 **Contractor** – A person working for a company other than FMC that provides services to FMC under a contract. This includes, but is not limited to: construction, maintenance or other repair work or capital projects at an FMC site.

3.2 **High Risk Contractor** – A contractor that will be exposed to the hazards of the FMC site and/or may expose FMC personnel, critical equipment, the community, or the environment to additional hazards in the course of the contractor executing their work. High Risk Contractors perform the following types of work at FMC facilities including, but not limited to:

- Application of volatile coatings inside and enclosed space
- Lifting operations
- Electrical work
- Hot taps
- Opening process lines or equipment containing any hazardous substance or potentially hazardous physical conditions (e.g., high temperature or pressures).
- Pinching furnace tubes
- Underwater work
- Vessel entry
- Servicing environmental systems (e.g., scrubbers, underground drains, and lagoons)
- Environmental stack testing
- Steam boiler service and repair
- Pipe service and installation
- Decontamination/Demolition including asbestos and lead abatement
- Hydro blasting
- Construction work
- Insulation work
- X-ray work
- Excavating
- Painting in the chemical process areas or warehouses
- Maintaining FMC process equipment

3.3 **Low Risk Contractors** – A contract company whose scope of work is of minimum complexity with little or no exposure to/from the hazards of the FMC chemical process and whose work will not expose FMC personnel, critical equipment, the community, or the environment to additional hazards in the course of the contractor's work at the FMC site. Low Risk contractors perform the following types of work at FMC facilities including, but not limited to:

- Administrative work
- Lawn and landscape care
- Window cleaning
- Office equipment servicing
- Equipment calibrations (except in high hazard process areas)
- Laboratory equipment servicing
- Watering plants
- Cleaning or replacing carpets
- Consulting
- Office moves
- Providing technical oversight while FMC personnel perform repairs
- Painting within an office area

3.4 **Contract Employees –** These are individuals working on a contract basis but directly under the supervision of FMC personnel. This is a situation where contract personnel are working at an FMC owned or operated facility where there is no supervision being provided by the company from which the contract personal are being directly paid. The day to day activities of these individuals are supervised by FMC managers, supervisors or other FMC employees.

3.5 **Contractors working under Contract Company Supervision** – A situation where a contract company has full time supervisory personnel on the site owned or operated by FMC and the contract company personnel are providing day to day supervision to individual contract employees.

3.6 **Contract Company** – A company hired to work for FMC under the terms of a written contract. Contract Companies perform designated work activities at a site owned or operated by FMC. Contractors work for a Contract Company.

3.7 **Self Supervised Contractors** – Professionals and/or individuals with specialized technical skills who work under contract at an FMC site without direct onsite supervision from FMC or a contract company.

3.8 **FMC Site** – A location or facility owned or operated by FMC and where FMC personnel select and manage the activities of Contract companies.

Contractors Working Under the Supervision of a Contract Company (Sections 4.0 – 14.0)

4.0 Contractor Safety Management Program

4.1 At a minimum each FMC site shall have a contractor safety management program and the program shall address all of the following elements of this standard:

4.2 Written Site Contractor Procedure

4.2.1 Each FMC site shall develop and implement a written contractor safety management program to ensure the safety of all contractors, sub-contractors, FMC employees and property the community and the environment.

4.2.2 This written program shall address all of the subsequent provisions of this standard.

4.2.3 For environmental remediation projects the required written Health and Safety Plan (HASP) will satisfy this requirement.

4.3 Assignment of Responsibility to Manage Contractors

4.3.1 The Written Site Contractor Procedure shall specify one or more FMC employees who are responsible for managing the contractor program.

4.3.2 This individual or individuals shall be responsible and accountable for ensuring that the contract company gets all of the information from FMC necessary to perform their assigned tasks safely.

4.3.3 Further the responsible individual(s) shall ensure that the contract company receives and reviews copies of applicable FMC Standards that are considered life critical.

4.3.4 If special or specific training is required for contract employee to perform the tasks for which they were hired then the assigned FMC individual shall ensure that all contract employees have received the required training.

5.0 Written Scope of Work

5.1 For each defined project, for which a contract company will be involved, the FMC site shall have a written document fully outlining the scope of work for each contract company.

5.2 This scope of work shall be used to determine if the contractor will be classified as a High or Low Risk contractor in the next section of this standard.

5.3 For embedded contract companies that have their employees perform a wide verity of routine and non-routine tasks at an FMC site on a daily or weekly basis, it may not always be practical to have a written scope of work for each task they perform.

5.4 In this case, the contract company shall go through the selection process as a high risk contractor and the FMC individual responsible for managing the contract company shall be responsible for ensuring that the contractors get the information necessary to perform their assigned tasks safely.

6.0 Contractor Pre-Qualification Assessment and Selection Process

6.1 If any part of the proposed contractor scope of work is determined to be High Risk as indicated in the above definition for "High Risk Contractor", then the site shall have each perspective contract company bidding on the job complete the FMC Corporate Procurement's Contractor Services Pre-Qualification Questionnaire.

6.2 Returned questionnaires shall be evaluated using the FMC Corporate Procurement's Supplier Ranking Tool.

6.3 All forms (Questionnaires, Supplier Ranking Criteria Tool) for those new Contractors FMC will engage need to be added to the Workflow Tool when the Contractor is added or uploaded to the GPG Procurement Sharepoint site under Processes – Supplier Selection and Approval if the contractor is already in SAP.

6.4 All documents for the Supplier Selection and Approval Process can be found on the Global Procurement Group (GPG) site at http://teams.myfmc.com/procurement/globalprocure/Processes/SupplierSelection/default.aspx

6.5 The EHS related information in the Contractor Services Pre-Qualification Questionnaire and the evaluation criteria in the Supplier Ranking Tool shall be review and updated as necessary, but at least once every 3 years by Corporate EHS Operations.

6.6 If all parts of the scope of work are determined to be Low Risk as indicated in the above definition for "Low Risk Contractor" then the FMC site shall use "as a minimum" the criteria specified for low risk contractors in the Supplier Ranking Criteria Tool.

6.7 The existing criteria for low risk contractors, in the Supplier Ranking Criteria Tool, are minimal. Thus, use of the Contractor Services Pre-Qualification Questionnaire is not required. Each site using low risk contractors shall develop their own pre-qualification questionnaire and include it in their Written Contractor Procedure as required above.

7.0 Substance Abuse Testing Requirements

7.1 Where permitted by country and local laws and labor contracts, part of the selection process for High Risk Contractors shall include verification that the contract company has a substance abuse testing program for all employees that will be coming onto the FMC site.

7.2 The contract employer's program, where permitted, shall include random unannounced testing of all employees and must permit "post incident testing".

7.3 Post incident testing shall be required for all incidents involving a "recordable injury" or causing FMC property damage greater than $5,000.

Note the $5,000, is limited to replacement or repair cost and does not include business interruption cost.

7.4 This testing will be performed by an appropriate substance abuse testing organization and is the responsibility of the contract company not FMC.

7.5 If the contract employer does not have an existing and effective random and "for cause" testing program, at the time the contract is awarded then all employees proposed to come onto the FMC site shall be tested before their first day on the FMC site. In emergency situations, a variance from this requirement is possible if agreed by the site manager and the business EHS Operations Leader.

8.0 Communication of Hazards to Contract Employers and Employees

8.1 FMC sites and businesses shall inform contract employers and their employees about known potential hazards at the FMC site that are applicable to the contractors' work at the site. This must be documented. Information shall include, but not be limited to the following:

- Fire hazards
- Explosion hazards
- Toxic Chemical hazards
- Specific machine or equipment hazards (hazards of equipment in motion)
- Hazards from high pressure
- Electrical hazards
- Radiation hazards
- Biological hazards
- Other hazards specific to the task(s) the contractor will be performing

8.2 This information shall be communicated by FMC to the contract company and the contract employees through contractor orientation training, safe work permitting process and/or through other suitable and effective means.

8.3 The contract employer will provide training to their employees on mitigation for any of the above hazards.

9.0 Communication of Hazards Brought onto the FMC Site by the Contract Company or its' Employees

9.1 A representative of the contract company shall be required to inform the responsible FMC individual of any chemical, physical or biological agent which will be brought onto the FMC site by the contract company or its employees.

9.2 The responsible FMC individual must review and approve the hazardous agent prior to permitting it to come onto FMC property.

9.3 The site's written Contractor Program shall specify a process for reviewing and approving a contract company or employee to bring a hazardous agent onto an FMC site.

10.0 Communication of Applicable Provisions of the Emergency Action Plan

10.1 FMC sites and business shall inform contract employers and their employees of the applicable provisions of the sites emergency action plan.

10.2 This communication shall include, but is not limited to the following items:

- Who to contact in the event of a fire, chemical spill, medical and/or other emergency situation.
- Preferred and alternate method for contacting individual(s) indicated above.
- Contract employees roll in an emergency, if any.
- Information on the site's emergency alarm or alternative emergency notification system.
- Action expected of contract employees in the event the emergency alarm sounds.
- Plant evacuation routes.
- Muster location(s) for contract employees to report to during an evacuation.
- Methods for accounting for contract employees during an evacuation.
- Any other site specific information contract employers or employees need to know about the sites emergency action plan.

10.3 This information shall be communicated from FMC to the contract company and the contract employees through contractor orientation training, safe work permitting process and/or through other suitable and effective means.

11.0 Control of Contract Employee Access to Designated Process Areas

11.1 At FMC sites with chemical processes covered by Process Safety Regulations and at sites with high risk process areas not covered by regulations, the site shall develop and implement a safe work practice to control the entrance, presence and exit of contract employers and contract employees in these process areas.

12.0 Communication of FMC Safe Work Rules and Procedures

12.1 FMC sites shall communicate to contract employers and employees the applicable site safety rules. Rules to be covered shall include, but are not limited to the following:

- Required PPE to be used when they are on site. For specifically required PPE, the site and contractor shall reference the FMC PPE standard and the site's PPE hazard assessment for the area(s) in which the contractors will be working. Contract employers shall provide their employees with the required PPE and they are also responsible for training their employees on the proper use, limitations, maintenance and cleaning of the required PPE. For specialized PPE required for specific activities unique to the FMC site, FMC may provide the contract employees with the necessary equipment and training to use the equipment safely.
- Rules for operating vehicles on the FMC site (where applicable) shall include, but are not limited to: speed limits, use of seat belts, restrictions on carrying passengers in backs of trucks not equipped for passengers, approved and restricted parking area, and any other vehicle rules adopted by the site.
- Smoking rules and restrictions on lighters and matches in restricted areas.
- Rules concerning where food and beverages can be consumed on site.
- Rules related to other safe work practices that the contract employer or employees will be involved in including, but not limited to:

    - Hot Work
    - Confined Space Entry
    - Isolation of Hazardous Energy Sources
    - Line breaking and equipment opening
    - Operation of fork trucks and other industrial trucks
    - Use of man lifts
    - Use of cranes and hoists
    - Electrical Safety requirements
    - Elevated Work
    - Any other site specific safe work practices applicable to the work of a contractor.

12.2 Contract companies and their employees shall follow the FMC Corporate "Life Critical Safety Standards" to include: Energy Isolation, Lockout/Tagout, Elevated, Work, Electrical Safety, Line Breaking and Equipment Opening, Hot

Work and Confined Space Entry when performing tasks at the FMC sites that involves these activities.

12.3 Contract companies that have their own life critical safety standards and/or procedures in the above areas can use their own standards or procedures if they have been reviewed by the FMC site safety staff and determined to be equivalent or more rigorous than the FMC standards.

12.4 In all cases where both contract and FMC personnel will be involved in a “life critical activity”, the FMC Standards shall be followed.

13.0 Evaluation of Contractors Safety Practices

13.1 For sites where FMC employees are continuously present on site during the time when contractors are working (e.g., operating sites), the FMC site shall designate FMC employees to, at least once every 10 contractor work days perform an evaluation of the contractor’s performance with respect to compliance with the sites safety rules and requirements. These evaluations shall be documented and kept on file for 1 year.

13.2 Minor non-compliance issues shall be addressed immediately with the contract employee and their supervisor.

13.3 Repeat non-compliance issues shall require a meeting between FMC project management and the contract employer.

13.4 The site’s Written Contractor Procedure shall indentify steps to be taken to address continuing or repeat violations of safety requirements up to and including termination of the contract.

13.5 For FMC sites where FMC employees are not continuously present during the time contractors are working, FMC employees with responsibility for the work of the contract companies shall perform evaluation during each visit to the site.

13.6 If the visits are 10 or mare days apart then at least 1 evaluation must be performed for every visit. If the visits are less than 10 days apart then 1 evaluation can be performed for every other visit.

13.7 These evaluations shall be documented and kept on file for 1 year.

13.8 Minor and repeat non-compliance issues shall be managed as indicted in the paragraph above.

14.0 Individual Self Supervised Contractors

14.1 These are generally professional consultants or trained technical expert employees brought onto the FMC to perform specific tasks or services.

Depending on the scope of their work they shall be subject to the provisions of this standard as they apply.

15.0 Contractors Working Directly Under FMC Supervision (Contract Employees)

15.1 In countries where FMC Corporate Procurement has established contracts with one or more Contract Employee employment agencies, only these agencies shall be used.

15.2 In countries or regions where there are no corporate contracts with an employment agency, then local procurement shall attempt to identify the best available agency and acquire Contract Employees through that agency.

15.3 Where possible and where it is permitted by law, the employment agency shall be responsible for screening potential FMC Contract Employees and for administrating pre-employment substance abuse testing. Where the employment agency cannot provide pre-employment substance abuse testing and where testing is permitted by law, the FMC site shall arrange for pre-employment substance abuse testing just as the site would do for a regular FMC employee.

15.4 Contract Employees working under FMC supervision shall be treated the same as FMC employees with respect to training and qualification for the jobs they are hired to perform.

15.5 FMC Supervisors of these Contract Employees shall be the same as that for FMC employees with supervision being responsible for the employees' safety. This is part of the responsibility we take on when we agree to supervise.

15.6 There can be inherent safety risks associated with the hiring use of Contract Employees and each business organization proposing to hire Contract Employees shall develop a method to identify these risks along with a plan to manage them. Each FMC business shall also develop an internal procedure for reviewing and approving the use of Contract Employees within their respective business. This procedure must consider the identified safety risks and the proposed methods for mitigating the risks.

16.0 Effective Date

16.1 This Standard is effective as of February 21, 2014. FMC sites and businesses shall implement this Standard no later August 20, 2014. This Standard will be reviewed and updated within 3 years of the effective date and every 3 years thereafter.

Note: an FMC site must be using Corporate Procurement's Contractor Selection Process for selecting new contractors at the time they certify compliance with this standard. However, the process and timing for screening

Contract Companies with existing contracts, as of the date this standard is published, will be determined by Corporate Procurement and will likely extend beyond this standard's implementation period.

Revision Log

Revision Level	Revision Details	Revision Date (MM//DD/YYYY)	Approval
0	Initial Release	02/21/2014	R. Haire

1.0 PURPOSE

1.1 The purpose of this guideline is to assist FMC sites in Effective Case Management of medical treatment for individuals who are injured or become ill as a result of work-related conditions.

2.0 SCOPE

2.1 This Guideline applies to all work-related injuries and illnesses at FMC worldwide sites.

2.2 This Guideline applies to all FMC employees.

2.3 This Guideline applies to contractors to the extent provided in contracts with FMC.

2.4 This Guideline is limited to case management from the time an employee initially reports a work-related injury or illness through treatment from a doctor or other licensed health care professional. This guideline is not intended to cover procedures for the employee retuning to work after a work-related injury or illness.

2.5 This Guideline is expressly subject to any applicable governmental requirement or the terms of any applicable collective bargaining agreement relating to access to employee medical treatment.

3.0 DEFINITIONS

3.1 **Contract Medical Provider**: Licensed occupational health medical providers or individual doctors who provide services to FMC employees under a contract with FMC Corporation.

3.2 **Effective Case Management**: Management of work-related injuries or illnesses so that FMC employees are provided with appropriate medical treatment and care from a doctor or other licensed health care provider. The goal of effective case management is to help the FMC employee receive appropriate medical care and recover from a work-related injury or illness to the point where he/she can resume activities without restriction.

4.0 PROCEDURES FOR INDIVIDUAL CASE MANAGEMENT

4.1 FMC Site Responsibilities – Each FMC site shall have a site specific Medical Case Management Plan (MCMP). To the extent possible, the MCMP should follow this guideline. The MCMP should supplement this guideline with information that will help injured or ill employees and their supervisors effectively navigate the health care system in their region or country. The MCMP shall include provisions regarding training of management and employees as specified in section 5.0 of this Guideline.

4.2 Employee Responsibilities – All employees shall: (a) immediately (or as soon as possible) report all work-related injuries and illnesses to their immediate supervisor or team leader, and (b) notify their immediate supervisor or team leader prior to seeking any medical treatment (even if after hours).

4.3 Guidance on the Initial response to a work related Injury or Illness:

4.3.1 First reports of an injury or illness can come in different ways ranging from an injured employee discovered on the plant floor to an employee reporting a possible work related injury. The immediate response to certain situations would be different.

4.3.2 In the case of a injured employee discovered at the plant in a condition where they are not capable of reporting the injury themselves, the procedure below should be followed:

4.3.2.1 Activate the site emergency response plan and bring first aid responders to the scene.

4.3.2.2 Ensure that the hazardous condition or environments that lead to the incident is controlled before other individuals are exposed.

4.3.2.3 If there are on-site medical personnel, bring them to the scene as soon as possible, if necessary. If there are no on-site medical personnel, contact outside emergency responders and call an ambulance to the site for transport to outside clinic or hospital, if necessary.

4.3.3 In the case of an employee reporting a possible work related injury to his/her supervisor after the event occurred, the employee should be encouraged to visit the on-site clinic (if available) or encouraged to

make an appointment with the FMC Contract Medical Provider as soon as possible. Each FMC site should understand the applicable regulations and laws pertaining to choice of a medical provider. Training and communication, as defined in section 6.0 of this guideline is an important part of a well defined process.

4.3.4 For sites within the US, excluding Green River, WY, FMC has partnered with Travelers/CSS to assist injured employees and managers with medical treatment following a work related incident. Injured employees will have the opportunity to speak with a Registered Nurse (RN), 24 hours a day 7 days a week who will obtain a history of the injury and recommend the best course of action based on the symptoms reported by the injured employee. Recommendations can range from simple first aid to referral to a medical provider. This service is not designed to replace calling 911 when immediate medical attention is required. If the employee does not require immediate medical attention, please have the employee, call 1-855-887-5057. Please allow the employees complete privacy during this call. The employee's personal medical information will be kept strictly confidential and will not be shared with the manager or supervisor.

4.3.5 Recommended case management steps for visits to outside medical clinics, hospital emergency rooms, and doctor's offices for work related injuries occurring at the site:

4.3.5.1 A manager, supervisor, or other trained FMC employee should pick up a "Red Packet" and accompany an injured employee who is seeking treatment with an outside medical provider or at a hospital emergency room. A form "Red Packet" is attached as Appendix A to this Guideline, however, each site should develop their own site-specific "Red Packet" with information that will be useful to the relevant employee and the outside medical provider.

4.3.5.2 The steps in the Red Packet should be followed as closely as possible by the manager, supervisor, or other employee accompanying the injured employee. Included in the Red Packet are:

Page 1: Instructions for the injured employee (if they are capable of reading them),

Page 2: Checklist for the FMC individual accompanying the injured employee, and

Page 3: Information for medical provider treating the employee.

FMC sites should use the information in the attached Red Packet (Appendix A) as a starting point; however, that information should be augmented with additional site specific information as appropriate, including information that may be helpful to the injured employee or the individual accompanying them.

4.3.5.3 If it appears that the employee was exposed to a hazardous chemical, the person accompanying the employee to a medical provider should bring copies of appropriate MSDSs. If there is not time to locate the appropriate MSDSs, the person accompanying the employee should have someone else at the Site find the MSDSs and forward those documents to the medical provider immediately.

4.3.5.4 The person accompanying the injured employee should stay at the outside medical provider or hospital until the injured employee is either released or admitted to the hospital. They should attempt to answer questions from the medical staff and provide information about conditions at the FMC site.

4.4 Records Retention and Management

4.4.1 A record of all employee and physician case management communications shall be maintained. This information will be kept confidential and separate from incident investigation information.

4.4.2 Other medical-related records, such as workers compensation records, will also be kept confidential and separate from incident investigation information.

4.4.3 All medical-related records shall be kept separate from any other employee records, including personnel files.

4.4.4 Prior to sharing any employee and physician case management communications or medical-related records with anyone, written approval must be obtained from the affected employee, as required by local or country requirements. Appendix B to this Guidance provides a Medical Information/Records Release Form.

5.0 PROCEDURES FOR RELATIONSHIP WITH MEDICAL PROVIDERS

5.1 Management Responsibilities – FMC Sites with On-site Medical Services

5.1.1 While it is every employee's right to choose his or her own health care, at locations that have on-site medical services available, supervisors who receive notice or otherwise become aware of an employee's injury or illness should encourage the injured or ill employee to first seek evaluation and treatment at the on-site facility unless the circumstances of the injury or illness require immediate off-site emergency attention. For shifts when on-site medical services are not available, supervisors should follow the guidelines for working with Contract Medical Providers (section 5.2).

5.1.2 Each site shall assign a manager to coordinate with the on-site medical provider. This manager should meet at least monthly with the service provider to review cases and to ensure Effective Case Management. Training for this type of management will be provided to the FMC manager if necessary.

5.2 Management Responsibilities – FMC Sites Using Contract Medical Clinics or Doctors

5.2.1 Sites that do not have on-site medical services available should establish relationships with local Contract Medical Providers to provide both routine and emergency medical services. Where possible, clinics and doctors with specific occupational medical experience should be chosen.

5.2.2 While it is every employee's right to choose his or her own health care, supervisors who receive notice or otherwise become aware of an employee's injury or illness should encourage the employee to use a Contract Medical Provider in the event of a work-related injury or illness, unless the circumstances of the injury or illness require immediate off-site emergency attention.

5.2.3 Each site shall assign a manager to coordinate with the Contract Medical Provider. Training for this type of management will be provided to the FMC manager if necessary.

5.2.3.1 This manager should have regular scheduled telephone conversations with the Contract Medical Provider to review all current cases, and more frequent conversations as needed based on particular cases.

5.2.3.2 This manager should meet with the Contract Medical Provider in person at least twice per year to review cases and to establish clear expectations regarding services to FMC employees.

5.2.3.3 This manager shall communicate FMC's concern for quality of care and expectation that the Contract Medical Provider provide only care and treatment that is medically necessary for all employees using their services.

5.3 **Management Responsibilities – Use of Hospital Emergency Rooms**.

5.3.1 The use of a hospital emergency room for primary care may be necessary when the circumstances of the injury or illness require immediate off-site emergency attention or for sites that do not have a Contract Medical Provider available.

5.3.2 The FMC manager identified in section 4.3.3 of this Guideline should coordinate with the director of the emergency department of the local hospital or hospitals. This coordination should include providing the director with information on the facility, its operations, potential for exposure, and other relevant information.

5.3.3 A knowledgeable supervisor, manager, or employee shall accompany an employee sent to an emergency room for treatment of a work related injury or illness to answer questions from the hospital, provide FMC's perspective on Effective Case Management, and to discuss the working conditions at the relevant FMC site.

6.0 TRAINING/COMMUNICATION

6.1 Effective training regarding Effective Case Management of employees, managers and supervisors is a very key component of the process. The goal of the training/communication is to help employees understand FMC's commitment to Effective Case Management. This guideline as augmented with site specific information should be the subject of management and employee training as follows:

6.1.1 Initial Communication - At a minimum, the key components of this guideline will be reviewed with existing employees within 6 months of its release and for new employees before their initial assignment.

6.1.2 Refresher Training – At a minimum, refresher training on the guideline shall be provided to affected personnel whenever there is a significant change to the guideline or when observations/events indicate the need to review this information.

6.1.3 Health and Wellness Fairs or Safety Day Activities – In addition, Effective Case Management should be a discussion topic for FMC health and wellness fairs or safety day activities.

7.0 CONTRACTORS

7.1 Contractors and sub-contractors will be expected to have and maintain injury reporting and treatment programs.

8.0 REFERENCES

8.1 FMC Occupational Health Resource Manual, 2004

9.0 APPENDICES

9.1 Appendix A, Red Packet, 3 part form
9.2 Appendix B, Medical Information/Records Release Form

10.0 Effective Date

This Guideline is effective as of August 2, 2013. Sites shall implement as much of this guideline as is possible in their respective states and countries within 6 months of the effective date or February 2, 2014. The Guideline will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

Revision Log

Revision Level	Revision Details	Revision Date (MM/DD/YYYY)	Approval
0	Initial Release	08/02/2013	Robert Haire, Director EHS Operations

Appendix A

Occupational Injury and Illness

Red Packet Information

Fore

Employees

Supervisors

&

Treating Physicians

Instructions for Injured Employees

Event: All Injuries or Illnesses

- Report Injury/Illness or suspected Injury/Illness to your supervisor or manager immediately.
- If necessary activate the plant emergency medical system by calling: XXXX
- In the US, except Green River, call TravCARE at 855-8875057 and describe the injury or the symptoms you are experiencing. At Green River contact MedCor at XXXX. At all other locations follow the recommendations of your supervisor, first aid responder or other emergency medical advisor.

Event: Injuries or Illnesses that may require treatment beyond First Aid

- Call ambulance or have someone drive you to (list institution preferred for your site, include address, phone hours of operation, and what to do if after hours care if necessary.)
- If possible bring the following information with you:
  - Copy of Job analysis for your job
  - Copy(s) of MSDS (SDS) if the event involved exposure to a chemical
  - Copy of your personal insurance Card
- Have someone notify a family member of where you are being taken for care.
- **Do not** work beyond your medical restrictions once you return to work.
- Contact your supervisor or Human Resource representative if you have any questions.

Important Names and Phone Numbers

Site Manager: XXX-XXX-XXXX
HR Representative: XXX-XXX-XXXX
EHS Manager: XXX-XXX-XXXX
Occupation Health Physician or Clinic with which the site has a contract: (Insert Name and numbers)
Site workers compensation coordinator: (Insert Name and contact numbers where applicable)
Other: Insert other important site specific names and numbers

Instructions for Supervisors

EVENT: Injury or Illness where it cannot yet be determined if treatment beyond First Aid will be required:

- Immediately summon assistance by someone at the site trained in first aid.
  - In the US, except at the Green River site, Call TravCARE at XXX-XXX-XXXX. At Green River contact MedCor and request assistance with appropriate treatment
  - For all other non-US sites use your best judgment and the judgment of the first aid responder to determine appropriate level of treatment.

EVENT: Injury or Illness that will likely require treatment beyond first aid

- In the US, except Green River Call TravCARE at 855-887-5057 and request help with case management. At Green River, contact MedCor.
- Call ambulance or drive injured/ill employee to (list institution preferred for your site, include address, phone hours of operation, and what to do if after hours care if necessary.)
- Contact another supervisor, manager or employee and inform them of your intentions.
- Accompany or follow injured employee to hospital or clinic.
- Bring the following information with you if possible:
  - Copy of Job analysis for the job title of injured employee
  - Copy(s) of MSDS (SDS) if the event involved exposure to a chemical
  - Review your sites substance abuse testing requirements, where applicable, and be prepared to communicate this information to the treating clinician.
- Stay with or wait for the employee until treatment is completed or they have been admitted to the hospital for longer term care.
- Contact site workers comp coordinator at first opportunity see number below.

Important Names and Phone Numbers

Site Manager: XXX-XXX-XXXX
HR Representative: XXX-XXX-XXXX
EHS Manager: XXX-XXX-XXXX
Occupation Health Physician or Clinic with which the site has a contract: (Insert Name and numbers)
Site workers compensation coordinator: (Insert Name and contact numbers where applicable)
Other: Insert all other site specific names and phone numbers

Clinician or Doctor

We value the health and welfare of our employees a great deal. *FMC Site Name* will consider significant job duty modifications, or even a temporary change of duties to assist our employees in returning to work as quickly and safely as possible.

If provided, please review the *Job Analysis* for this employee and note any restrictions that should be followed to ensure a safe return-to-work. If you do not wish to release the employee to his/her regular job (with or without restrictions), please contact the site manager or HR representative at the numbers indicated below.

We appreciate your expertise in the treatment of injuries/illnesses suffered by our employees and your assistance in their safe return to work. If you have any questions regarding this information or if you would like to tour our facility, please contact me directly.

Sincerely,

Include: Workers Compensation, Employee Name, and other contact information here as applicable. Sites should modify this note to be consistent with local laws and to reflect the actual at the site.

APPENDIX B – Medical Information/Records Release Form

FMC hereby disclaims all control and liability for the disposition by an employee-designated representative of documents and information released hereunder; FMC assumes no responsibility for the use of such documents or information by any third party.

I,_____, agree to have_____
Employees Name Employee/Medical Provider

released to:
_____

_____

Check one:

Any information in my medical records regarding evaluation and treatment

Only that information needed and relative to the period from _____ through _____

and concerning
_____

_____

_____

Reason(s) release is requested
_____

_____

_____

Signed _____ Date _____

Witness_____ Date _____

For continued confidentiality, a copy of this form must precede the information listed above

1.0 Purpose

1.1 The purpose of this Standard is to protect workers from electrical hazards.

2.0 Scope

2.1 This Standard applies to all FMC locations.

2.2 Corporate Engineering Standards define and address Hazardous Locations (Area Classification), shock hazard boundaries, and arc-flash boundaries plus electrical design and installation requirements. Other electrical safety requirements are covered in Corporate EHS Standards for Project Safety Reviews (PreStartup Safety Review to verify proper installation), Emergency Response (medical emergencies), and Safety Equipment (AED = Automatic External Defibrillators).

3.0 Definitions

3.1 AED – automatic external defibrillator. Sudden Cardiac Arrest is caused by an abnormal heart rhythm called ventricular fibrillation that prevents the heart from pumping blood. An AED is a device that delivers a controlled electric shock to the heart that allows a normal rhythm to resume.

3.2 EHS – Environmental, Health and Safety

3.3 Electrical Safety Program – a program that establishes requirements appropriate for the electrical hazards, voltage, energy level and circuit condition for operation of electrical equipment and for maintenance.

3.4 GFCI – Ground Fault Circuit Interrupter. A GFCI is a device that is designed to trip at 25 to 30 milliamps for durations greater than 25 milliseconds (upper bound). In North America, GFCI's for single phase 110 VAC are specified by the National Electrical Code and should be Underwriter's Lab approved (UL 943, Class A) to trip between 4 and 6 milliamps, for about 25 milliseconds. Other terms for GFCI's include Residual Current Devices (RCD's) and Earth-Leakage Circuit Breakers (ELCB's).

3.5 NFPA – National Fire Protection Association

3.6 PPE – Personal Protective Equipment

3.7 Qualified Person – a person trained to become knowledgeable of the construction and operation of electrical equipment or a specific work method and tasks for recognizing and avoiding the electrical hazards that might be present with respect to that equipment or work method and tasks at a particular FMC site.

3.8 Unqualified Person – a person who has not been trained to become knowledgeable of the construction and operation of electrical equipment or a specific work method and

tasks for recognizing and avoiding the electrical hazards that might be present with respect to that equipment or work method and tasks at a particular FMC site. An Unqualified Person may have received general electrical awareness training.

4.0 Standard

4.1 Each site shall develop and implement an Electrical Safety Program.

4.1.1 FMC has adopted the requirements of NFPA 70 and NFPA 70E; this FMC Standard lists only a summary of these requirements.

4.1.2 Each site's program shall comply with local country regulatory requirements if more stringent or robust than the requirements within this Standard.

4.2 Site Responsibilities - The site's Electrical Safety Program shall include training/qualifications, hazard identification and risk assessment procedure, emergency procedure, labeling and electrical PPE, grounding, temporary wiring approvals, and internal audits every 3 years.

4.2.1 Training/Qualifications - Site shall train all personnel per Section 4.3 and hire/contract Qualified Persons and/or provide the additional training needed for Qualified Persons.

4.2.1.1 A Qualified Person shall also be trained in the decision making process of the degree and extent of the hazard and PPE selection and job planning necessary to perform the job safely.

4.2.2 Hazard Identification and Risk Assessment Procedure - Site shall train all Qualified Persons in a procedure for hazard identification and a risk assessment procedure to be used before work is started within Shock Hazard and Arc-flash Boundaries (see 4.4.1 and Attachment 1).

4.2.3 Emergency Procedure - Site shall train employees exposed to shock hazards and those employees responsible for taking action in case of emergency in methods of release of victims from contact with exposed energized electrical conductors or circuit parts, cardiopulmonary resuscitation, and automatic external defibrillator (AED) use.

4.2.4 Labeling and Electrical PPE - Site shall provide the electrical labeling and electrical Personal Protective Equipment (PPE) based on the hazards of voltage and environmental conditions indicated by the Shock Hazard and Arc-flash Studies.

4.2.5 Grounding - Site shall have properly grounded systems per NFPA 70 (National Electrical Code) except specific circuits exempted per Section 250.22 of NFPA 70 (2011 edition).

4.2.5.1 Site shall provide portable GFCI devices where needed (see section 4.3.3).

4.2.5.2 Permanent and portable GFCI shall be included in the Inspection, Testing and Preventive Maintenance program.

4.2.6 Temporary Wiring – Each site shall have a method for approving temporary wiring. Use of extension cords in offices is exempt from this approval.

4.2.7 Audits - Site shall conduct an internal audit of their Electrical Safety Program at least every three (3) years (note: a Corporate EHS Audit does not satisfy this requirement).

4.3 Unqualified Persons - All employees and contractors covered under the Electrical Safety Program shall be trained appropriately for their responsibilities and skills including limitations of Unqualified Persons, basic electrical safety, use of portable/plug-in electrical equipment in wet or damp areas, and compliance with restrictions in electrically classified areas/zones.

4.3.1 Limitations - Personnel who do not meet the requirements of Section 4.4 (Qualified Persons) shall not:

4.3.1.1 repair electrical equipment, nor

4.3.1.2 access shock hazard and arc flash areas.

4.3.2 Basic Electrical Safety - All personnel shall:

4.3.2.1 use properly rated electrical cords (including extension cords),

4.3.2.2 protect cords from abrasion and wear; for example a cord routed through any structure and especially through doorways shall be protected,

4.3.2.3 not overload outlets and power strips beyond rated capacity,

4.3.2.4 use the plug when removing from an outlet – do not pull the cord,

4.3.2.5 visually inspect cords before each use – tag damaged cords for qualified repair or removal from service, and

4.3.2.6 recognize the proper type of fire extinguisher if trained to fight incipient fires.

4.3.3 Electrical Safety in Wet or Damp Locations - All plug-and-cord-connected portable electrical devices used in a wet or damp location shall be plugged into a portable GFCI unless:

4.3.3.1 the electrical outlet is part of a circuit permanently protected by a GFCI,

4.3.3.2 the portable device is distinctly labeled as “double insulated”, or

4.3.3.3 the portable device is supplied through an isolating transformer with an ungrounded secondary of not over 50 volts.

4.3.4 Electrically Classified Areas/Zones - All personnel are responsible for observing entry restrictions into electrically classified areas/zones where unapproved electrical devices (including most mobile phones) are potential ignition sources for flammable gasses or combustible dusts that may be present. Where an unapproved device is temporarily required, a Hot Work Permit shall be obtained which includes air monitoring requirements.

4.4 Qualified Persons - In addition to the general requirements for all employees and contractors described above in Section 4.3, the following requirements apply to Qualified Persons working on electrical equipment.

4.4.1 Energized versus De-energized Systems - Qualified Persons shall plan work activities to favor de-energized systems (using Energy Isolation, Lockout/Tagout) as much as possible. Where work must be performed on an energized system of 50 volts or more, an Electrical Hazard Analysis/Energized Work Permit (see Attachment 1) is required including written justification that one of the following conditions apply:

4.4.1.1 de-energizing introduces additional or increased hazards. Examples of “additional or increased” hazards include interruption of life support equipment, deactivation of emergency alarm systems, or shutdown of hazardous location ventilation systems; or

4.4.1.2 de-energizing is not possible due to equipment design or operational limitations. Examples of this situation include testing and troubleshooting of electrical circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous process that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

4.4.2 Shock Protection Boundaries - Qualified Persons shall observe shock protection boundaries for limited approach, restricted approach, and prohibited approach including use of appropriate PPE and tools when exposed to energized electrical conductors or circuit parts.

4.4.3 Arc-flash Boundaries - Qualified Persons shall observe arc-flash boundaries including use of PPE and tools appropriate for the Hazard Risk Category (HRC).

4.4.4 Test Instruments - Qualified Persons shall use only test instruments that are properly rated and calibrated. A visual inspection of leads, probes, casing etc shall be performed before each use. When using a voltmeter to test for zero voltage, always check a known voltage before and after to ensure that the voltmeter has not failed during the test.

4.4.5 Replacement Parts and Repairs - Qualified Persons shall only use approved replacement parts and repair methods.

5.0 References

5.1 NFPA 70 - National Electrical Code, National Fire Protection Association.

5.2 NFPA 70E – Standard for Electrical Safety Requirements for Employee Workplaces, National Fire Protection Association.

5.3 FMC OS 001 – Energy Isolation, Lockout/Tagout (LOTO).

5.4 FMC CES 3050P – Engineering Guide for Determining Electrical Area Classification.

5.5 FMC CES 3902P – Arc Flash Implementation Guide.

5.6 FMC CES 3910 – Qualifications of Electrical Workers.

5.7 FMC CES 3903 – Model Electrical Safety Program [non-mandatory].

5.8 FMC CES 3920 – Electrical Hazard Assessment, Approach Boundaries to Live Parts, and PPE Selection Based on 2009 NFPA 70E [non-mandatory].

6.0 Effective Date

6.1 The effective date of this Standard is August 27, 2012, at which time all FMC employees are expected to be in compliance within 3 months of issue except if an extension is specifically granted. This standard will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

7.0 Revision History

This Standard was originally issued on August 27, 2012 at Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date (MM/DD/YYYY)	Approval
0	Initial Release	08/27/2012	Rob Haire

ATTACHMENT 1
ELECTRICAL HAZARD ANALYSIS / ENERGIZED WORK PERMIT

Before work is started on or near electrically live parts operating at 50 volts or more, part 8 approval shall be completed. However, for systems 600 volts & below, an electrically qualified person with the required PPE may do certain limited voltage measurements, troubleshooting and testing on electrically live equipment without or before part 8 approval.

1.Description of work:	**Work Order:**

2. Supervisor **justification** for people working on this equipment while energized –
Why this circuit/ equipment cannot be de-energized or the work deferred until the next scheduled outage?

Work on energized equipment (see above) must also be approved in Part 8 below.

3. Detailed description of the **equipment, task & procedure** to be used in performing the above listed work:

4. **Hazard Risk Category** Specifics: (Consult FMC CES 3903 Electrical Hazard Assessment and PPE Selection)
a. Nominal equipment voltage _____
b. **Hazard Risk Category (HRC)**: 0___, 1___, 2___, 3___, 4___
c. Means employed to keep unqualified persons from work area:

5. **Personal Protective Equipment** Required (Consult FMC CES 3903 Electrical Hazard Assessment and PPE Selection)

a. ASTM rated EH boots ___
b. Clothing: standard electrical uniform____; or ____ Cal/cm2 clothing ___
c. Head & Eye Protection: class E hard hat___ safety glasses___ goggles ___;
switchman's hood & face shield___ or flash suit hood___.
d. Hearing protection _____
e. _____v voltage rated rubber gloves ___
f. Leather glove protectors ___(including overgloves)
g. Electrically safe tools required ___

6. Electrical **safety briefing** held on parts 1 through 5 (above).

Operator (name/date)	Operation supervisor(name/date)	Maint. tech (name/date)

7. **Certification that work can be done safely** from the electrically qualified person(s) who will be doing this work:
Maintenance Tech / Contractor date
Maintenance Tech / Contractor date

8. APPROVALS TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED:
Maintenance Supervisor/Engineer Date
Product Team Manager Date

Once the work is complete, forward this form to the safety department for review and retention

1.0 Purpose

1.1 The purpose of this standard is to protect FMC employees, contractors and visitors from workplace hazards by identifying, providing and requiring the use of Personal Protective Equipment (PPE).

2.0 Scope

2.1 This standard applies to all worldwide FMC locations and FMC work activities including but not limited to: manufacturing plants, laboratories, warehouses/distribution centers (DCs), research stations as well as work activities by FMC employees at customer farms, toll manufacturing sites, and other customer sites.

2.2 This standard applies to all FMC employees: specified portions of the standard apply to contractors and visitors.

2.3 This standard does not cover electrical PPE, which is covered in the FMC Electrical Safety Standard and related Corporate Engineering Services (CES) engineering standards.

2.4 This standard does not cover hearing protection required by site specific hearing conservation programs. Specifics on who must use specified types of hearing protection shall be covered under the site's Hearing conservation program.

2.5 This standard does not cover respiratory protection as required by a site specific respiratory protection programs. The specifics of required use of respirators shall be covered under the site's Respiratory Protection Program.

3.0 Definitions

3.1 Personal Protective Equipment (PPE) – Equipment to protect the human body or portions of the body from hazardous chemical or physical agents. PPE includes but is not limited to the following: Head protection, eye protection, hand protection, foot protection, skin protection, and other specialized personal protective items.

3.2 PPE Hazard Assessment – A systematic evaluation, by FMC site management, or safety specialists engaged by FMC site management, of the

physical, chemical and biological hazards present in each workplace or created by tasks performed in the workplace. This hazard evaluation is used to identify Personal Protective Equipment required to mitigate employee exposures to identified hazards.

4.0 Minimum requirement for PPE in FMC owned or operated Manufacturing Plants, Warehouses and Distribution Centers (DCs)

4.1 Safety glasses with fixed side shields (ANSI Z87.1 or EN 166, 169, 170 & 172):

4.2 Hard hats (ANSI Z89.1.1997 or equivalent):

4.3 Safety toed shoes or boots (ASTM F2413 or equivalent):

4.4 Gloves (at a minimum, to provide some protection from physical hazards, but should be appropriate for specific tasks being performed): and

4.5 Other area or task specific PPE based on hazard assessment for the area or task.

5.0 Minimum requirement for PPE in Laboratories

5.1 Safety Glasses with fixed side shields (ANSI Z87.1 or EN 166, 169, 170 & 172):

5.2 Gloves, including those for specific laboratory tasks as well as gloves for every visitor in the laboratory. There can be exceptions to this glove requirement in laboratories for task such as but not limited to administrative tasks and tasks involving the use of computer keyboards: and

5.3 Other PPE for specific areas or tasks based on the laboratory PPE hazard assessment.

6.0 Minimum PPE requirements for FMC employees at toll manufacturing location or customer manufacturing locations

6.1 Safety Glasses with fixed side shields (ANSI Z87.1 or EN 166, 169, 170 & 172):

6.2 Hard Hats (ANSI Z89.1.1997 or equivalent):

6.3 Safety toed shoes or boots (ASTM F2413 or equivalent):

6.4 Gloves: and

6.5 Other PPE as required by the host toller or customer plant or as determined to be necessary by an FMC PPE hazard assessment.

7.0 Minimum PPE requirements for FMC employees visiting farms or performing other field service work at non-manufacturing locations

7.1 Safety Glasses with fixed side shields (ANSI Z87.1 or EN 166, 169, 170 & 172):

7.2 Safety toed shoes or boots, (ASTM F2413 or equivalent), except Sea Weed farms where appropriate footwear for use in water shall be used :

7.3 Gloves: and

7.4 Additional PPE as specified by the host employer or as determined to be necessary by an FMC hazard assessment.

8.0 PPE Hazard Assessment

8.1 All FMC manufacturing sites, laboratories, warehouses/DCs, research stations and field service organizations shall perform a PPE hazard assessment and identify hazards that are present, or are likely to be present, which require the use of PPE. The PPE assessment shall cover all areas and/or tasks performed at the FMC site, toller sites, customer sites or at field locations.

8.2 If employees have the potential for exposure to vapors, mists or splashing of corrosives, solvents, or other chemicals that have the ability to cause eye damage, the hazard assessment shall specify a requirement for the use of chemical resistant goggles in addition to safety glasses.

8.3 If employees have the potential for exposure to solid particulates that have the ability to be accelerated in the direction of an employee, the PPE hazard assessment shall specify a requirement for the use of face shields in addition to safety glasses.

8.4 Following the PPE hazard assessment, FMC management shall select and require each employee; contractor and visitor to use the PPE that will protect them from the hazard identified in the hazard assessment.

8.5 FMC management shall communicate and document the communication of the PPE selection decisions to each affected employee, contractor, and visitor and ensure that the selected PPE will properly fit each affected employee, contractor and visitor.

8.6 Completion of the PPE hazard assessments shall be certified by local management. The certification shall include: identifications of the workplace

evaluated, the person certifying the evaluation; and the date(s) of the hazard assessment.

8.7 An example of an acceptable PPE Hazard Assessment Form is shown in Appendix A to this standard. Appendix B contains important considerations for performing a PPE Hazard Assessment.

9.0 Inspection and Maintenance of Required PPE

9.1 PPE shall be inspected before each shift by the employee, contractor or visitor using the PPE and defective or damaged PPE shall not be used. Defective or damaged PPE that cannot be repaired shall be taken out of service and destroyed.

9.2 Employees, contractors, and visitors shall be provided with information or training on the proper condition and function of PPE.

9.3 Periodic site wide inspections and/or audits shall confirm that only properly maintained and functioning PPE is in use.

9.4 Each site shall ensure that all PPE is worn properly and in accordance with manufacturers' recommendations.

9.5 Each site shall ensure that PPE is not modified.

10.0 Cost of PPE

10.1 FMC shall provide employees with required PPE at no cost to the employee. There can be exceptions for safety toed shoes or boots where each site shall establish the number of these items they will supply to employees within a specified time period.

10.2 Contractors are required to have the PPE, specified by FMC, when working at FMC locations but FMC shall not be responsible for the cost of PPE used by contractors.

10.3 The cost of PPE for visitors shall be handled by each site on a case by case basis.

11.0 Signage and Communication

11.1 When PPE is required for a specified area, above the minimums identified in sections 4.0 and 5.0, adequate signage at entrances or other suitable employee areas shall clearly indicate the specific PPE required.

11.2 Within specified work areas, a PPE matrix, such as the one shown in Appendix C, shall be posted that shows the PPE required for common production tasks expected to be performed in that area. The matrix should be posted in the control rooms or other high employee traffic areas.

11.3 Each site shall perform an assessment to determine the number of PPE signs needed and the appropriate placement of these signs so that they can most effectively communicate PPE requirements to employees, contractors and visitors.

11.4 For tasks that require special PPE, which can be performed in many various areas of a location management shall clearly communicate the specific PPE requirements for the specified tasks.

12.0 Employee Training

12.1 Training on the required use of PPE and its limitation shall be provided to each FMC employee prior to initial assignment and to contractors and visitors when they first visit to the site.

12.2 Refresher training on required PPE and its limitations shall be provided to all FMC employees anytime there are changed to the PPE required and at least once every 3 years following release of this standard.

13.0 Exceptions to requirements in this PPE Standard

13.1 An exception to this PPE standard is granted to allow employees to travel to and from the plant entrance through clearly identified and marked or otherwise identified low hazard areas of the plant. The site shall perform and document a hazard assessment to identify the low hazard route that employees must follow. The documented assessment shall remain on file as long as this exception is being used.

13.2 For visitors touring a site an exception allowing minimal PPE is permitted provided the site performs an adequate hazard assessment of the tour route and keeps the group out of or away from areas with identified hazards. The route used shall be marked or otherwise identified. The hazard assessment performed and the specified route shall be documented and kept on file as long as this exception is being used.

13.3 Other exceptions to this PPE standard are permitted where the use of the specified PPE will create a greater hazard to the employee or co-workers. The site manager and the Business EHS Operations Leader must review each of these exceptions and agree that the exception is necessary. Each specific exception shall be the subject of a through hazard review or risk assessment with the results and conclusions documented and kept on file as long as the exception is being used.

14.0 Effective Date

This Standard is effective as of October 8, 2013. FMC sites and businesses shall implement this Standard no later April 8, 2014. This Standard will be reviewed and updated within 3 years of the effective date and every 3 years thereafter.

Revision Log

Revision Level	Revision Details	Revision Date (MM/DD/YYYY)	Approval
0	Initial Release	10/08/2013	Robert Haire, Director EHS Operations

Appendix A
PPE Hazard Assessment Form

Facility:	Assessor:
Location/ Area:	Date of Assessment:
Task or Job Function:	I, _____, certify that I performed the PPE hazard assessment for the identified area or job task.

Insert text indicating the types of task performed

Eye & Face Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Impact/Penetration				
Chemicals				
Dust				
Heat				
Glaring Light/Radiation				

Head Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Impact/Penetration				
Burns				
Electrical Shock				
Chemicals				

Hand and Dermal Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Cuts/Abrasion/ Punctures				
Corrosive Chemicals				

Solvents; de-fatting				
Irritants / Sensitizers				
Temp. Extremes / UV Radiation / Flash Fire				

Foot Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Falling, Rolling or Impact Loads				
Slips-muddy and wet conditions				
Liquid/particulate chemicals				
Electrical hazards				

Respiratory Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Dust/Mists/Metal Fumes Particulates				
Gas/Vapor				
Asphyxia				
Respirator program elements*properly administered				

Heat Stress:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Work in chemical barrier suit or protective clothing?				
Worked performed next to heat sources, burners or in hot and humid				

environment, etc.?				

Noise Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Impulsive Noise ≥ 140 dB (un-weighted scale)				
Continuous Noise ≥ 85 dBA				

Fall Hazards:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Work performed on elevated surface or deck?				
Work performed on portable step ladders, rolling ladder devices, etc.?				

Electrical Safety and Arc Flash Protection:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Work on or near to live electrical terminals greater than 50 volts? Potential for static electricity during handling of flammable liquids?				
Potential for electrical arc flash resulting in thermal energy ≥ 1.2 calories / cm^2 or second degree burn?				
Electrical insulated rubber gloves are to be tested every 6 months per OSHA 29 CFR 1910.137(b)(2)(viii) and Table 1-6. For exposure to live terminal parts greater than 120 volts, level of PPE arc flash protection or Hazard Risk Category (HRC) should be determined via arc flash hazard analysis in accordance to NFPA 70E-2009 and/or IEEE Standard 1584. Hazard Risk				

Categories: 0 ≤ 2 cal/cm^2 = 8 cal/cm^{2,} 3 =25 cal/cm^2 and 4 = 40 cal/cm^2

Ionizing Radiation:	***Yes***	***No***	***Specific Hazards and controls including PPE***	***List Specific PPE Items Required***
Work in vicinity to ionizing radiation?				

Appendix B

Guidance on things to consider when performing PPE Hazard Assessment

1. Controlling hazards. PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

2. Assessment and selection. It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational or educational operation or process, and to match the protective devices to the particular hazard. It should be the responsibility of the safety officer to exercise common sense and appropriate expertise to accomplish these tasks.

3. Assessment guidelines. In order to assess the need for PPE the following steps should be taken:

a. Survey. Conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

(a) Impact

(b) Penetration

(c) Compression (roll-over)

(d) Chemical

(e) Heat

(f) Harmful dust

(g) Light (optical) radiation

b. Sources. During the walk-through survey the safety officer should observe: (a) sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects; (b) sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.; (c) types of chemical exposures; (d) sources of harmful dust; (e) sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.; (f) sources of falling objects or potential for dropping objects; (g) sources of sharp objects which might pierce the feet or cut the hands; (h) sources of rolling or pinching objects which could crush the feet; (i) layout of workplace and location of co-workers; and (j) any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas

c. Organize data. Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment.

d. Analyze data. Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards (paragraph 3.a.) should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

4. Selection guidelines. After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to: a) Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.; b) compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment; c) select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and d) fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

5. Fitting the device. Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

6. Devices with adjustable features. Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

7. Reassessment of hazards. It is the responsibility of the safety officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

8. Selection chart guidelines for eye and face protection. Some occupations (not a complete list) for which eye protection should be routinely considered are: carpenters, electricians, machinists, mechanics and repairers, millwrights, plumbers and pipe fitters, sheet metal workers and tinsmiths, assemblers, sanders, grinding machine operators, lathe and milling machine operators, sawyers, welders, laborers, chemical process operators and handlers,

and timber cutting and logging workers. The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

Eye and Face Protection Selection Chart

Source	**Assessment of Hazard**	**Protection**
IMPACT -- Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding	Flying fragments, objects, large chips, particles sand, dirt, etc	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use faceshield.
HEAT -- Furnace operations, pouring, casting, hot dipping, and welding	Hot sparks	Faceshields, goggles, spectacles with side protection. For severe exposure use faceshield. See notes (1), (2), (3).
	Splash from molten metals	Faceshields worn over goggles. See notes (1), (2), (3).
	High temperature exposure	Screen face shields, reflective face shields. See notes (1), (2), (3).
CHEMICALS -- Acid and chemicals handling, degreasing plating	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11).
	Irritating mists	Special-purpose goggles.
DUST -- Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types. See note (8).
LIGHT and/or RADIATION –		
Welding: Electric arc	Optical radiation	Welding helmets or welding shields. Typical shades: 10-14. See notes (9), (12)
Welding: Gas	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. See note (9)
Cutting, Torch brazing,	Optical radiation	Spectacles or welding face-shield.

Torch soldering		Typical shades 1.5-3. See notes (3), (9)
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

Notes to Eye and Face Protection Selection Chart:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Faceshields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

(9) Welding helmets or faceshields should be used only over primary eye protection (spectacles or goggles).

(10) Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4). Select the darkest shade that allows task performance.

9. Selection guidelines for head protection. All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.

Some examples of occupations for which head protection should be routinely considered are: carpenters, electricians, linemen, mechanics and repairers, plumbers and pipe fitters, assemblers, packers, wrappers, sawyers, welders, laborers, freight handlers, timber cutting and logging, stock handlers, and warehouse laborers.

Beginning with the ANSI Z89.1-1997 standard, ANSI updated the classification system for protective helmets. Prior revisions used type classifications to distinguish between caps and full brimmed hats. Beginning in 1997, Type I designated helmets designed to reduce the force of impact resulting from a blow only to the top of the head, while Type II designated helmets designed to reduce the force of impact resulting from a blow to the top or sides of the head. Accordingly, if a hazard assessment indicates that lateral impact to the head is foreseeable; employers must select Type II helmets for their employees. To improve comprehension and usefulness, the 1997 revision also redesignated the electrical-protective classifications for helmets as follows: "Class G -- General"; helmets designed to reduce the danger of contact with low-voltage conductors; "Class E -- Electrical"; helmets designed to reduce the danger of contact with conductors at higher voltage levels; and "Class C -- Conductive"; helmets that provide no protection against contact with electrical hazards.

10. Selection guidelines for foot protection. Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with

compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians, machinists, mechanics and repairers, plumbers and pipe fitters, structural metal workers, assemblers, drywall installers and lathers, packers, wrappers, craters, punch and stamping press operators, sawyers, welders, laborers, freight handlers, gardeners and grounds-keepers, timber cutting and logging workers, stock handlers and warehouse laborers.

11. Selection guidelines for hand protection. Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

(A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,

(B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

(A) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;

(B) Generally, any "chemical resistant" glove can be used for dry powders;

(C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials;

and,

(D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

12. Cleaning and maintenance. It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

For the purposes of compliance with 1910.132 (a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection.

It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

Standard Title: Ground Transportation Safety for People	
Standard No.: OS-9	Revision Number: 5
Document Number: 1	

1.0 Purpose

The purpose of this Standard is to help safeguard FMC employees, contractors and guests who are either operating or riding in vehicles while traveling on company business. The safety practices in this Standard can also be used by employees in their off-the-job activities to help ensure their safety and that of their family and friends.

2.0 Scope

This Standard applies to all FMC employees, contractors and guests while operating or riding in a personally-owned vehicle, rental vehicle, company owned/leased vehicle and any form of public ground transportation, while on company business. FMC employees who operate fleet or pool vehicles in the USA must also comply with the FMC Vehicle Use Policy[(1)]. This Standard is not meant to supersede regulatory requirements (e.g., US DOT regulations, MSHA regulations) or local laws. The requirements of this Standard apply to all vehicles operated on FMC premises. FMC employees who operate vehicles rented from Avis or other car rental agencies must comply with the FMC Travel Policy.

3.0 Standard

Vehicle operators are expected to know and comply with all local and national requirements pertaining to the vehicles they operate, including those of foreign countries. These local and national requirements include operator licensing, speed limits and other vehicle operating restrictions or prohibitions. Nothing in this Standard is meant to contradict these local and national requirements.

3.1 Seat Belt Use

When traveling on company business, safety belts (seat belts/harness) must be worn at all times by vehicle operators and passengers (front and other seats) in a personally-owned vehicle, company owned, rented or leased vehicle, or any form of public ground transportation where seatbelts are provided. Where choices are available in developing countries, limos and taxis with seat belts/harnesses must be used.

3.2 Distractions While Driving

Various driving safety studies show that distractions of the vehicle operator while driving are a major contributing factor to traffic accidents, and should be minimized. The significant more common distractions are addressed below. While it is not practical to identify all the distractions that might occur during operation of a vehicle, as a general rule vehicle operators

should avoid activities that are mentally distracting or require their hands to be taken off the steering wheel of the vehicle and/or their eyes off the road.

a) Cell Phone Use

While an employee is operating a vehicle (vehicle operators), only hands-free cell phones are permitted to be used, and they are to be used for receiving incoming calls only. Vehicle operators may receive these calls and talk for a very short period of time in order to understand the action needed and to make arrangements for follow up conversations. Vehicle operators may not participate in conference calls, even if that participation is limited to listening only. Longer cell phone calls and calls requiring note taking and concentrated thought process must be done when the vehicle is safely parked off the driving surface.

Using cell phones (such as smart phones, PDA's and other devices) for texting, games, Internet surfing or any other activity that takes the driver's attention from the road is prohibited. Vehicle passengers can give messages to the driver provided this is done in a manner that does not distract the attention of the driver.

b) GPS (Global Positioning System) Operation

The programming and adjustments of a GPS will not be done by the operator of the vehicle while the vehicle is being operated. The programming and adjustments must be made while the vehicle is safely parked.

c) Radios, Tape Players, CD Players, Audio/Video Devices

Operation of radios, tape players, CD players and any other audio/video device shall be done in a manner that does not distract attention from driving.

d) Personal Computers and Games

The use of personal computers, PDAs and games by the vehicle operator is prohibited.

e) Reading Printed Materials

Reading of printed materials – maps, directions, newspapers, reports, etc. – in a manner that distracts attention from driving is prohibited. Occasional glancing at written driving directions is permitted providing that action does not significantly distract attention from vehicle operation.

3.3 Travel Outside Home Countries

Employees travelling in countries outside their home countries will arrange local ground transportation following consultation with the FMC site/personnel being visited. In cases where travel does not involve work with the local FMC personnel, then the International SOS (see FMC Security intranet website) travel guidelines must be reviewed prior to arranging ground travel arrangements. Guidance can also be provided by the EHS Team.

3.4 Use of Contracted Limo or Car Services

When contracted limo or other car services are used while traveling, FMC requires the same practices and requirements as are contained in this Standard.

3.5 Allowable Hours of Operation

The total combination of working and driving hours is limited to a maximum of 17 hours in any 24-hour period, including an actual driving time limit for the vehicle operator of 8 hours. The vehicle operator should pull safely off the roadway should he/she feel drowsy and take steps to refresh himself/herself prior to resuming vehicle operation. FMC fleet drivers with a US Commercial Drivers License will comply with the applicable local and national transportation hours of service regulations.

3.6 Visible Checks of Vehicles <u>Before</u> Operation

Visual checks will be made before operation each day by the vehicle operator to ensure that at a minimum the following equipment is in good condition and functioning properly:

a) Tires
b) Lights, including turn signals
c) Windshield wipers
d) Mirrors

Checks of additional vehicle parameters – such as engine oil, horn and coolant levels – can be made at the discretion of the vehicle operator.

This Standard supplements the current local policies/procedures in place for vehicle inspections; if a site or business has a more stringent policy/procedure (e.g., requiring a checklist, additional checks, etc.), then the site or business policy/procedure must be followed.

To ensure clear field of vision, snow, ice, frost and dirt must be removed from windows prior to operating vehicles.

Vehicles will not be operated when any significant driving defect is identified. Significant defects include any problems that adversely affect visibility (lights, wipers, windshield damage, mirrors, etc.), steering (wheel alignment and balance), road traction (tire tread and sidewalls), braking, and turn/stop signal lights.

3.7 Substance Abuse

The FMC Substance Abuse Policy[(2)] applies to employees operating vehicles on company business.

3.8 Incident Reporting and Investigation

All ground transportation incidents must be reported to the employee's immediate supervisor as soon as practicable. The immediate supervisor will notify the EHS Team within 24 hours of receiving a report of a ground transportation incident (see ML-EHS OPS in Outlook Global Address List), excluding weekends except in cases covered in the FMC Injury and Incident Notification Procedure[(3)]. Incidents resulting in property loss or liability exposures must be reported to

the police. A police report is often the only proof of fault and can be very beneficial in the settlement of a third party claim. Such incidents must also be reported to the FMC Corporate Risk Management Department[4]. In addition to the immediate supervisor, the operator of a vehicle involved in a ground transportation incident must also report the incident to other departments and entities. Operators of FMC leased or pool vehicles, must report incidents pursuant to the FMC Vehicle Use Policy. Operators of vehicles rented from Avis or other rental car agencies must report incidents pursuant to the FMC Travel policy. A chart identifying the individuals, departments and entities to be notified of a ground transportation incident is set forth below

Ground transportation incidents include (a) injuries to employees, passengers, and third parties, (b) damage to vehicles, property or highway/road equipment (e.g., signs, guardrails, and posts), (c) tickets/citations given for alleged violations of traffic laws, and (d) car theft. This reporting requirement does not apply to personally-owned vehicles, except when they are used for company business. Corporate EHS will decide if an incident investigation is warranted.

Vehicle Assignment	**Individual/Dept./Entity to be contacted in case of an accident**	**Who initiates contact**	**When**
All vehicles	Supervisor	Driver	As soon as practicable
All vehicles	**Police**	**Driver**	As soon as practicable
All vehicles	Risk Management	Supervisor/Fleet Administrator	Within 24 Hours
All vehicles	EHS Dept.	Supervisor/Fleet Administrator	Within 24 Hours
Leased or company owned vehicles	Fleet Management (PHH, Arval, Lease Management Company)	Driver	As soon as practicable
Leased or company owned vehicles	FMC Fleet Administrator	Driver	As soon as practicable
Rental Vehicles	Rental Car Agency, FMC Travel	Driver	As soon as practicable
Rental Vehicles	Citibank Credit Card (if card is used to rent a car from a non preferred car rental agency & employee declined rental agency's coverage)	Driver	As soon as practicable
* International locations with separate insurance must contact insurance company!			

3.9 Transportation of Chemical Samples

Transportation of chemical samples (products, raw materials, etc.) in a personally-owned vehicle, rental vehicle, company owned/leased vehicle and any form of public ground transportation should be avoided in most cases; when necessary, such transportation must

comply with all national and local requirements. If chemical samples are transported they must be safely over-packed in an approved container. The FMC businesses are responsible for developing specific packaging and carriage requirements for chemical samples transported by their employees.

3.10 Assurance Process

All FMC employees are responsible and accountable for complying with the requirements of this Standard.

3.11 Driver Training Requirements

The scope of the FMC Defensive Driver Training Program applies to all FMC employees who drive FMC owned/leased vehicles, drive their own vehicle or a rental vehicle for company business more than 1000 miles per year, except for the commute between the employee's residence and the workplace.

New Employee Driver Training

Behind-the-wheel (BTW) driver training for employees in the scope of this standard must be scheduled and completed within six months from the hire date. To allow for initial implementation existing employees within the scope of this requirement must complete training by end of 2013.

Ongoing Driver Safety Training

All drivers must successfully complete BTW Safety Training once every three (3) years. Other assigned Driver Safety Interventions including but not limited to Motor Vehicle Regulation checks, online Defensive Driver Safety Training, and issue specific Remedial Safety Training may be required at other intervals as determined by divisions or EHS operations.

Global Defensive Driver Training Provider

Driving Dynamics (DD) is FMC's preferred defensive driver training provider and will actively manage the training needs of employees enrolled in the program. Contact information:

Debbie Lodge
Director, Client Relations│Driving Dynamics
Oxford Building│256 Chapman Road
Suite 202│Newark│DE 19702
Office 302.607.7222 x110 │Direct 302.607.7230
Email: dlodge@drivingdynamics.com

3.12 Effective Date

The effective date of this Standard is January 1, 2011, at which time all FMC employees are expected to be in compliance.

3.13 References

(1) FMC Vehicle Use Policy, Philadelphia & Ewing Site Services Department, Effective 05/01/07.
(2) FMC Substance Abuse Policy, Occupational Health Resource Manual, Section D-1, dated 10/01/2010.
(3) FMC Procedure for Notification/Reporting of Injuries and Incidents, Corporate Safety Team, dated 05/01/10.
(4) Financial Standard C.240, Insurance and Risk Management Department, Effective 07/01/08.

This Standard was originally issued on December 1, 2010 at Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date	Approval
0	Initial Release	12/01/2010	Charles E. Fryman
1	Revised section 3.8 to provide clarity to accident reporting instructions. Added chart.	03/23/2012	Charles E. Fryman
2	Revised Scope to include vehicles used on company premises. Moved Seat Belt section from 3.4 to 3.1.	5/10/2012	Barry Crawford
3	Added Driver Training requirements to Section 3.11	01/2/2013	Barry Crawford
4	Added Police notification	02/14/2013	Rob Haire
5	Deleted 20 times per year for personal vehicle and added 1000 miles per year minimum.		

1.0 Purpose

1.1 The purpose of this Standard is to ensure FMC Manufacturing Sites, Laboratories and Research Facilities manage and maintain a rigorous Hazard Assessment process for Non-Standard tasks. The process aims to ensure FMC employees and contractors assess and mitigate hazards when no formal risk assessment has been completed for the job. In addition, FMC is focused on ensuring the skills in hazard identification and mitigation are to a high level of proficiency.

2.0 Scope

2.1 This Standard applies to all FMC Manufacturing Sites, Laboratories and Research Facilities. FMC employees and contractors who work for an FMC operation must adhere to this standard. The standard is required for all Non-Standard tasks (see section 3.0 Definitions). This Standard is not meant to supersede regulatory requirements or local/national laws.

3.0 Definitions

3.1 **Hazard Assessment** is an evaluation of a work place, or work situation, as to the potential for hazards that employees may encounter while performing the job.

3.2 **Hierarchy of Control** is a widely accepted system promoted by numerous safety organizations. This system is taught to managers in industry, to be promoted as standard practice in the workplace. The hierarchy of controls is in order of effectiveness, elimination, substitution, engineering, administration, personal protective equipment and Discipline. For simplicity, FMC has adopted a 3 tier hierarchy: Eliminate (which combines elimination, substitution, and engineering, Control (which is the traditional both engineering and administration, being engineering preferred to administrative), and Protect (which combines personal protective equipment and Discipline).

3.3 **Non-Standard Tasks** are any task not having a Standard Operating Procedure or maintenance job procedure, Checklist, or other documentation that provides guidance on executing the task. Typically Non-Standard tasks are done infrequently.

3.4 **Risk Assessment** is a careful examination of what, at work, could cause harm to people. Risk Assessments are completed through rating the risk by determining likelihood and severity through calculation, measurement or estimates. Risk Assessments are conducted by qualified personnel against the written SOP.

3.5 **Site Management Team** is defined as the Site Manager and direct reports (typically Environmental, Health and Safety Manager, Production Manager, Maintenance Manager and Technical Manager, but can include others). For Laboratories, the supervising leader of the facility and his/her director reports satisfies the term "Site Management Team."

3.6 **Standard Task** means any task with a Standard Operating Procedure, Maintenance Job Procedure, Check list, or other documentation that provides guidance on executing the task.

3.7 **Stop-Work-Triggers** are a set of specific conditions that if they were to occur during the task, the employees will stop work immediately and revisit their hazard assessment.

4.0 Standard

4.1 **Overview** – Hazard Assessments will include a list of the critical steps for the task being performed, identification of hazards in the immediate environment and controls identified and used to perform the task safely. In addition, specific stop-work-triggers are agreed upon by those performing the task before beginning the work. The following criteria are required for Non-Routine tasks and sites are required to adhere to each component of the standard.

4.2 **Hazard Assessments for Non-Standard Tasks**

4.2.1 Hazard Assessments shall be completed prior to every non-standard task for maintenance and operations personnel, and FMC contractors working in an FMC operating unit.

4.2.2 Personnel shall document the Hazard Assessment to record the results of the assessment (See Appendix A for an example). This written record should be available for auditing, and shall be retained for a minimum of one year after task is completed or adhere to the FMC Record Retention Policy if the Hazard Assessment is combined with other Safe Work Permits.

4.2.3 The Hazard Assessment form will consist of the following:

4.2.3.1 A brief description of the task

4.2.3.2 **Detailed steps listed to complete the task**

4.2.3.3 Hazards identified as agreed upon by the personnel that will work on the task. A checklist of hazards should be included in the hazard assessment form along with space to describe specifically what the hazards are that were checked.

4.2.3.4 Controls that the FMC personnel performing the task will put in place before executing the work. Each control measure should be written in detail on how the employee(s) addressed the hazard, and categorize the control measure using the hierarchy of control categories Eliminate, Control, Protect.

4.2.3.5 Stop-Work-Triggers

4.2.3.6 A space for names of the personnel working the task and others who may be part of the assessment to validate.

4.2.4 While planning non-standard tasks, site management and/or designate will review each task and will determine the personnel (number, organization, experience level) needed to complete the hazard assessment, and the level of supervision needed to complete the hazard assessment.

4.2.5 The Hazard Assessment participation level shall be defined by the site management team according to the level of complexity of the task.

4.2.6 Hazard Assessments should involve two people. One of the two people must be a performer of the task. Contractors, Operators, Mechanics, Supervisors, site safety professionals or process engineers can carry out the hazard assessment. The hazard assessment shall be kept on the job site while the job is in progress and used as a checklist.

4.2.7 A Formal Risk Assessment may be required based on the level of risk. Managers, Safety Professionals and/or Process Engineers shall have a defined process to evaluate all non-standard tasks and determine if a risk assessment is required.

4.2.8 For non-standard tasks not previously planned or scheduled, Site supervisors or designated staff (i.e., Safety reps) will assign the task and work with the personnel to complete the hazard assessment regardless of the participation criteria defined in 4.2.4.

4.2.9 During the task, the completed Hazard Assessment form should be present at the job site, and each employee working on the task should

sign the document confirming their review and agreement of the assessment.

4.2.10 After completing a non-standard task, a post-task review meeting shall be completed by the employees who completed the task, those who validated the hazard assessment, and the direct supervisor of the employees. The post-task review meeting shall address the following:

4.2.10.1 Any hazards that were not addressed formally by the hazard assessment

4.2.10.2 The completion of post-task wrap up duties – housekeeping, removal of added warning signage, safety tape, or barriers, etc.

4.2.10.3 Safety work orders that need to be put in to the sites system are completed.

4.2.10.4 Evaluation of the task frequency and risk level to determine if the task should have a formal Standard Operating Procedure, Maintenance Job Procedure, and Risk Assessment.

4.2.11 The Hazard Assessment documentation can either be combined with existing safe work permit documentation or as a standalone document. The following list of Hazards must be included in the Hazard Assessment documentation and sites/divisions should add to this list to customize the hazard assessment to pertain to their sites specific hazards.

4.2.11.1 Handling of Chemicals
- Flammable Gas/Liquid
- Corrosive Liquid
- Toxic Gas (i.e., Ammonia)
- Asbestos

4.2.11.2 Exposure to Chemical Hazard through
- Inhalation
- Skin Contact
- Ingestion

4.2.11.3 Physical and Ergonomic Hazards
- Hot/Cold Material
- Dust/Fumes
- Pressurized System
- Electrical, Hydraulic, Mechanical Energy
- Noise

- Lighting
- Slips/Falls,
- Access/Egress
- Pinch Points
- Entanglement/Cuts
- Repetition
- Vibration
- Posture
- Manual Handling, Heavy Lifting
- Line of Fire

4.2.11.4 Personnel Hazards

- First time performing task
- Distractions

4.2.11.5 Working at Heights

- Other people in the area not working on task
- Not trained in fall protection
- Not trained in elevated work platforms
- Tie off points not identified
- Use of Ladders, Scaffolds, Aerial Lifts

4.2.11.6 Body Use

- Prolonged twisting and bending motion
- Hands not in sight
- Working in a tight area
- Working above your head

4.2.11.7 Potential Environmental Hazards

- Loss of containment
- Waste Generated and Disposal Route
- Emissions Points

5.0 Management Audits

5.1 The Site Management team shall conduct monthly audits (Hazard Assessment Behavioral Observations) to ensure this standard is being followed and that continuous improvement opportunities are addressed. The audits shall be recorded and include the following:

5.1.1 Site Management team conducts monthly audits through direct observation in the field on completing hazard assessments for non-routine tasks. Audits shall include the following minimum standards:

5.1.1.1 A direct observation of a hazard assessment being completed in the field. If direct observation cannot be completed, a secondary but less desirable audit is to review and evaluate the documented hazard assessment form for quality.

- Task Details
- Hazard Assessment
- Controls
- During and Post Task Review

5.1.2 A review of the Key Performance Indicators (see section 6.0).

5.1.3 Lessons learned and proposed changes as indicated by site personnel.

5.1.4 When an incident or injury has occurred and behavioral factors were identified, the hazard assessment should be evaluated for one of the following.

5.1.4.1 **Not completed**: The hazard assessment was not completed and the correct hazard assessment was not reviewed and control measures not implemented.

5.1.4.2 **Not followed**: The hazard assessment was ignored and the person(s) completing the task did not apply the correct control measures to stop the incident or injury occurring.

5.1.4.3 **Inadequate**: The hazard assessment team or individuals failed to identify a particular hazard(s) that led to the incident or injury and therefore did not implement adequate control measures to prevent the incident or injury. The investigation team should review the hazard assessment and adjust as needed.

5.1.5 Findings of “Not Completed”, “Not Followed” or “Inadequate” should be included in root cause analysis reports for all injuries and incidents.

6.0 Key Performance Indicators

6.1 The following Key performance Indicators shall be reviewed by the site monthly to evaluate effectiveness of the standard.

Key Performance Indicator	Definition	Purpose	Frequency
a. Number of hazard assessments conducted by FMC maintenance personnel or contractors.	# of hazard assessments conducted by FMC maintenance personnel	Provides a means of evaluating volume of work and it's relation to planned/routine work.	Monthly

	or contractors.		
b. Number of hazard assessments conducted by FMC operations personnel or other functions (Quality, Engineering).	# of hazard assessments conducted by FMC operations personnel or other functions (Quality, Engineering).	Provides a means of evaluating volume of work and it's relation to planned/routine work.	Monthly
c. Total number of Hazard Assessments completed.		This number is a sum from KPI a and b.	Monthly
d. Hazard Assessment Behavioral Observations	# of audits conducted by managers and supervisors and/or designates.	Provides quality check for quality and skill mastery (fluency) of personnel conducting hazard assessments.	Monthly

7.0 Assurance Process

7.1 All personnel working for FMC Manufacturing Sites, Laboratories and Research Facilities are responsible and accountable for complying with the requirements of this Standard. Assurance monitoring will conducted monthly by the site management team, annually and by the Corporate EHS department every 3 years.

8.0 Communication & Training

8.1 Communication of the requirements of this Standard will be completed by each business. Training and orientation materials will be delivered by the Division and Site personnel as assigned by Corporate EHS.

9.0 Variance Process

9.1 The following process for all local variances to this standard shall be used:

9.1.1 Documentation of local regulations mandating an alternative hazard assessment methodology shall be sent to FMC Corporate EHS Operations Director.

9.1.2 Development of a procedure defining the variance shall include:

9.1.2.1 Hazard Assessment tool

9.1.2.2 Hazard List and method of review of completion of assessment.

9.1.2.3 Procedure to audit for quality of hazard assessments.

9.1.3 Site-wide communication and training of variance and reason for it.

9.1.4 Corporate EHS Operations Director approval of variance.

10.0 Effective Date

10.1 The effective date of this Standard is June 30, 2014, at which time all FMC Manufacturing facilities shall be in compliance with this standard. However many sites shall be compliant earlier than this date per specific implementation plan.

10.2 New acquisitions to FMC must be in compliance within 12 months after the date of the acquisition.

11.0 Revision History

11.1 This Standard was originally issued on March 4, 2013 at Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date	Approval
0	First version of Standard	3/4/2013	
1	**Added new 4.2.3.2** Detailed steps listed to complete the task **Added more detail on 4.2.3.3** 4.2.3.3 Hazards identified as agreed upon by the personnel that will work on the task. A checklist of hazards should be included in the hazard assessment form along with space to describe specifically what the hazards are that were checked. **Added more detail on 4.2.3.4** Controls that the FMC personnel performing the task will put in place before executing the work. Each control measure should be written in detail on how the employee(s) addressed the hazard, and categorize the control measure using the hierarchy of control categories Eliminate, Control, Protect. Added new 4.2.9 During the task, the completed Hazard Assessment form should be present at the job site, and each employee working on the task should sign the document confirming their review and agreement of the assessment.	3/27/2013	

	Deleted 5.1.1.2 (redundant to 5.1.1.1)		

Appendix A – Hazard Assessment Form

	HAZARD ASSESSMENT FORM		Task #_____
	Task:		**Date:**
	Task Location:	***Who's Working the Task?***	
	What is the most hazardous part of this job and what is needed to control the hazard?	• Are you properly trained to complete the task? • Did you review the JSA for similar work?	• What do you need to ensure this task is completed incident free?
	What conditions, job changes or distractions could call for you to use stop work authority?	• Housekeeping is part of the task. • Have there been any incidents doing this before?	• Any hazards remaining? • If conditions change then **STOP** & revise assessment

STEPS OF THE TASK	√	WHAT ARE MY HAZARDS? (Use list as Guide)		DESCRIBE HAZARDS	HOW I ADDRESSED THE HAZARDS	Eliminate-Control-Protect
1.		**Handling of Chemicals** ☐ **Flammable Gas/Liquid** ☐ **Corrosive Liquid** ☐ **Toxic Gas (i.e., Ammonia)** ☐ **Asbestos** **Exposure to Chemical Hazards through** ☐ Inhalation ☐ Skin Contact ☐ Injection	**Personnel Hazards** ☐ First time performing task ☐ Distractions **Working at Heights** ☐ Other people in the area not working on task ☐ Not trained in fall protection ☐ Not trained in elevated work platforms ☐ Tie off points not identified ☐ Use of Ladders, Scaffolds, Aerial Lifts			
2.						

3.			**Working at Heights** ☐ Other people in the area not working on task ☐ Not trained in fall protection ☐ Not trained in elevated work platforms ☐ Tie off points not identified			
4.						
5.		**Physical/Ergonomic** ☐ Hot/Cold Material ☐ Dust/Fumes ☐ Pressurized System ☐ Electrical, Hydraulic, Mechanical Energy ☐ Noise ☐ Lighting ☐ Slips/Falls, ☐ Access/Egress ☐ Pinch Points ☐ Entanglement/Cuts ☐ Repetition ☐ Vibration ☐ Posture ☐ Manual Handling, Heavy Lifting ☐ Line of Fire	**Body Use** ☐ Prolonged twisting and bending motion ☐ Hands not in sight ☐ Working in a tight area ☐ Working above your head			
6.						
7.			Potential Environmental Hazards ☐ Loss of containment ☐ Waste Generated and Disposal Route ☐ Emissions Points			
8.						
PPE Required	☐ Hearing Protection ☐ Safety Glasses ☐ Face Shield ☐ Chemical Goggles ☐ Cut Resistant Gloves ☐ Respiratory Protection ☐ Fall Protection ☐ Ice Cleats ☐ Safety Toed Footwear ☐ Wet Conditions Footwear ☐ Leather Gloves ☐ Hard Hat					
Safe Work Practice Completed	☐ Lock Out/Tag Out Devices in Place ☐ Hot Work Permit ☐ Confined Space Entry Permit ☐ Working at Heights ☐ Threnching ☐ Other Site Specific:_____					

*All members of the team review and sign **prior** to commencing work.*

NAME	SIGNATURE

JOB COMPLETION – POST TASK REVIEW

Was the job site cleaned up after work? ☐ Yes ☐ No

All non-necessary warning signs/tape/ribbons removed? ☐ Yes ☐ No

Are there any hazards remaining or new hazards that weren't identified above? ☐ **Yes** ☐ **No**
If Yes – Explain:

Were there any learning? ☐ **Yes** ☐ **No**
If Yes – Explain:

Should there be a Formal Risk Assessment, Standard Procedure? ☐ **Yes** ☐ **No**

ALWAYS REMEMBER

Appendix B - FMC Hazard Assessment Audit Form

Auditor: _____ Date: _____ Plant Area: _____

Work Performers: _____

Scoring:
1 = Unsatisfactory – More than one / two serious areas of concern 3 = Satisfactory – One or two areas of minor concern easily corrected, but nothing serious 5 = Excellent – Item complete with no further improvement possible

SECTION 1: Task Details				
Audit Questions	**Scoring (Please √)**			**Comments**
	1	**3**	**5**	
1. Has the location of the task, date, time of the task, and work performers been correctly identified?				
2. Does the task description of work adequately detail the task performed?				
	Section 1 Score:			_____ of _____ (_____%)

SECTION 2: Initial Hazard Screening				
Audit Questions	**Scoring (Please √)**			**Comments**
	1	**3**	**5**	
1. Have the workers identified the most hazardous parts of the task and what can go wrong?				
2. Have they considered whether the Hazard Assessment is sufficient or whether the task requires a formal risk assessment?				
3. Did you directly observe or is there evidence of the workers discussing capabilities, hazards, and PPE requirements before executing the work?				
4. Workers have considered and implemented necessary precautions for access control?				
	Section 2 Score:			_____ of _____

				_ (___ __%)
SECTION 3: Hazard Assessment				
Audit Questions	**Scoring (Please √)**			**Comments**
	1	**2**	**3**	
1. Have the workers written each step of the task?				
2. Have the worked checked each of the appropriate job types that pertain to the task?				
3. Do the identified hazards represent the scope of work?				
4. Where hazards have been identified are they then specified and are the control measures appropriate?				
5. Where additional specific permits has been identified (i.e., Hot Work, Confined Space) is the appropriate additional permit in place, completed, and available?				
6. Are all identified control measures in place?				
7. Are the necessary PPE being worn by the workers?				
	Section 3 Score:			____ of _____ (___ __%)

SECTION 4: During and Post Task Reviews				
Audit Questions	**Scoring (Please √)**			**Comments**
	1	**2**	**3**	
1. Did the workers consider and new hazards during the task and were properly mitigated?				
2. Were any scope changes or conditions identified and were they properly mitigated?				
3. If work has been completed or suspended has the work area been left in a safe and				

tidy condition?		
	Section 4 Score:	_____ of _____ (_____%)

1.0 Purpose

1.1 The purpose of this Standard is to protect FMC employees and facilities from fires as a result of Hot Work.

2.0 Scope

2.1 This Standard applies to all FMC locations when performing Hot Work, as defined in section 3.0 below.

3.0 Definitions

3.1 Hot Work: Any work that results in sparks or uses open flames or sources of heat that could ignite materials in the work area. Hot work includes the following:

- Welding, cutting, using a propane torch, oxy/acetylene burning, grinding, brazing.
- Use in a classified area of equipment, motors and tools not properly rated or protected according to the area classification.

3.2 Fire Watch: During the duration of the actual Hot Work and for 1 hour following the work, a Fire Watch is an individual responsible for remaining in the work area and watching for fires. Between 1 hour and 4 hours after Hot Work has been completed a Fire Watch is an activity for which acceptable methods are automatic detection systems, security video cameras, routine rounds by security or other personnel and observations by operations personnel working in the area.

4.0 Standard

4.1 Hot Work Permit

4.1.1 A Hot Work permit is required before any Hot Work is conducted inside of the plant or on a facility structure (i.e., roof). Attachment 1 to this standard is a recommended Hot Work Permit. FMC sites may use this permit or an alternative that includes all of the items in Attachment 1.

4.1.2 Before any hot work begins, a hot work permit must be completed. All precautions required by the permit must be put in place before work begins

4.1.3 A Hot Work permit may be issued for the length of work or for one shift, whichever is shorter. If work extends past one shift, a new Hot Work permit shall be issued at the start of the new shift prior to Hot Work continuing.

4.1.4 A Hot Work permit shall be canceled if any the risk of fire is introduced to the work area. The following circumstances shall cause cancellation of the permit:

- A fire occurs preventing the continuation of the job;
- Concentration of a flammable substance is above 10% of the LEL (Lower explosivity level);
- New risks in the area are detected; or
- The scope of the authorized work is modified.

4.2 Areas/Activities Not Requiring a Hot Work Permit

4.2.1 Each facility may designate areas and/or activities that do not require a Hot Work permit.

4.2.2 If these areas and/or activities are established, the plant must still ensure that the area or activity has been evaluated and precautions have been taken to ensure that fires are not unknowingly started.

4.2.3 Even if a Hot Work permit is not required in the established areas and/or activities, an evaluation for fire hazards prior to starting work by the person performing the work must occur.

4.2.4 Examples of areas and/or activities that may not require a Hot Work permit are as follows:

- Maintenance Shop; and
- Quality Lab (during quality tests).

4.3 Prohibited areas

4.3.1 Hot work shall not be permitted in the following situations:

- In areas not authorized by management;
- In buildings with impaired sprinklers;
- In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air) or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts; and
- In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper, or cotton.

4.4 Precautions

4.4.1 If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.

4.4.2 If the object to be welded or cut cannot readily be moved and if all the fire hazards cannot be removed, then guards (i.e., welding blankets) shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards.

4.4.3 Wherever there are floor openings or cracks in the flooring that cannot be closed, precautions shall be taken so that no readily combustible materials on the floor below will be exposed to sparks that might drop through the floor. The same precautions shall be observed with regard to cracks or holes in walls, open doorways and open or broken windows.

4.4.4 Where combustible materials are on the floor, the floor shall be swept clean for a radius of 35 feet (10.7 m). Combustible floors shall be kept wet, covered with damp sand, or protected by fire-resistant shields. Where floors have been wet down, personnel operating arc welding or cutting equipment shall be protected from possible shock.

4.4.5 Relocation of combustibles. Where practicable, all combustibles shall be relocated at least 35 feet (10.7 m) from the work site. Where relocation is impracticable, combustibles shall be protected with fireproof covers (i.e., welding blankets) or otherwise shielded with metal or guards or curtains.

4.4.6 Fire extinguishers. Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use.

4.4.7 Ducts. Ducts and conveyor systems that might carry sparks to distant combustibles shall be suitably protected or shut down.

4.4.8 Combustible walls. Where cutting or welding is done near walls, partitions, ceiling, or roof of combustible construction, fire-resistant shields or guards shall be provided to prevent ignition.

4.4.9 Noncombustible walls. If welding is to be done on a metal wall, partition, ceiling or roof, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided.

4.4.10 Combustible cover. Welding shall not be attempted on a metal partition, wall, ceiling or roof having a combustible covering or on walls or partitions of combustible sandwich-type panel construction.

4.4.11 Pipes. Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs shall not be undertaken if the work is close enough to cause ignition by conduction.

4.4.12 Used containers. No welding, cutting, or other Hot Work shall be performed on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are no flammable materials present or any substances such as

greases, tars, acids, or other materials which when subjected to heat, might produce flammable or toxic vapors. Any pipe lines or connections to the drum or vessel shall be disconnected or blanked. Where necessary, containers or tanks shall be filled with water.

4.4.13 Venting and purging of containers. All hollow spaces, cavities or containers shall be vented to permit the escape of air or gases before preheating, cutting or welding. Purging with inert gas is recommended.

4.4.14 If it has been determined that there are or could be flammable or combustible liquids or vapors present, LEL monitoring shall be done prior to issuing the permit and if necessary continuously. Work shall not be permitted or shall be cancelled (see 4.1.4) if concentration is above 10% of LEL.

4.4.15 All employees shall have the necessary personal protective equipment including required eye protection, welder's shield, safety hat, respirator, hearing protection and other equipment as prescribed by the supervisor. When necessary noncombustible welding screens shall be provided to protect other employees from electric arc flashes, sparks and flames

4.4.16 If needed, adequate safe ventilation will be provided in the area of the Hot Work operation

4.4.17 All oxygen and fuel cylinders shall be in an upright position and maintained at a safe distance from sparks, flame or hot slag. All cylinders will be securely fastened to prevent from falling.

4.5 Fire Watch

4.5.1 Fire watchers shall be required whenever Hot Work is performed.

4.5.2 Fire watchers shall have fire extinguishing equipment readily available and be trained in its use. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. Fire extinguishers shall be dedicated and not taken from the area or other plant areas.

4.5.3 Fire watcher's name and signature shall be included in the work permit.

4.5.4 Fire watchers are required to be in the work area during all Hot Work operations. They must be in the line of sight of the Hot Work throughout the Hot Work and for 1 hour thereafter. Fire watches shall continue during all breaks, lunches and work interruptions

4.5.5 Past the one hour fire watch period, the area shall be monitored for an additional 3 hours. Acceptable methods are automatic detection system, security video cameras, routine rounds by security or other personnel (at least 1 visit to the Hot Work area every 30 minutes) and observations by operations personnel working in the area.

5.0 Training

5.1 Fire Watch

5.1.1 A Fire Watch shall be trained on the requirements for Hot Work, the Hot Work permit, fire extinguishers, how to activate an alarm in the event of a fire, and emergency reporting and evacuation procedures.

5.2 Authorized Permit Issuer

5.2.1 Authorized Hot Work permit issuers shall be trained on the proper methods to complete a Hot Work permit and the requirements and restrictions of performing Hot Work.

5.3 Employees Performing the Job

5.3.1 Employees performing the job shall be trained on the requirements and restrictions of performing Hot Work and the permit.

6.0 Hot Work Evaluations

6.1 Sites are required to conduct periodic documented evaluations of the Hot Work operations and the effectiveness of their Hot Work program. Attachment 2 to this standard has a model that can be used.

7.0 References

7.1 OSHA General Industry Standards, Subpart Q.

8.0 Effective Date

8.1 The effective date of this Standard is October 15, 2012, at which time all FMC employees are expected to be in compliance within 3 months, of issue except if an extension is specifically granted. This standard will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

9.0 Revision History

9.1 This Standard was originally issued on October 15, 2012 at Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date (MM/DD/YYYY)	Approval
0	Initial Release	10/15/2012	Rob Haire

ATTACHMENT 1- Hot Work Permit

Nº: **HANG THIS TAG IN WORK AREA**

HOT WORK PERMIT
GOOD FOR ONE SHIFT ONLY

Instructions on reverse side must be followed without fail.

Date…… Area……..

Time Started …… Time Finished……..

Work to be Done……

……

……

I have been instructed and understand the hazards as well as the precautions necessary for this work and will be alert to prevent any unsafe practices or conditions.

❑ **FMC** ❑ **CONTRACTOR**

Employee's Signature……

Employee's Signature……

Employee's Signature……

Date……

The location and conditions where the above work is to be done has been personally examined, necessary precautions have been reviewed, explained and taken, and permission is granted for this work. All items on reverse side have been complied with.

Signed…… Date……..
FMC Operating Supervisor

Signed…… Date……..
Contractor Job Supervisor

Assigned Fire Watch (print name)……

Signature……

Assigned Fire Watch (print name)……

Signature……

Time Hot Work was Completed……..

Time Fire Watch was Completed……..

CHECK OFF ALL ITEMS ON OTHER SIDE BEFORE SIGNING

Nº: **HANG THIS TAG IN WORK AREA**

HOT WORK PERMIT
PRECAUTIONS

NOTICE: All operations shall be restricted to a predetermined fire safe area. Before portable units may be moved or cutting and welding started, this permit shall have the signature of both supervisors listed on the reverse side of this form. The location shall be carefully inspected by the supervisors and the necessary safeguards arranged and taken before signing this permit.

❑ 1. Hot work is only permitted on the equipment/area specified on the permit.
❑ 2. Sprinklers are in service and in working order.
❑ 3. Any hazardous operation or areas that will be exposed by this Hot Work have been shut down. If piping of flammable gases or liquids is to be exposed, then this material has been removed and the piping purged of the flammable material. Close examination, cleaning and inspection of closed containers that have held flammables shall be conducted before welding operations are permitted. Where necessary, containers or tanks shall be filled with water.
❑ 4. If it has been determined that there are or could be flammable or combustible liquids or vapors present, LEL monitoring has been done prior to issuing the permit.
❑Yes ❑ No Continuous LEL monitoring is required.
❑ 5. Before cutting or welding operations are started, the area must be personally examined and approved by an authorized person and necessary safeguards arranged prior to issuing the permit.
In addition:

- ❑ A. A trained and qualified fire watch has been assigned (*)
- ❑ B. A fully charged portable fire extinguisher has been provided and shall always be kept in the immediate area of the Hot Work operation.
- ❑ C. All combustibles have been removed and all floor and wall openings have been tightly covered within 35 ft. of the Hot Work.
- ❑ D. No torch with an open flame shall be set directly on wooden floors or other combustible object or support.
- ❑ E. All employees have the necessary personal protective equipment including required eye protection, welder's shield, safety hat, respirator, hearing protection and other equipment as prescribed by the supervisor. Noncombustible welding screen have been provided to protect other employees from electric arc flashes, sparks and flames.
- ❑ F. If needed, adequate safe ventilation has been provided in the area of the Hot Work operation.
- ❑ G. All oxygen and fuel cylinders are in an upright position and are being maintained at a safe distance from sparks, flame or hot slag. All cylinders are securely fastened to prevent from falling.

❑ 6. Cutting and welding equipment is in good condition.
All regulators have been inspected before use to ensure that they are operative. All welding and cutting hoses are free of oil and grease. Acetylene gas pressure has been reduced to 15 psig.
❑ 7. Firewatch has been instructed to patrol the area including floors above and below during any lunch or rest period, and for at least 60 minutes after work is completed.
(*) If necessary

ATTACHMENT 2- Hot Work Audit Form

Audit Team Members:
Audit Date: Hot Work Permit #: Location:

#	Question	Yes	No	N/A
1	Is there a hot work permit for the work being performed?			
2	Are the plant sprinklers in service?			
3	Is the employee's name performing the work clearly written on the permit?			
4	Has a trained and authorized Hot Work permit issuer signed the permit?			
5	Have all of the requirements on the permit been checked?			
6	Has a fire watch been assigned?			
7	Is the employee's name performing the fire watch clearly printed on the permit?			
8	Has fire watch been trained in the following:			
	a) Use of fire extinguishers (verify training records)?			
	b) How to report an emergency?			
	c) Emergency Evacuation Procedures?			
9	Are all employees involved in the Hot Work process wearing the required / appropriate PPE?			
10	Ask the fire watch how long he is required to monitor the Hot Work area after the completion of work. Did he answer 60 minutes or longer?			
11	Have all combustibles been removed a minimum of a radius of 35' from Hot Work area?			
12	Does the fire watch have a fully charged fire extinguisher ready for use (fire watches should be using an extra fire extinguisher and not taking them from a column, wall, etc.)?			
13	If combustibles are not able to be removed, are they protected with non-combustible tarps or other materials?			
14	Are all floor and wall openings and any other area that may transfer sparks to combustibles covered or protected?			
15	If welding, have welding curtains been set up in order to prevent sparks from spreading and employee exposure to arc (UV radiation)?			
16	If oxy/acetylene burning, were hoses inspected prior to work starting?			
17	If welding in a confined space, has the need for ventilation or supplied air been addressed?			
18	If oxy/acetylene burning, are cylinders stored upright, protected from heat sources and properly secured?			

Please attach comments and corrective actions as appropriate.

1.0 Purpose

1.1 The Line Breaking and Equipment Opening Standard (LBEOS) establishes the **minimum** requirements for safe preparation, opening and restoring to service of Process Lines and Equipment that contain, or previously contained, materials that are capable of causing injury.

2.0 Scope

2.1 The LBEOS applies to all FMC Manufacturing sites, including company employees, temporary employees and outside contractors.

2.2 The LBEOS shall be applied to all work activities where the opening of Process Lines and/or Equipment may expose personnel to Hazardous Conditions.

2.3 The LBEOS applies to Process Lines and/or Equipment that are currently in service at the facility and those that are no longer in service, but are still physically connected to a process.

2.4 The LBEOS applies to activities such as scheduled maintenance, inspections, repairs, construction and demolition.

2.5 Exceptions

2.5.1 This Standard does not apply to the opening of drain valves, bleed valves and sample valves.

2.5.2 The LBEOS does not apply to particular routine line breaking or equipment opening activities specifically covered by Standard Operating Procedures (SOPs) that include control measures to ensure adequate protection of all affected personnel and the environment.

2.5.3 The Equipment listed below is excluded, unless a specific risk analysis determines otherwise:

- Open ended utility hoses;
- Instrument air and breathing air tubing;
- Sanitary (potable) water systems;
- Pneumatic transfer hoses; and

- Fire water, cooling water, treated water, mill water and soft water systems;

2.5.4 Non-hazardous Conditions, Each site shall be responsible for evaluating site-specific risks, and shall develop a site-specific exceptions list.

3.0 Definitions

3.1 Blanking: The absolute closure of a Process Line by the installation of a solid plate that completely covers an opening and is capable of withstanding the maximum pressure of the Process Line with no leakage beyond the plate. Blanking includes blinding by use of a
spectacle blind or a skillet blind.

3.2 Block and Bleed: The closing and locking and tagging an in-line valve and the opening and locking and tagging a drain or vent valve

3.3 Double Block and Bleed System: The closure of a Process Line by closing and locking and tagging two in-line valves and opening and locking and tagging a drain or vent valve in the line between the two closed valves.

3.4 Equipment: Process and utility tanks, vessels, pumps, compressors and jackets.

3.5 Equipment Opening: Any physical separation of process or utility equipment by any means such as unbolting or unscrewing of Equipment by burning, grinding, cutting or drilling into equipment. Equipment Opening also includes removing any instruments, such as pH probes, thermocouples and pressure gauges, from process equipment. For purposes of this LBEOS, Equipment Opening shall apply to thermocouples only when the thermocouple is not in a thermowell or when the thermowell is suspected of leaking. Removal of a pressure gauge is not considered Equipment Opening if a Block and Bleed is between the gauge and the Process Line leading to the Equipment.

3.6 Equipment Owners: Individuals responsible for Line Preparation procedures, for reviewing the procedures and precautions with the Work Performing Group and others at the work site, and for issuing the appropriate permits.

3.7 First Line Break: The initial opening of Process Lines or Equipment after Line Preparation.

FMC OU EMP Remedial Action Activities Job #152356

3.8 FMC Manufacturing Site: Any site that is owned or operated by FMC where FMC products are mined or produced.

3.9 Hazard Assessment: A Hazard Assessment is an evaluation of a workplace or work situation to identify the potential for hazards that employees may encounter while performing a job.

3.10 Hazardous Condition: Any work activity where the opening of Process Lines and/or Equipment is likely to expose personnel to flammable, reactive,

corrosive, or toxic materials, inert gases, or any other material at a volume, pressure, pH or temperature capable of causing injury, illness or harm to the environment.

3.11 Hot Tap: A procedure used in repair, maintenance, and servicing activities that involves welding and/or cutting on a Process Line or piece of Equipment while it is still in service or under pressure. Hot tap is commonly used to install or replace sections of a Process Line or piece of Equipment or to add connections without interrupting the service provided by a Process Line or piece of Equipment.

3.12 Isolation: The process by which a section of a Process Line or piece of Equipment is removed from service and completely protected against the release of its contents. Isolation includes the following practices: Double Block and Bleed, Lockout / Tagout (LOTO) as set forth in Corporate EHS LOTO Standard and blocking or disconnecting all mechanical linkages.

3.13 Line Breaking: Any physical separation of parts of a Process Line by any means such as unbolting or unscrewing, or any alteration of Process Line integrity by burning, grinding, cutting or drilling.

3.14 Line Preparation: Work involving diverting or stopping the flow of material through a Process Line and/or the depressurization of a Process Line.

3.15 Line Unplugging: Any action taken to restore the flow of material after the normal flow has been stopped or restricted by a physical blockage.

3.16 Non-hazardous Condition: Work activity where the opening of Process Lines and/or Equipment is not likely to expose personnel to flammable, reactive, corrosive, or toxic materials, inert gases, or any other material at a volume, pressure, pH or temperature capable of causing injury.

3.17 Post Job Checklist: A document developed during permit preparation and used to verify that a Process Line or piece of Equipment is back to normal condition before the permit is finished.

3.18 Process Line(s): Any pipe or duct, including all process and utility pipelines, flanges, coils, couplings, tubing, steam tracing connections and attached equipment between isolation points on a system to be worked on. Process Lines include utility and process hoses connected at both ends.

3.19 Work Performing Group: The group of individuals actually performing the Line Breaking work.

3.18 Zero Energy State: Complete isolation from all energy sources with all potential energy removed and measures in place to prevent potential re-accumulation of energy.

4.0 Responsibilities

4.1 Employees and/or Contractors

4.1.1 Where LBEOS applies, all employees and/or contractors are responsible for carrying out LBEOS and clearing activities in a safe manner using caution and following appropriate EHS standards and other related procedures, including proper personal protective equipment (PPE) selection and use.

4.2 Supervisors

4.2.1 Supervisors are responsible for having employees and/or contractors trained in LBEOS in their specific areas and for providing and enforcing the use of required safety equipment.

4.3 Equipment Owners

4.3.1 Equipment Owners are responsible for Line Preparation procedures, for reviewing the procedures and precautions with the Work Performing Group and the work site, and for issuing the appropriate permits.

4.4 Work Performing Group

4.4.1 The Work Performing Group is individually responsible for performing the actual Line Breaking work to include, understanding the potential hazards involved in the work to be performed, checking that the system has been secured by following all related procedures before work begins, and using the specified personal protective equipment (PPE).

5.0 Requirements for Preparation

5.1 Development of Activity Plan

5.1.1 The Work Performing Group and Equipment Owner shall prepare a detailed activity plan that addresses the Line Breaking or Equipment Opening to be performed with a thorough Hazard Assessment, LOTO and other required hazard controls identified. In addition to engineering and administrative controls, the activity plan shall specify the area to be barricaded and the PPE to be required. The Activity Plan shall address the minimum considerations listed below which shall be analyzed and documented in a Hazard Assessment:

- Hazards from exposure to chemicals, Hazards from pressurized or gravity fed systems and pressurized Process Lines or pieces of Equipment;
- Hazards from Process Lines or pieces of Equipment that cannot be depressurized;
- Any potential energy remaining in the system;

- Hazards from flammable / explosive mixtures, dust explosion or pyrophoric materials;

- Hazards relating to unknown Hazardous Conditions inside the Process Lines or pieces of Equipment;

- Hazards relating to the Hot Tap of Process Lines or pieces of Equipment where zero energy state has not been achieved; and

- Other Hazards identified by a team member.

5.2 Identification of Break Point

5.2.1 The Activity Plan shall identify all break points. Break points must be marked by attaching a visual indicator or tag at the actual point of the Line Break or Hot Tap.

5.2.2 The Work Performing Group and the Equipment Owners shall jointly identify and physically mark the break points.

5.3 Communication of Activity Plan and Hazard Assessment

5.3.1 All team members in the Work Performing Group and Equipment Owners who will be involved in the activity shall be familiar with the requirements of the Activity Plan and Hazard Assessment.

5.4 Pre-Activity Review and Site Check

5.4.1 The Work Performing Group and Equipment Owners shall perform a Pre-Activity Review and Site Check. This review shall include, at minimum, the following items:

- Verify the Process Line and/or Equipment to be worked on.

- Verify the contents of the Process Line and/or Equipment to be worked on during the Activity.

- Review all active permits relating to the Process Line and/or Equipment to be worked on during the Activity.

- Identify PPE required for the Activity and confirm that the Work Performing Group has completed the training necessary to perform the Activity.

- Identify the tools to be used in the Activity.

- Test the nearest safety shower / eyewash station. If a fixed safety shower / eyewash station is not available nearby (accessible within

10 seconds), a portable safety / eyewash shall be obtained, tested, properly located and, designated as the emergency wash station.

- Barricade the surrounding work area to restrict access for protection of passers-by and nearby workers. Barricades may include the use of warning tape.

- Locate the nearest telephone to use in case of an emergency. If a land-line telephone is not located within a 10 second walk from the work site, a portable communications device in the possession of an Equipment Owner or Work Performing Group member shall be designated as the emergency phone.

- Check that the Process Lines and/or Equipment have been properly locked out and tagged as set forth in the Corporate EHS LOTO Standard.

- Review evacuation routes or Shelter-in-Place designated meeting locations.

- Evaluate the potential for hazards that may occur with the project due to atmospheric conditions, e.g., high humidity, wind direction.

- Determine the potential volume of any material that may become a waste and determine the proper management method, including the location and requirements for disposal of such waste.

- Inspect safety equipment before using. Make sure all safety equipment functions properly and is in ready to use (clean) condition. Do not use safety equipment if found defective.

- Inspect Process Line and/or Equipment to be worked on during the Activity for proper preparation against known and/or suspected Hazardous Conditions.

- Prepare the Post Job Checklist that will be utilized to return equipment back to service.

6.0 Personal Protective Equipment (PPE)

6.1 Specify PPE requirements for the job

6.1.1 The Hazard Assessment shall consider not only the material that was last contained in the Process Line and/or Equipment to be worked on during the Activity, but also materials and energy that may be contained in other Process Lines and/or attached Equipment. Hazardous substances can flow into equipment that is normally in non-hazardous service (*e.g.,* process chemicals into utility service lines).

6.1.2 Individuals must wear PPE for First Opening while in the vicinity of the open line / equipment. The PPE requirements shall be based on an expectation that the Hazardous Condition still exists in the Process Line or Equipment.

6.1.3 When there is verification that the Line / Equipment is clear and depressurized the Work Performing Group may consider changing the PPE requirements provided the 1 of the following 3 conditions have been met:

- Each connection into the Process Line or Equipment is isolated by a Double Block and Bleed System and the line is verified to be properly prepared and emptied; or

- Each connection into the open Process Line or Equipment is capped, plugged or Blanked; or

- Each connection into the Process Line or Equipment is isolated with single valve, does not leak through, and all residual hazardous material has been flushed out by appropriate methods.

6.1.4 PPE requirements shall be specified in the written procedure such as SOP or general permit to work.

6.1.5 Any PPE that contacts hazards chemicals shall be decontaminated or disposed of following the proper procedures.

7.0 Line Breaking / Equipment Opening Work

7.1 The critical steps listed in Appendix 1 shall be included in the Line Breaking / Equipment Opening work and safe work permit.

7.2 Line / Equipment Clearing Work

7.2.1 Consider and include as appropriate for the specific applications, the critical precautions listed in Appendix 2 in the Process Line / Equipment clearing work and Safe Work Permit.

7.3 Line / Equipment Unplugging Work

7.3.1 In addition to the work practices and precautions described in this section, the following additional precautions apply to line unplugging tasks:

- An open flame shall not be applied to any plugged valve, line or pump no matter what the contents.
- Air shall not be used to unplug a line containing hydrocarbons or other flammables. Use inert gas with precautions to prevent asphyxiation and over pressurization.
- The open ends of plugged line shall face a safe direction so injury or damage does not occur from the discharge point.
- Take into account that the clearing / unplugging fluid is not close to the decomposition temperature of the chemicals that are in the line
- If there is no way to check the pressure, always assume the line is under pressure. Lines, hoses and other equipment must be secured to avoid the potential for “whipping” when a plug breaks loose and pressure is relieved. Loosen flanges and/or connections with great caution, (do not remove bolts) in such a manner that they can be re-tightened if excessive leakage occurs. Loosen the bolts on the opposite side of the flange when practical and stand to the side when making the break. In the case of unions, do not disengage the collar threads until the break is complete. Stand to the side when making the break.

7.3.2 When using pressure to blow out a plugged line, precautions must be taken to ensure injury or damage does not occur at the discharge point (i.e., protection at discharge end for material ejected from line / equipment, tied down, etc.). Barricade the area where appropriate. Check the line for instruments and other equipment that may be damaged during the clearing process.

7.3.3 If steam must be used to externally heat a plugged line, start heating at the open end to prevent pressure build-up. Bleed the pressure down frequently to avoid over pressure.

7.3.4 A Hazard Assessment must be developed prior to performing any unplugging activities that involve Line Breaking / Equipment Opening.

8.0 Down Time after Line Breaking

8.1 Where Line Breaking includes a period of downtime, such as in the replacement of a pump, the breaks in the system shall be properly capped or Blanked. Safeguards such as locked switches (e.g. pumps, etc.) and locked valves shall be continued until the system is returned to normal service.

8.2 Returning Equipment to Service

8.2.1 When returning Equipment back to service, a test shall be performed to check the system integrity. The Post Job Checklist located on the Safe Work Permit shall be utilized to return Equipment back to service.

9.0 Work Permits Requirements

9.1 The Safe Work Permit system shall be used for all Line Breaking activities. In preparing the Safe Work Permit the Equipment Owner and the Work Performing Group shall consider the items indicated below:

9.1.1 All Breaks shall be thoroughly planned and have a completed Safe Work Permit.

9.1.2 The Equipment Owner and Work Performing Group shall fill out the permit together. The permit shall be approved by the area Supervisor before the Line / Equipment breaking is started.

9.1.3 Transfer of the Equipment Owner responsibilities shall be documented on the permit, when the original Equipment Owner is unable to provide continual supervision on the affected work plan.

10.0 MOC Requirement

10.1 Project-specific procedures must be developed and reviewed through the management of change (MOC) process for work on Process Lines Equipment that cannot be isolated or removed from service.

11.0 Environmental Requirement

11.1 The Equipment Owner and Work Performing Group shall pre-plan for collecting and managing the drainage and flushing of the hazardous material line. The preplanning shall consider hazardous waste management and plan for materials that might go down a wastewater drain during the work. The Equipment Owner and Work Performing Group shall have the appropriate containers ready with adequate capacity, labeling and spill clean-up materials at the site before starting the work.

11.2 The Equipment Owners and Work performing Group shall evaluate collected materials from the work for potential reuse or reprocessing. Material that cannot be reused or reprocessed shall be managed as waste. In either case, all containers shall be fully labeled and securely closed before moving the containers to an appropriate location for temporary storage.

12.0 Training

12.1 All Production, Maintenance, Contract personnel and other affected personnel shall receive training concerning this standard every three years or as needed based on performance. In addition, such employees shall receive training during the following circumstances:

- New hire
- Initial change of job assignment into a maintenance or production role
- Change in procedure or standard

12.2 All team members taking part in the activity must be trained in the following:

- The requirements of this standard and related procedure
- How to interpret the requirements on the line breaking permit
- Required PPE
- Hazard Communication – specific hazards of the chemicals that could be encountered during the activity including a review of the MSDS sheet(s)

12.3 Site management must certify that the training has been performed and the certification shall be updated every 3 years. The certification / training record shall contain each employee‘s name and dates of training.

13.0 Periodic Inspections

13.1 Each site shall perform periodic inspections of randomly selected FMC Employees and/or contractors performing work under this standard. The inspection shall be performed, at a minimum, on an annual basis. The inspection shall:

- Ensure that the procedure and the requirements of the standard are being followed;

- Evaluate the effectiveness of the program and permit and training;

- Identify and correct inadequate procedures; and

- Provide feedback to employees on their adherence to the LBEOS standard.

13.2 Performance of periodic inspections shall be documented and certified by management. The inspection checklist is located at Appendix 3 of this standard.

14.0 References

14.1 Energy Isolation, Lockout / Tagout (LOTO)

15.0 Effective Date

15.1 The effective date of this Standard is September 24, 2012, at which time all FMC employees are expected to be in compliance within 3 months of issue except if an extension is specifically granted. This standard will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

16.0 Revision History

16.1 This Standard was originally issued on September 24, 2012 at Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date (MM/DD/YYYY)	Approval
0	Initial Release	09-24-2012	R. Haire

1.0 Purpose

1.1 The purpose of this LOTO standard is to ensure that all FMC sites have procedural requirements governing the servicing and maintenance of machines and equipment in which start up of the machines or equipment, or release of potential energy could cause injury to personnel. This standard establishes ***minimum*** performance requirements to isolate energy.

2.0 Scope

2.1 This LOTO standard applies to all FMC sites, employees at each site, including temporary employees, outside contractors, and anyone working for and on company property.

2.2 This standard applies to the control of energy during start-up, servicing, and/or maintenance of machines and equipment as follows:

2.2.1 Servicing and/or maintenance that take place during normal production operations are covered by this standard only if:

2.2.1.1 An employee is required to remove or bypass a guard or other safety device; or

2.2.1.2 An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (points of operation) or where an associated danger zone (an area outside of the actual point of operation where machines or equipment may have moving parts or could release energy) exists during a machine operating cycle.

2.3 This standard does not apply to the following situations:

2.3.1 Work on electrical equipment for which cord or plug is the only source of energy and is under the exclusive control of the person performing the work.

2.3.2 Minor tool changes and adjustments.

2.3.3 Other minor servicing activities which take place during normal operations if they are routine, repetitive, and integral to the use of the equipment for production.

2.3.4 During these activities alternative measures which provide effective protection shall be taken.

3.0 Definitions

3.1 Affected Employees – Employees whose jobs involve operating, using, or working on equipment that authorized personnel have locked out or tagged out.

3.2 Authorized Employee – Employees for which the lockout or tagout of machines or equipment are required in order to perform servicing or maintenance on that machine or equipment.

3.3 Blocks – A means to support suspended loads or elevated parts of a machine during maintenance activities. Blocks shall be built to support the weight of the suspended load including lateral drift but not to withstand the force of a cycling machine.

3.4 Capable of Being Locked Out – An energy isolating device is "capable of being locked out" if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are "capable of being locked out" if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating devices or permanently alter its energy isolation capability.

3.5 Disconnecting Means – A device that cuts off the source of power to equipment, such as an electrical disconnect or an approved air valve.

3.6 Energized – Connected to an energy source or containing residual or potential energy.

3.7 Energy Isolating Device – A physical device that prevents the transmission or release of energy such as an "on/off buttons, line valves and block valves.

3.8 Energy Source – Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, or other source of potential energy.

3.9 Entry Point of Power – The point at which energy enters a system, machine, or unit. Changes in power routing at the entry point shall be isolated by an Equipment Specific Isolation Procedures (ESIP).

3.10 Equipment Specific Isolation Procedure (ESIP) – A procedure for a specific machine or other equipment detailing the preferred method, and locations for isolating various forms of energy.

3.11 Group Lockout – Practice involving a "Lock Box" or multiple lock hasps that allows a group of employees to attach their individual locks onto the box or hasp. Group lockouts are used for situations involving multiple energy sources and where it is not feasible for each employee to attach his/her lock directly at the energy isolation point.

3.12 Hot Tap – A procedure used in repair, maintenance, and services, or activities that involve welding on a piece of equipment (pipelines, vessels, or tanks) under pressure, in order to install connections.

3.13 Job/Process Locks – A set of locks used to lock out equipment or processes during shut down or other major work when more than one energy source is involved and it is not feasible to use personal locks to provide maximum protection.

3.14 Lockbox – A box specifically designed for equipment lockout into which all keys from the lockout devices are inserted and the captured keys remain secured under the control of the Responsible Authorized Individual and the other authorized workers participating in the equipment maintenance or repair.

3.15 Lockout Device – A device that utilizes a positive means such as a lock to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment.

3.16 Other Employees –Employees not permitted to perform lockout/tagout and are not affected by lockout/tagout, but are employees within the facility that will be provided knowledge about the facilities lockout/tagout program.

3.17 Power – Any type of energy that can operate equipment, cause movement, or cause injury directly from the energy source.

3.18 Responsible Authorized Individuals – Employees responsible for work areas in which LOTO is being performed and have the ultimate responsibility for authorizing LOTO activities and removal of LOTO devices (*i.e.,* shift leaders, project leader, supervisors, or managers).

6.0 Standard

6.1 Each site shall maintain and administer a written LOTO program that complies with this standard as well as any other applicable local laws or regulatory requirements concerning energy isolation. The program, at a minimum, shall address the following items:

- Responsibilities for implementation
- Authorized and affected employees
- Machine specific procedures
- Procedures for alternative safe guards when minor tool changes and adjustments, and other minor servicing activities which take place during normal operations (not specifically covered under the OSHA standard)
- Types of locks and tags to be used
- System for lock and tag distribution
- Define purpose and use of job, process or department locks and availability
- Shift change procedures
- Multiple lockout devices and uses
- Periodic inspections
- Lock removal procedure
- Employee training
- Management of contractors involved in energy isolations

6.2 Machinery or equipment with potential for energy start up, or release of potential energy shall have a written LOTO procedure with exclusive control, which is the Equipment Specific Isolation Procedure (ESIP). Machines or equipment excluded from having a written procedure are those with single energy sources readily identified and isolated and with no potential for energy or re-accumulation of potential energy after shut down which could endanger employees. The procedure shall be either posted on the machine or equipment or be readily available at all times.

6.2.1 ESIP shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the isolation of energy, and the means to enforce compliance including. All ESIP's will include:

6.2.1.1 A specific statement of the intended use of the procedure;

6.2.1.2 Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to isolate energy;

6.2.1.3 Specific procedural steps for the placement, removal and transfer and the responsibility for them; and

6.2.1.4 Specific requirements for testing a machine or equipment to determine and verify the effectiveness of LOTO devices, tagout devices, and other energy control measures.

6.3 Before an Authorized Employee turns off a machine or equipment to conduct work on it, the Authorized Employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

4.4 The Authorized Employee shall notify all affected employees and contractors in the relevant area that an equipment specific lockout procedure will be implemented.

4.5 The machine or equipment shall be shutdown using the ESIP for that machine or equipment. An orderly shutdown must be utilized to avoid any hazard(s) to employees as a result of a failure to isolate energy.

4.6 Each ESIP shall identify all sources of potential energy, and must include the following:

4.6.1 All potential energy sources shall be isolated and

4.6.2. The isolation shall be verified by testing. That is, a specific and recorded attempt to restart or re-energize the machine or equipment performed after the energy sources have been isolated. Verification of isolation shall be continued when there is a possibility of re-accumulation of potential energy until servicing or maintenance is complete, or until the possibility of such accumulation no longer exists.

4.7 Devices needed to isolate energy to the machine or equipment shall be properly located and operated to isolate the machine or equipment from the energy source(s).

4.8 Prior to initiating work on a machine or equipment, a lockout device shall be affixed to each energy-isolating device or on a group lockbox to secure the energy-isolating device by an Authorized Employee.

4.8.1 Whenever replacement or major repair, renovation, or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

4.9 Before lockout device(s) are removed and energy is restored to a machine or equipment, the following shall occur:

4.9.1 The work area shall be inspected to ensure non-essential items have been removed and machine or equipment components are operationally intact;

4.9.2 The work area shall be checked to ensure all employees have been removed from the area; and

4.9.3 After lockout device(s) have been removed and before machinery or equipment is started, the Authorized Employee shall notify all Affected Employees that lockout device(s) have been removed.

4.10 Each lockout device shall be removed from each energy-isolating device by the Authorized Employee(s) who applied the lockout device(s). If the Authorized Employee has to immediately leave the premises or the shift changes, the Authorized Employee will do the following:

4.10.1 The Authorized Employee who applied the device(s) will notify their supervisor or manager which machine that is currently locked out and the service that needs to be performed

4.10.2 The supervisor, manager or team leader will then choose another Authorized Employee to continue the work on the machine.

4.10.3 The new Authorized Employee will affix their locking device(s) in the presence of the Authorized Employee who initiated the lockout. The Authorized Employee leaving will then remove his/her locking device(s).

4.11 Under no circumstances shall safety devices designated for employee protection (i.e., light curtains, limit switches, or similar employee safety devices) be relied upon as a substitute for implementing an ESIP.

FMC confidential and proprietary Job # 15266

4.12 Hot taps involving transmission and distribution systems for substances such as gas, steam, water, or petroleum products when they are performed on pressurized pipelines, are permitted provided that FMC demonstrates:

- Continuity of service is essential;
- Shutdown of the system is impractical; and
- Documented procedures are followed.

4.13 Any deviation from this LOTO Standard will constitute a serious failure to follow a company policy and will be addressed with corrective disciplinary action.

5.0 Lockout Tagout Devices

5.1 Authorized Employees will affix lockout devices to energy isolation devices. The lockout devices will be attached in a manner that will maintain the energy isolation device in “safe” or “off” position.

5.1.1 Under no circumstances shall a tag be used exclusively when an energy source disconnect is equipped to accept a lock.

5.2 All lockout devices will be supplied to employees by FMC.

5.3 Lockout devices will be durable and capable of withstanding the environment to which it will be exposed and substantial enough to prevent removal without the use of excessive force or unusual techniques. Lockout devices will be standardized and easily identifiable (*i.e.,* same color, brand, size, shape, etc.). Lockout devices will only be used for lockout/tagout purposes. Tags shall be attached using non-releasable, self-locking cable ties with a minimum unlocking strength of no less than 50 pounds.

5.4 Locks shall identify the employee applying the device. All personal locks will identify the owner by name, employee ID, or picture on the face of the lock. A lock serial number can be used as a lock ID only if a list of owners and corresponding serial numbers is easily accessible, kept updated and part of the training program.

5.4.1 If Authorized Employees are issued more than one personal lock; all locks shall meet the above requirement.

5.4.2 A supply of additional locks (*i.e.,* job, process, or department locks) shall be readily available for Authorized Employees to use if the number of energy sources he/she needs to lock out is greater than the number of locks he/she is assigned. All personal locks must be uniquely keyed.

5.4.3 Tags will be of a material designed to withstand the environment in which they will be used.

5.4.4 Tags shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as “Do Not Start,” “Do Not Energize,” “Do Not Operate” or other similar language.

6.0 Use of Lockboxes and or Multiple Lock Out Devices/Hasps

6.1 If more than one employee works on individual energy sources, a hasp specifically designed to allow multiple locks to be attached to a single energy source should be used. The hasp or other comparable device shall be first placed on the lockout mechanism and all employees working on the equipment shall then attach their individual personal locks to the hasp or other comparable device.

6.2 A lockbox can be used for group lockouts when the work involves more than one energy source and it is not feasible to use multiple personal locks. A Responsible Authorized Individual shall oversee the group lockout process to ensure each member of a group lockout is provided the utmost personal protection.

6.2.1 The Responsible Authorized Individual shall assume responsibility of the entire process and ensure continuity of protection.

6.2.2 Locks shall be applied to all applicable energy source shutdown mechanisms and the authorized responsible individual shall verify that this has occurred.

6.2.3 Lock keys shall be placed in the lockbox and the Responsible Authorized Individual shall place his/her personal lock on the lockbox. This authorized responsible individual's lock will remain on the lockbox until the equipment is ready to be reenergized or only after the next responsible authorized individual has placed their lock on the lockbox.

6.2.4 Each participating Authorized Employee will affix a personal lock to the group lockbox prior to he or she beginning work on the equipment.

6.2.5 Each participating Authorized Employee will remove his/her personal lock when he or she stops working on the machine or equipment being serviced or maintained.

7.0 Shift Changes

7.1 In order to maintain continuity of lockout/tagout protection, the Responsible Authorized Individual or department supervisor will assure that:

7.1.1 All locks shall be removed upon shift change by those individuals leaving the job except that lock belonging to the Authorized Responsible Individual. His/her lock should be removed only after the next responsible individual/shift supervisor placed their lock on the lockbox; and

7.1.2 Certify that all aspects of the LOTO program are followed to minimize exposure to hazards from the unexpected energy start-up of machine or equipment or releases of potential energy.

8.0 Un-removed LOTO Device

8.1 If an Authorized Employee leaves a lock on a piece of equipment, the following procedure will be followed by the Responsible Authorized Individual:

8.1.1 All efforts must be made to locate or contact the employee to remove their lock.

8.1.2 The lock will not be removed before assuring the owner of the lock is not on company property.

8.1.3 If the employee cannot be contacted, the supervisor or manager in-charge may remove the lock after assuring the employee is clear of the machine, equipment or process and that all hazards have been addressed for equipment start-up.

8.1.3.1 Each lock removal shall be documented using the form attached as Appendix B to this standard or the equivalent.

8.1.4 If an employee's lock is removed, that individual will be informed of their lock removal and counseled about removing lockout devices properly before they resume work.

9.0 Training

9.1 Initial and annual refresher training will be provided to Authorized, Affected, and Other Employees. Training may be conducted more frequently if deemed necessary.

9.2 Authorized Employees must receive detailed training on the facility LOTO written program, recognition of applicable energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation.

9.2.1 All Authorized Employees are required to demonstrate their competency of execution of the lockout/tagout process. This can be demonstrated by passing a written test after training or through personal observations made by a supervisor or shift leader.

9.3 Affected Employees must receive training on the purpose and use of this standard, the facility LOTO written program and their role with respect to ensure that they make no attempt to use the machine or equipment that is being locked or tagged.

9.4 Other Employees must be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

9.5 Retraining shall be conducted whenever a periodic inspection reveals inadequacies in the employee's knowledge or use of the LOTO procedures. The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures as necessary.

9.6 New hires will receive training during the new employee orientation program.

9.7 Plant management must certify that LOTO training has been accomplished and updated. The certification/training record shall contain each employee's name and dates of training.

10.0 Periodic Inspections

10.1 Periodic inspections will be conducted on an annual basis of randomly selected FMC Authorized Employees performing LOTO. The inspection will:

- Ensure that the procedure and the requirements of the standard are being followed,
- Evaluate the effectiveness of the LOTO program and training,
- Identify and correct inadequate procedures, and
- Provide feedback to employees on their adherence to the machine-specific procedures.

Note: Periodic inspections do not have to be conducted on all Authorized Employees.

10.2 Periodic inspections shall be performed by an Authorized Employee or member of management other than the one(s) utilizing the energy isolation procedure being inspected and are knowledgeable of LOTO procedures.

10.3 Performance of periodic inspections shall be documented and certified by management. The Certification shall identify the machine or equipment on which the energy isolation procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection. The inspection checklist is located at Appendix A of this standard.

11.0 Contract Personnel

11.1 FMC and contractors are to inform each other of their LOTO procedures.

11.2 FMC site management must ensure that FMC employees to do not interfere with the methods used by the contractor for energy isolation.

12.0 References:

12.1 U.S. Occupational Safety and Health Administration, 29 CFR 1910.147, Control of Hazardous Energy (lockout/tagout).

13.0 Effective Date

13.1 The effective date of this Standard is June 28, 2012, at which time all FMC employees are expected to be in compliance within 3 months of issue except if an extension is specifically granted. This standard will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

14.0 Revision History

This Standard was originally issued on June 28, 2012 at Revision 0. It has been revised as follows:

Revision	Revision Details	Revision Date	Approval

Level		(MM/DD/YYYY)	
0	Initial Release	06/28/2012	R.Haire
1	Removed parenthetical phrase (keyed or combination) from definition for Lockout Device in 3.15	9/13/2012	R. Haire

Appendix A

Energy Isolation LOTO Inspection Form

1. Inspection Date: _____

2. Inspector Name: (Printed/Signature):_____/_____

3. Employee(s) Name Inspected (Printed/Signature):

_____/_____

_____/_____

_____/_____

_____/_____

4. Machine/equipment on which the energy isolation procedure was being utilized:

_____

_____

_____

Is the employee authorized to perform LOTO?	**Yes**	**No**
Has the employee notified affected employees?	**Yes**	**No**
Has employee received LOTO training within the last year?	**Yes**	**No**
Has employee de-energized equipment?	**Yes**	**No**

Have all procedures been followed?	**Yes**	**No**
Were tags legible and clearly displayed?	**Yes**	**No**
If this is an outside contractor, are they following FMC procedures?	**Yes**	**No**

5. Comments/Observations:

_____
_____
_____
_____
_____
_____

Appendix B

Lock Removal Form

If employee is not available to remove a LOTO device then only the shift supervisor may authorize its removal. The following must occur:

1. The lock must be identified with employee's name or number

Employee Name or Number on Lock: _____

Verified By: _____

2. Verify that the employee is not in the plant

Physical Check of Plant Performed By: _____

Employee Located (Y/N): _____ Verified By: _____

3. Attempt to the contact the employee

Employee was called: Home (Y / N) _____ Cell (Y / N) _____

Date: _____ Time: _____

Employee was contacted and informed of lock removal (Y / N) _____

Verified By: _____

4. Prepare to remove the lock. Follow re-energy procedures to ensure all employees and tools have removed from the equipment. Remove lock with bolt cutters. Preserve lock so that it can be given to employee.

All required steps verified by: _____ Lock removed by: _____

5. Return lock to the employee

Lock returned by: _____ Verified: _____

Appendix 1

Critical Steps for Line / Equipment Opening

Step	Action
1	Identify the proper line / equipment, contents and hazards Know what the material is / was in the line to be opened. Know what is being handled and any hazards. .
2	Isolate the Energy Sources Whenever servicing or maintenance activities could expose personnel to any hazard due to contact with gas, fluid, solid, electricity, energy, or other mechanical motion, etc., associated with line or equipment clearing, isolate and safeguard the system per proper energy isolation methods. Open, lock and tag Bleed valves (if available)
3	Depressurize, drain, and clear the line / equipment (Line preparation) Prepare the line / equipment for the work by depressurizing and clearing the line of harmful materials. To the maximum extent practical, clean lines / equipment. Verify depressurization by testing. Testing may include opening a vent or drain to ensure that there is no pressure.
4	Perform atmospheric monitoring as required. If the atmosphere shows 25% or more of the LEL, possibility of oxygen enrichment or deficiency, or concentrations exceeding IDLH, implement precautions and procedures to protect personnel from the hazards. Document the precautions on the permit or procedure. <u>Note</u>: UK standard is 10% of LEL.

Step	Action
5	Provide additional supports as necessary, so that the line sections do not fall when flanges, connectors, or joints are opened. Be aware of electrical tracing when disconnecting.
6	Protect Personnel Implement precautions so that individuals entering the area where hazards from the line opening may be present. Where line breaking presents a hazard to personnel in surrounding areas, a barricade (such as warning tape), or a safety watch (when the First Break is being made) is required. Precautions shall be required on multiple levels if necessary. Prepare to contain and clean all spills resulting from the line opening.
7	Specify and use PPE based on the potential hazard. On First Break the potential hazard is based on the premise that the line is under pressure and contains the most hazardous material connected to it. Always assume the hazard is present until opening is completed and affected line proven clear.
8	Check the line / equipment to verify all precautions are in place and the proper line / equipment is being opened.

Step	Action
9	Loosen connections with control to be sure pressure is relieved before completely opening. Loosen bolts on opposite side of workers. Break the flange so leakage is directed away from the workers. Consider using a cover or shield Loosen but do not remove any bolting / studding until the gasket joint seal has been broken and that it can be assured that internal pressure does not exist Loosen threaded fittings slowly and make every effort to break the seal and verify that the line / equipment is depressured and empty before uncoupling the fitting. When loosening hose fittings, be aware of indications of system pressure. Loosen with control. Consider low spots where liquid or vapor can accumulate. Precautions for material that may be released (e.g., bucket).
10	Safeguard open lines that contain hazardous substances to prevent vaporization, dripping, spills, or other releases that could cause safety or environmental risks. Safeguards may include: blind flanges, plugs, caps, upstream blanks, or positive isolation.
11	If a hazard assessment is conducted following the First Break, a different level of PPE may be specified. A lower level of protection may be considered if the risk of wearing full PPE for an extended time (e.g., heat stress, etc.) is greater than the risk of completing the job in the lower level of PPE.

Appendix 2

Critical Steps for Line / Equipment Cleaning

Step	Action
1	Verify that clearing pressures, temperatures and materials are within the operating limits of the line / equipment.
2	Verify that the clearing material is compatible with the contents.
3	Utilize the least severe method of clearing a line / equipment. Choices, in order of preference may include • Water or other non hazardous fluids • Low pressure nitrogen or argon (air is permissible if not in flammable service) • Low pressure steam • High pressure nitrogen or air • High Pressure Steam NOTE 1: Check site chemical compatible matrix to make sure there is no possibility that water / steam / air / nitrogen will react with the chemicals in the process NOTE 2: Take into account that the cleaning / unplugging fluid is not close to the decomposition temperature of the chemicals that are in the line NOTE 3: Verify the allowable pressure and temperate of the pipe and equipment
4	Avoid high pressure steam, air or nitrogen. If required, extreme caution must be observed and the pressure limitations of the line or equipment must not be exceeded.
5	Install a block-and-bleed assembly at the process inlet point when using air, nitrogen or steam so the utilities can be depressured prior to disconnecting the hose.
6	Consider the need for backflow prevention at the process connection point to prevent process materials from flowing into connection hoses or utility systems.

Appendix 3

INSPECTION FORM FOR LINE BREAKING AND EQUIPMENT OPENING

INSPECTION SITE: _____ INSPECTOR NAME: _____
AREA / BUILDING: _____ PERMIT /WORK ORDER: _____
DATE: _____ START TIME: _____END TIME: _____

Inspection Questions (Assign Yes, No or N/A and score based on percent safe)	**Y/N/NA**	**Comments**
Safe Work Permit is completed and at job site		
Line properly de-energized, drained, de-pressurized, purged, and isolated (i.e., by double block and bleed valve or single isolation valve)		
Pipe insulation evaluated for special hazards (asbestos, contamination, etc.)		
Cleanup / containment equipment is available and used to handle residual chemicals		
Exclusion zone(s) (including area below) is established through roping off / barricading		
Permit issuer and receiver do field verification to identify all isolation points and pump controls and to identify potential hazards		
Personnel are positioned out of “line of fire” during First Break (bolts on opposite side or break point is possibly shielded)		
Pipe is supported to prevent movement		
First Breaks into equipment or process lines that have contained any hazardous material involve (at a minimum) wearing of goggles, face shield, protective clothing and gloves		
SCBA is used for breaking into potential IDLH atmospheres (e.g., potential for HCN, H2S, Chlorine, Anhydrous HCl, CO, etc.)		
Standby employee is present for breaking into potential IDLH atmospheres		
Additional Items, Described here…		

1.0 Purpose

1.1 This standard establishes the minimum requirements for fall protection while performing Elevated Work according to definitions in this standard.

2.0 Scope

2.1 This standard applies to Elevated Work as defined below.

2.2 This standard does not apply to design and construction requirements for Fixed Elevated Surfaces, except to the extent that whenever a Fixed Elevated Surface presents a fall exposure due to conditions that do not meet applicable design codes or standards, deteriorated conditions, deficient design or incomplete repair. Any work performed from a Fixed Elevated Surface exhibiting such conditions shall be considered Elevated Work and this standard shall apply.

3.0 Definitions

3.1 *Anchorage*: A secure point of attachment for lifelines, lanyards or deceleration devices.

3.2 *Body Belt (safety belt)*: A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

3.3 *Body Harness: S*traps that may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

3.4 Competent Person: A trained and qualified person appointed by the site or contractor to perform a job.

3.5 Collective Protection: A safety measure which provides protection to a group of workers as opposed to personal protection which provides protection to only one person.

3.6 *Deceleration Device* means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which dissipates or limits energy to protect an employee during a fall arrest.

3.7 Elevated Work: any work performed on temporary walking-working surfaces or equipment such as:

- Platforms;
- Roofs;
- Edge of unprotected excavations and holes;
- Scaffolds;
- Aerial lifts; and
- Ladders

3.8 Fixed Elevated Surfaces: fixed ladders, fixed stairways, or fixed workplace surfaces that are not temporary working- walking surfaces or equipment.

3.9 *Guardrail:* A barrier erected to prevent employees from falling from a higher to a lower level.

3.10 Hole: A gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface

3.11 *Lanyard:* A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting a body belt or body harness to a deceleration device, lifeline, or anchorage.

3.12 Leading Edge: The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

3.13 *Lifeline*: A flexible rope, cable or lanyard for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

3.14 *Opening:* A gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which an employee can fall from a higher to a lower level.

3.15 *Personal Fall Arrest System:* A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a Body Harness and may include a Lanyard, Deceleration Device, Lifeline, or suitable combinations of these devices.

3.16 Positioning Device: a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

3.17 *Roofing Work:* The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

3.18 *Safety-Monitoring System: A* safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

3.19 Stepladder: A self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back.

3.20 *Toe Board:* A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

3.21 *Unprotected Sides and Edges:* Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway, where there is no wall or guardrail system at least 39 inches (1.0 m) high, (0.9 m in the EU).

3.22 *Walking/Working Surface: A*ny surface on which an employee walks or works excluding vehicles, trailers on which employees must be located in order to perform their job duties.

3.23 *Warning Line System: A* barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

3.24 *Work Area*: The portion of a walking/working surface where job duties are being performed.

4.0 Standard

4.1 An evaluation of hazards and a safe work permit are required for Elevated Work, so that the work is safely planned and carried out. Site specific exceptions to the permit requirement are permitted for low risk task preformed from ladders provided an undocumented evaluation of hazards is completed.

FMC DU EMF Remedial Action Activities Job 3152356

4.2 Systems and measures to prevent falls shall be used as required by this standard. Collective protection (such guardrails) shall take priority over personal protection measures.

4.3 General Duty for Fall Protection

4.3.1 Walking/working surfaces must have the strength and structural integrity to support employees safely.

4.3.2 Employees shall be protected from falling by the use of Guardrail, safety net systems, or personal fall arrest systems when exposed to falling from an unprotected side, edge, or hole which is 4 feet (1.2m) or more above a lower level and in the following situations:

- on a walking/working surface
- while constructing a leading edge;
- on a walking/working surface where leading edges are under construction, but the employee is not engaged in the leading edge work; or
- on walking/working surfaces and exposed to falling through holes.

4.3.3 Holes must be protected by covers to prevent objects from falling and employee from tripping in or stepping into or through holes (including skylights).

4.3.4 Each employee on ramps, runways, and other walkways shall be protected from falling 4 feet (1.2m) or more to lower levels by guardrail systems.

4.3.5 Employees working on edges of an excavation including wells and pits 4 feet (1.2m) or more in depth shall be protected from falling by guardrails, fences, barricades or covers.

4.3.6 An employee working above equipment posing chemical or physical hazards shall be protected from falling into or onto the equipment by guardrail or equipment guards.

4.3.7 Each employee reaching more than 10 inches (25 cm) below the level of the walking/working surface on which they are working shall be protected from falling by a guardrail, safety net or personal fall arrest system.

4.3.8 Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 4 feet (1.2m) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1.0 m) above the walking/working surface, shall be protected from falling by the use of a guardrail, a safety net or a personal fall arrest system.

4.3.9 When conducting roofing work 4 feet (1.2M) above lower levels the following measures must be implemented

- Erect a warning line beyond 8 feet (2.4 m). from the roof edge and establish a safety monitor to warn personnel to not cross the warning line.
- Use of a personal fall arrest system when work occurs within 8 feet of the roof edge.

4.3.10 When traveling to roof work area (e.g. ladder) applicable requirements in this standard must be followed.

4.3.11 Fixed elevated surfaces that are not considered temporary working/walking surfaces with open- sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by means according to appropriate design codes and standards

4.4 Scaffolds

4.4.1 Scaffolds shall be designed by a competent person and shall be constructed and used consistent with that design. Scaffold design, construction, maintenance, and inspection shall at a minimum be done according to OSHA 29 CFR 1926.450 and OSHA 29 CFR 1910.28 or other more restrictive applicable national regulations.

4.4.2 Inspections should be conducted and documented:

- After assembling or installation and before use; and
- Periodically and as often as necessary to ensure safety.

4.4.3 Inspections shall be conducted and documented by competent person and shall be done according to OSHA 29 CFR 1926.450 or other more restrictive applicable national regulations.

4.4.4 Bamboo scaffolds are acceptable provided they comply with the provisions of this standard. When national standard does not exist the Code of Practice for Bamboo Scaffolding Safety of the Hong Kong Labor Department shall be used.

4.5 <u>Aerial lifts</u>

4.5.1 Aerial lifts include the following types of vehicle-mounted devices which are used to elevate personnel to job-sites above ground:

- Extensible boom platforms;
- Aerial ladders;
- Articulating boom platforms;
- Scissors lifts;

- Vertical towers; and
- A combination of any such devices

4.5.2 Lift controls of extensible and articulating boom platforms shall be tested each day prior to use to determine that such controls are in safe working condition.

4.5.3 Only Competent Persons shall operate an aerial lift.

4.5.4 The following verifications shall be conducted before lifting:

- Existence of electrical lines. A safe distance must be kept (An evaluation of potential for contact and arching should be made to determine the safe distance);
- Maximum load;
- Area is clear barricaded;
- Required employee fall protection;
- Status of platform protections and access gate; and
- Suitable weather conditions and winds to perform safely the job.

4.5.5 Attaching the worker's fall protection equipment to an adjacent pole, structure or equipment while working from an aerial lift is not permitted.

4.5.6 Workers shall use a personal fall arrest system attached to the boom or basket when working from an aerial lift. Except for scissors lifts for which personal fall arrest systems are not required as long as the employee remains in the basket and follows the other requirements of this standard.

4.5.7 Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket. Extending the walking/working surface of the basket by using planks, ladders, or other devices is prohibited.

4.5.8 Boom and basket load limits specified by the manufacturer shall not be exceeded. Such limits shall be posted on the equipment.

4.5.9 The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline provided they can be safely installed.

4.5.10 An aerial lift truck shall not be moved when the boom is elevated in a working position with men in the basket, except for equipment which is specifically designed for this type of operation. Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position

4.5.11 Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of

the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

4.5.12 Fork truck supported platforms shall not be used to lift personnel unless it becomes strictly necessary because the use of other equipment is physically not possible or pose more risk. When using fork trucks a risk assessment must be conducted prior to performing the elevated job

4.6 Body Belts

4.6.1 Body belts are not acceptable as part of personal fall arrest system. Harnesses should always be used as part of the personal fall arrest system. The use of a body belt in a positioning device system is acceptable.

4.7 Ladders and step ladders

4.7.1 Working on ladders or stepladders should be limited to low risk level situations, short working time or its use is necessary because other means are not possible due to the condition of the area .As a guide, they should be used in the following situations.

- Working on one position for a maximum of 30 minutes;
- Light work;
- Handhold is available; and
- When 3 points of contact by the person at working position are possible

4.7.2 Working on ladders shall not be permitted when imposing overload, overreaching, or a side loading.

4.7.3 Working on ladders of more than 15 feet (5 m) long shall not be permitted.

4.7.4 Ladders shall not be tied or fastened together to provide longer sections unless they are specifically designed for such use.

4.7.5 A metal spreader or locking device shall be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.

FMC TV EMF Remedial Action Activities Job #152356

4.7.6 Wood ladders shall not be coated with any opaque covering, except for identification or warning labels which may be placed on one face only of a side rail.

4.7.7 When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet (.9 m) above the upper landing surface to which the ladder is used to gain access; or, when such an extension is not possible because of the ladder's length, then the ladder

shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grab rail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

4.7.8 Ladders shall be maintained free of oil, grease, and other slipping hazards.

4.7.9 Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support). This is equivalent to 75 degrees angle with the horizontal.

4.7.10 Ladders shall be used only on firm ground and stable and level surfaces. The maximum admissible side slope will be 16º (the side needs to be leveled anyway) and the back slope 6º.

4.7.11 Ladders must be secured to prevent accidental displacement.

4.7.12 Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.

4.7.13 A barricade shall be used to keep the activities or traffic away from the ladder.

4.7.14 The area around the top and bottom of ladders shall be kept clear.

4.7.15 The top of a non-self-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment.

4.7.16 Ladders shall not be moved, shifted, or extended while a worker is climbing it.

4.7.17 Ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized electrical equipment.

4.7.18 The top or top step of a stepladder shall not be used as a step.

4.7.19 Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

4.7.20 Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components, shall either be immediately marked in a

manner that readily identifies them as defective, or be tagged with “Do Not Use” or similar language, and shall be withdrawn from service until repaired.

4.7.21 Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.

4.7.22 Single-rail ladders shall not be used.

4.7.23 When ascending or descending a ladder, the user shall face the ladder.

4.7.24 Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.

4.7.25 An employee shall not carry any object or load that could cause the employee to lose balance and fall.

4.7.26 An employee working from a ladder above 11 feet (3.5m) from the feet shall be protected with fall arrest system.

4.8 Inspections before use

4.8.1 Elevated Work equipment and Personal Fall Arrest Systems must be inspected before use.

4.9 Training requirements

4.9.1 Only competent person will perform Elevated Work. Competency will have to be demonstrated and achieved by:

- Providing initial and refresher training on this standard on Elevated Work, and
- Qualification/certification according to national regulations when available

4.9.2 Training and demonstrated competency will include the following:

- Hazards of Elevated Work on walking-working surfaces, ladders, edges, aerial lifts and scaffold and procedures to minimize this hazards
- Use and inspection before use of fall protection equipment, including fall arrest systems
- Procedures to operate and inspect before use Elevated Work equipment, ladders, scaffold and aerial lifts.

4.10 Periodic Inspections of Elevated Work

4.10.1 Inspections shall be conducted on annual basis to ensure requirements of this standard are being followed and evaluate the effectiveness of the program and training. Inspections must be documented using the Inspection checklist in the attachment A.

5.0 Referencies

5.1 OSHA 29 CFR 1926.450

5.2 OSHA 29 CFR 1910.28

5.3 OSHA 29 CFR 1926.500

5.4 OSHA 29 CFR 1926.1053

5.5 OSHA 29 CFR 1910.23

5.6 UK, HSE Work at Height Regulation 2005 Guide

5.7 UK, HSE Safe Use of Ladders and Stepladders Employers' Guide

5.8 EU Directive, 2001/45/CE amending Council Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work.

5.9 Spain, RD 2177/2004 on minimum safety and health requirements for the use of work equipment by workers at temporary Elevated Work.

5.10 Hong Kong, Code of Practice for Bamboo Scaffolding Safety of the Labor Department.

6.0 Effective Date

6.1 The effective date of this Standard is August 9, 2012, at which time all FMC employees are expected to be in compliance within 3 months of issue except if an exception is specifically granted. This standard will be reviewed and updated within 3 years of the date it is published and every 3 years thereafter.

7.0 Revisions

7.1 This Standard was originally issued on August 9, 2012 as Revision 0. It has been revised as follows:

Revision Level	Revision Details	Revision Date	Approval
0	Initial Release	8/9/2012	R. Haire
1	In paragraph 4.1 add; Site specific exceptions to the permit requirement are permitted for low risk tasks performed from ladders provided that an undocumented evaluation of hazards is performed.	11/9/2012	R. Haire
2	Change reference height for fall protection from 6 feet (1.8m) to 4 feet (1.2m) in paragraphs: 4.3.2, 4.3.4, 4.3.5, 4.3.8, and 4.3.9	8/6/2013	R. Haire
3	Added and exemption to paragraph 4.5.6 to eliminate the requirement to use personal fall arrest system when working from a scissors lift.	9/17/2013	A. Kobylinski

Attachment A
Elevated Work Inspection Form

Date:	**Plant:**
Inspection Performed by:	
Work order/description:	

1. Inspection Questions (Assign Yes, No or N/A and score based on percent safe)	**Y/N/NA**	**Safe/ unsafe**
1.1. Is there a work permit for this job (Elevated Work permit) and properly filled out?		
1.2. Are the employees performing the job competent?		
1.3. Working/walking surfaces • Are employees protected from falling from 6 feet by guardrails, safety nets or personal fall arrest systems? (guardrails for runways, walkways and ramps) • Are fall protection devices adequate and in good condition? • Have they been inspected before use?		
1.4. Scaffolds • Are mounted and loaded per design? • Are inspected after installation and before use? • Are kept in good condition?		
1.5. Aerial lifts • Have been inspected before use including testing of lifting controls? • Have verifications been conducted before lifting such as maximum load, barricading, electrical lines, fall protection, weather conditions? • Are employees using fall protection and performing the job safely, including not attached to adjacent equipment or structure, stand firmly on basket without climbing on edges or elevated from the basket, truck is not moved when basket is elevated?		
1.6. Ladders • If work is performed on ladders, is the work limited to “low risk situations (e.g. 30 minutes, 3 points of contact, light work, etc)? • Are ladders adequate in type and condition and are properly placed, secured, inspected and used and the area barricaded?		

Appendix G
FMC RCRA Pond Area Rules

SCOPE: These work rules pertain to ALL PERSONNEL (including, but not limited to FMC employees, contractors, regulatory personnel, and/or visitors) entering the RCRA Pond Area. These work rules are also intended to provide written training prior to entry of the RCRA Pond Area. FMC expects that all personnel will do their jobs in compliance with all applicable regulatory requirements, Health and Safety Plans, and FMC rules and plans. FMC reserves the right to immediately eject from the premises any person not working safely or to bar entry to any person lacking proper safety training (including the lack of training on these Pond Area Work Rules) or proper safety equipment or evidencing impairment.

GENERAL WORK RULES FOR THE RCRA POND AREA

The following work rules must be adhered to in the RCRA Pond Area:

1. All personnel entering the Plant site must sign in and out at the FMC Log-in Center located near the Main Entrance Gate.
2. Only persons authorized by FMC or an FMC representative shall be allowed to enter the RCRA Pond Area. Personnel entering the RCRA Pond Area must have a current (within the last 6 months) signed copy of these rules on file with FMC (or FMC representative). Having a signed copy of these rules on file does not, by itself, constitute authorization to enter the RCRA Pond Area.
3. Personnel working alone in the RCRA Pond Area must check in with their designated safety contact at the top of each hour. **CHECK-IN IS THE RESPONSIBILITY OF THE PERSON WORKING ALONE IN THE RCRA POND AREA.** If there has been no check-in with the safety contact, other available personnel will attempt to get in touch with that person. If no contact is made, the safety contact will investigate to ensure that the person is safe.
4. All personnel working in the RCRA Pond Area must have training meeting the requirements of the OSHA HAZWOPER standard (found at 29 CFR 1910.120) to be provided by their employer. Training shall include hazards that could be encountered at FMC, including potential exposure to phosphine gas (including Item #12 below). FMC may require evidence of such training prior to entry. Authorized visitors may enter the RCRA Pond Area without HAZWOPER training, but only while accompanied by a properly trained FMC employee or representative.
5. Personnel entering the RCRA Pond Area must have a cell phone capable of summoning assistance if needed. (NOTE: There are potential "dead spots" around the RCRA Pond Area depending on the cell phone service provider, so cell phone checks are advisable for personnel not familiar with these dead spots.)
6. Personnel entering the RCRA Pond Area must have the following personal protective equipment (PPE) - shirt, full-length pants, hard hat, work gloves, safety shoes, and safety glasses with lateral protection. Any other PPE (such as respirator or hearing protection) is TASK SPECIFIC – to be determined after a safety review prior to entry. FMC may require a written report on any safety review prior to entry.
7. Training of personnel on the proper use and limitations of PPE is the responsibility of the respective employer. FMC may require evidence of appropriate training prior to entry.
8. No smoking is allowed in the RCRA Pond Area.
9. Any gate used to enter the RCRA Pond Area should be left **OPEN** while personnel are in the RCRA Pond Area in order to facilitate a quick exit, if necessary.
10. Gates must be **CLOSED** when work is completed and all personnel have exited the RCRA Pond Area. The last person or crew leaving the RCRA Pond Area will check that all entry gates used that day have been closed and locked.

11. All RCRA ponds (with exception of former RCRA Pond 18 Cell B which was closed by removal) were closed in place with protective engineered covers installed. Also, there are buried power and other utility lines in the area.
    - **NO MECHANICAL OR HAND DIGGING IS ALLOWED ON THE CAP OR WITHIN 20 FEET OF THE CAP ANCHOR TRENCH ON THE CLOSED, CAPPED RCRA PONDS WITHOUT WRITTEN AUTHORIZATION FROM FMC.**
    - **NO MECHANICAL OR HAND DIGGING WITHIN THE RCRA POND AREA OUTSIDE THE CAP AND 20-FOOT EXCLUSION AREA IS ALLOWED BEYOND A 18 INCH DEPTH WITHOUT CONDUCTING A CHECK OF DRAWINGS AND CONDUCTING THE REQUIRED SAFETY REVIEW PRIOR TO PERFORMING ANY DIGGING**
    - Personnel working on top of any RCRA pond should minimize the possibility of soil erosion or damage to existing monitoring equipment such as TMPs and settlement monuments.
    - Driving any vehicle on any RCRA pond cap surface is not allowed without prior approval from FMC or an FMC representative (except as noted below on the Pond 16S cap road).
    - The Pond 16S cap has a road for vehicle traffic. Vehicle drivers on this road must be cautious when driving or parking on this road. Large vehicles (over 4 wheels) must have a spotter when backing up on this road.
12. Possession of a calibrated, fully functional phosphine monitor is required for each person or group entering the RCRA Pond Area. Each person performing operation, maintenance, and/or monitoring (OMM) work (e.g., gas extraction/treatment operators or persons performing RCRA inspections, sampling, or maintenance) within the RCRA pond area shall be in possession of a calibrated, fully functional phosphine monitor. Persons not performing OMM work (e.g., supervisory personnel, vendors, or visitors) may enter as a group provided each group is in possession of a calibrated, fully functional phosphine monitor. Group members not in possession of a phosphine monitor must remain within 20 feet of a group member that is in possession of a phosphine monitor. Groups entering the RCRA Pond Area in vehicles must have at least one phosphine monitor per vehicle.
    - Phosphine monitors are available from the Plant O&M contractor – KASE/Warbonnet. Contact Mark Smith at (208) 681-8227 or the designated emergency coordinator.
    - Phosphine monitors must be fully functional and must have been calibrated within the last 14 days.
    - Any person in possession of a portable phosphine monitor will be provided hands-on training on the proper use of the monitor by their safety contact.
    - The portable PH3 monitors are programmed to alarm at 0.3 ppm and 1.0 ppm. Any person or group must record the location and reading of a confirmed phosphine monitor alarm (e.g., an alarm caused by vehicle exhaust, cell phone interference, etc., is not considered a "confirmed" phosphine monitor alarm) in air at or above 0.3 ppm. Confirmed air monitoring alarms will trigger an investigation of the source and potential corrective action in accordance with established procedures, provided that these measures can be safely performed. If a confirmed alarm of 1.0 ppm or higher is experienced, the individual (or group) must immediately relocate to an area that is monitored to be less than 0.3 ppm. In addition, any confirmed air monitoring alarm of 1.0 ppm phosphine or greater will trigger an additional round of fenceline monitoring for PH3 at the nine fenceline monitoring locations (sites 1 through 9) in accordance with established procedures. (Contact Mark Smith at (209) 681-8227 or the emergency coordinator if such an alarm is experienced.)
    - Any person entering a work area within the RCRA Pond Area that might reasonably be expected to result in a potential exposure to phosphine above 0.3 ppm, can only enter that work area with a "buddy", i.e., work cannot be performed alone in such an area. Regardless of the use of the "buddy" system, each person entering such an area will carry a phosphine monitor.

- Phosphine personnel monitoring "trigger levels" are:
  - No person will be allowed to work under conditions that would result in a phosphine exposure above the 8-hr TWA PEL of 0.3 ppm PH3 or the STEL of 1.0 ppm PH3.
  - If readings show less than 0.3 ppm, the task may proceed without restrictions.
  - If confirmed readings indicate the PH3 level is between 0.3 ppm and less than 1.0 ppm, task work will be restricted to a maximum of 2 hours.
  - If confirmed readings attain 1.0 ppm PH3, exposed workers must immediately relocate to an area that is monitored to be less than 0.3 ppm PH3.
  - If workers need to re-enter the original work area after relocation, the original work area must be checked for phosphine prior to re-entry. Unrestricted work in the original task area can only resume when readings in the original task area have decreased to less than 0.3 ppm.
- If any worker feels they have experienced an overexposure to phosphine, they shall leave the RCRA Pond Area as quickly as possible and then notify their safety contact. Emergency response or a health care follow-up and/or an exposure assessment will then be arranged as appropriate.

CERTIFICATION

I have been provided with a copy of these RCRA Pond Area Work Rules. I have read the rules, understand the information provided, and agree to comply with these rules. I have received the necessary training specified in these RCRA Pond Area Work Rules.

I understand that I am responsible for my safety and the safety of those around me.

SIGNATURE: _____

PRINTED NAME: _____

DATE: _____ (This form is valid for 6 months and then must be renewed.)

EMPLOYER: _____

CELL PHONE NUMBER: _____ (Required if used for communication while working in the RCRA Pond Area.)

Proper Use of a Portable Phosphine Monitor

1. Ensure that your monitor has been calibrated within the last 14 days. A green calibration sticker on the monitor will indicated if the calibration for the monitor is current.
2. Two types of monitors are used for industrial hygiene monitoring. These are the Toxipro and the Draeger Pac III.
3. **Toxipro Monitor**
   a. **Turn on the monitor:** Push the button on the front of the monitor once. The monitor will go through an initialization. During this initialization the monitor will demonstrate the audible alarms for the 2 alarm points. The first alarm is at 0.30 ppm PH3 and a second alarm occurs at 1.0 ppm PH3.
   b. **Ensure adequate battery life:** When there are less than 7 days of battery life remaining the low battery icon will appear on the screen. When there are less than 8 hours of battery life remaining a triangular warning symbol will appear over the low battery icon. If the monitor you are using has less than 8 hours of battery life exchange it for another monitor.
   c. **Turning off the monitor:** Push and hold the button on the front of the monitor. The monitor will chirp 4 times and then shut down.
4. **Draeger Pac III Monitor**
   a. **Turn on the monitor:** There are 3 buttons located on the front of the Pac III monitor. Two buttons on the left side and one button on the right side. To turn on the monitor push the right button and hold until the monitor beeps. The monitor will go through an initialization. During this initialization the monitor will indicate the 2 alarm points. The first alarm is at 0.20 ppm PH3 and a second alarm occurs at 1.0 ppm PH3.
   b. **Ensure adequate battery life:** If the battery gets low during use of the Pac III a "Battery Low" warning will appear and the monitor will beep. If the monitor you are using has a low battery warning exchange it for another monitor.
   c. **Turning off the monitor:** Push and hold the two left buttons on the front of the monitor simultaneously for at least 1 second. The monitor will shut down.
5. When using/carrying a phosphine monitor ensure the sensor aperture is kept clear.
6. If you have any questions on the operation of your phosphine monitor contact Mark Smith at: 208-681-8227.