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May 12, 2014

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Subject: **Ottawa Radiation Areas NPL-11 Site**
Technical Memorandum, Revision 0
EPA Contract No.: EP-S5-06-04
TDD No.: S05-0008-0802-008
Document Control No.: 385-2A-AOSZ
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Dear Mr. Fayoumi:

Enclosed is the Technical Memorandum, Revision 0, for the Ottawa Radiation Areas NPL-11 Site in Ottawa, Illinois. The Technical Memorandum summarizes the sediment sampling, quarterly groundwater sampling, and radon sampling for the NPL-11 Site.

Should you have any questions or require additional information, please feel free to contact us.

Very truly yours,
WESTON SOLUTIONS, INC.

Richard H. Mehl, Jr.
Site Manager

Enclosure

cc: START DCN File

TECHNICAL MEMORANDUM
FOR
NPL-11 SITE
OTTAWA RADIATION AREAS
OTTAWA, ILLINOIS

REVISION 0

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emergency Response Branch
Region V
77 West Jackson Boulevard
Chicago, IL 60604-3507

Prepared by:

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NPL-11 SITE
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OTTAWA, ILLINOIS

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ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
ALARA	As Low As Reasonably Achieveable
amsl	above mean sea level
ANL	Argonne National Laboratory
bgs	Below ground surface
CFR	*Code of Federal Regulations*
COC	Contaminant of concern
cm/sec	centimeter per second
cpm	counts per minute
FEMA	Federal Emergency Management Agency
FS	Feasibility study
ft	foot or feet
IAC	*Illinois Administrative Code*
IDNS	Illinois Department of Nuclear Safety
IDW	Investigation derived waste
IEMA	Illinois Emergency Management Agency
IEPA	Illinois Environmental Protection Agency
LPI	Luminous Processes, Inc.
MCL	Maximum contaminant level
mg/kg	milligram per kilogram
mg/L	milligram per liter
NaI	Sodium iodide
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OHM	OHM Remediation Services Corporation
PCB	Polychlorinated biphenyl
pCi/L	PicoCurie per liter
pCi/g	PicoCuries per gram
PIN	Permanent Index Number
PRG	Preliminary remediation goal
PVC	polyvinyl chloride
Radium Dial	Radium Dial Company
RAO	Remedial action objective
$RaSO_4$	Radium sulfate
RBC	Risk-based concentration
ROD	Record of Decision
SSL	Soil Screening Level
START	Superfund Technical Assessment and Response Team
SVOC	Semivolatile organic compound
TACO	Tiered Approach to Correction Action Objectives
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure

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ACRONYMS AND ABBREVIATIONS, CONT.

TDD	Technical Direction Document
TDS	total dissolved solids
TSC	Testing Service Corporation
TSS	total suspended solids
UECA	Uniform Environmental Covenants Act
USACE	United States Army Corps of Engineers
U.S. DOE	United States Department of Energy
USGS	United States Geological Survey
VOC	Volatile organic compound
WESTON	Weston Solutions, Inc.

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1. INTRODUCTION

The Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START) prepared this Technical Memorandum for the Ottawa Radiation Areas NPL-11 Site (the Site) in Ottawa, LaSalle County, Illinois, for the U.S. Environmental Protection Agency. Under Technical Direction Document (TDD) No. S05-0008-0802-008, EPA requested that WESTON START collect sediment samples from Goose Creek; install bedrock and shallow monitoring wells at the Site; conduct single well permeability testing (slug tests) and a well elevation survey; collect quarterly groundwater samples; and collect quarterly radon samples from nearby residential properties to determine whether elevated concentrations of radium-226 in groundwater are migrating off-site and impacting Goose Creek or nearby resident populations.

This technical memorandum is organized into the following sections:

- **Introduction –** Provides a brief description of the objective and scope of site activities
- **Site Background** – Details the Site description and its known history
- **Sampling Activities –** Discusses site observations, activities, and methods and procedures used during the sampling
- **Analytical Results –** Discusses analytical results for samples collected during the investigation
- **Hydrogeologic Investigation Results –** Discusses the results of the hydrogeologic investigation.
- **Conclusions –** Summarizes the investigation conclusions

Tables and figures are presented after the conclusions section. In addition, this technical memorandum contains six appendices. **Appendix A** provides a photographic log of Site conditions at the time of the site activities. **Appendix B** provides the laboratory analytical and data validation reports for sediment samples collected during the site activities. **Appendix C** provides the laboratory analytical and data validation reports for groundwater samples collected during site activities. **Appendix D** provides the laboratory analytical reports for residential radon samples collected during the site activities. **Appendix E** provides the laboratory analytical and

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data validation reports for disposal samples collected during the site activities. **Appendix F** provides the aquifer test analyses data and plots from the hydrogeologic investigation.

2. SITE BACKGROUND

This section discusses the site description; the regional geology; the regional surface water hydrology; groundwater use in the area; and the site history.

2.1 SITE DESCRIPTION

The 0.75-acre Site consists of two vacant parcels located at 351 Bellevue Avenue and 353 Bellevue Avenue on the northeast side of the City of Ottawa, in LaSalle County, Illinois. The property located at 351 Bellevue Avenue (Permanent Index Number [PIN]: 21-01-114-007) is legally described as containing the western 40-foot (ft) portion of Lot 16 as well as the eastern 10-ft portion of Lot 15 (subsequently referred to as Parcel 2). The property located at 353 Bellevue Avenue (PIN: 21-01-114-008) is legally described as containing the entire Lot 17 and the eastern 10-ft portion of Lot 16 (subsequently referred to as Parcel 3). Each parcel is owned by a private party. The NPL-11 Site formerly included the property at 349 Bellevue Avenue (PIN: 21-01-114-007; subsequently referred to as Parcel 1); however, remediation has been completed at Parcel 1. The Site lies within Section 1 of Township 33 North, Range 3 East, of the United States Geological Survey (USGS) topographical quadrangle map for Ottawa, Illinois (**Figure 2-1**).

The Site is located in type "A-2, Single and Two Family Residential" zoning district. Residential use is the primary land use in the area, though there are commercial properties located near the Site. The NPL-11 Site is bordered to the north by Bellevue Avenue and residential properties, to the south by Goose Creek, to the west by a residence and Patton Plumbing, and to the east by a residence and the Lion's Club building (**Figure 2-2**).

The topography varies by less than 5 feet (ft) across the NPL-11 Site, with a moderate grade from Bellevue Avenue to Goose Creek to the south. Both parcels of the NPL-11 Site are grass

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covered lots containing a few trees. A residential dwelling was formerly located on Parcel 2, but was relocated due to the presence of high levels of radon gas in the home.

2.2 REGIONAL GEOLOGY

The geology of the Ottawa area is primarily composed of bottomland or Wisconsinan glacial deposits overlying Pennsylvanian or Ordovician age bedrock. Most of the area is underlain by the Ordovician-aged St. Peter Sandstone. At locations north and west of Ottawa, the uppermost bedrock consists of Pennsylvanian-aged sandstone and shale (Carbondale and Spoon Formations) which overlies the St. Peter Sandstone. Approximately 8 miles west of Ottawa, the uppermost bedrock consists of sandstone and dolomite formations of the Ordovician-aged Prairie du Chien Group. The St. Peter Sandstone crops out along the southern bluffs of the Illinois River Valley. Basal beds of the Platteville Group limestone are locally exposed near Ottawa in channels cut into the top of the St. Peter Sandstone.

The character of the deeper strata, as determined from a City of Ottawa municipal well log, identifies the thickness of the St. Peter Sandstone as approximately 155 ft and the Prairie du Chien Group formations as approximately 800 ft thick. At approximately 960 ft below ground surface (bgs), the Cambrian System is encountered and consists of Potsdam Sandstones and Shales to a depth of 1,449 ft. The youngest formation in this system is the 160-to-200 ft thick Galesville Sandstone, which grades into blue shales at around 1,200 ft bgs.

Ottawa is within the Illinois River Valley, bordered to the south and north by sandstone and dolomite bluffs. Glacial deposits within the valley have been eroded and replaced by relatively thin surficial deposits of silt, silty clay, sand, and gravel in flood plains and terraces. Wisconsinan glacial deposits of the Wedron Formation are present at the surface away from the river valley. The Wedron formation consists of till interbedded with sand and gravel and thin beds of silt. The till occurs in sheet-like bodies 10 to 100 ft thick that terminate in moraines. Near Ottawa, the glacial deposits average approximately 100 ft thick outside the Illinois River Valley.

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Predominant soil types in the area include DuPage silt loam, Loran silt loam, Millington loam, and Wabash silty clay (SCS, 1972).

DuPage silt loam soils are calcareous, dark-colored, well- to moderately well-drained soils that have developed in calcareous stream alluvium under prairie native vegetation. DuPage silt loam soils occur on nearly level to very gently sloping floodplains of the Illinois, Fox, and Vermillion Rivers. DuPage silt loam soils are most often cropland, but some areas are in forest or pasture. Permeability is moderate, surface runoff is slow to medium, available moisture content is high to very high, and surface organic matter content averages 4.0 percent.

Loran silt loam soils are dark-colored, and somewhat poorly drained soils that have developed in 30 to 50 inches of loess or silty material over acid shales of Pennsylvanian age under native prairie vegetation. Loran silt loam soils occur on nearly level to gently sloping areas primarily east of Ottawa along the Illinois River. Loran silt loam soils are associated with very dark-colored, poorly drained Wabash silty clay soils. In some areas, Loran silt loam soils have a silty mantle approximately 6 inches less than the minimum of 30 inches. Permeability is moderately slow and surface runoff is medium. Available moisture capacity is high to moderate. Surface organic matter content averages 4.5 percent.

Millington loam soils are very dark-colored, poorly drained calcareous soils that have developed in calcareous, dark-colored alluvium under native marsh and prairie grass vegetation. Millington loam soils occur primarily on nearly level floodplains of the Fox River. Millington loam soils are associated on the floodplain landscape in most cases with DuPage silty loam soils. Millington loam soils are in cropland pasture and woodlands. Permeability is moderate, and the water table is normally high. Surface runoff is slow to ponded. Available moisture capacity is high. Surface organic matter content averages 5.0 percent.

Wabash silty clay soils are very dark-colored, and poorly- to very poorly drained soils that have developed in heavy-textured alluvial deposits under primarily native prairie vegetation consisting of marsh grasses and sedges. Wabash silty clay soils occur on nearly level to depressional areas along the Illinois River. East of Ottawa, large areas of Wabash silty clay soils are underlain at

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depths of 50 to 60 inches by clayey shale. Most areas of Wabash silty clay soils are in croplands, but a few areas are either undeveloped, in pasture, or in woodland. Permeability is very slow to slow. Surface runoff is slow to ponded. Available moisture capacity is high to moderate. Surface organic matter content averages 5.0 percent.

2.3 REGIONAL SURFACE WATER HYDROLOGY

LaSalle County lies in the drainage basin of the Illinois River. The Illinois River flows across the county in a westward direction. Major tributaries to the Illinois River in this area are the Vermillion, Little Vermillion, and Fox Rivers. The northern half of the county is drained by the Little Vermillion to the west and by the Fox River to the east.

Except during periods of relatively high precipitation, overland flow on grassy areas of the Site is expected to be minimal. The topography of the Site varies by less than 5 ft across the Site, with a moderate grade from Bellevue Avenue to Goose Creek. During periods of normal precipitation, surface water either collects in pools at the surface and is lost through evapotranspiration or infiltrates. A surface drain connected to a drain tile exists in the southern portion of the Site. This surface drain channels pooled surface water into the drain tile, which discharges directly into Goose Creek. From the Site, Goose Creek flows east approximately 0.5 miles, where it discharges to the Fox River. From the Fox River, surface water flows approximately 1.6 miles southwest to the Illinois River.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the City of Ottawa, the southern portion of the NPL-11 Site is located within a 500-year flood zone for Goose Creek. The flood zone consists of an approximately 50-ft-wide buffer area from the creek bank to the Site.

2.4 GROUNDWATER USE IN THE AREA

City of Ottawa municipal drinking water is supplied to city residents from four large volume wells. All of the municipal wells are screened between 1,180 and 1,220 ft bgs within the

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Galesville Sandstone, and are located within the northeast quadrant of the City. Saline groundwater was encountered at a depth of 1,500 ft bgs during installation of the municipal wells.

The concentration of radium in Ottawa's groundwater is historically high due to elevated levels of naturally-occurring radium from the radioactive decay of thorium in both the Galesville and St. Peter Sandstone aquifers. The City of Ottawa water supply, on average, reports radium concentrations of 6.2 picoCuries per liter (pCi/L). This average concentration exceeds the Illinois Environmental Protection Agency (IEPA) Groundwater Quality Standards for Class I Groundwater of 5 pCi/L. Ottawa received a variance from restricted status from IEPA in 1986. In addition, residential well data collected for the Remedial Investigation for Ottawa Radiation Areas Site NPL-8 has established that radium is present in the St. Peter Sandstone aquifer at concentrations as high as 18 pCi/L. The residential wells sampled for the NPL-8 investigation was located within 1.5 miles of the NPL-11 Site.

The City of Ottawa has an Ordinance (Number 002-2007), which prohibits the use of groundwater as a potable water supply and prohibits the installation or use of potable water supply wells within the City. The Ordinance, effective January 16, 2007, applies to drilling new potable water supply wells and does not address existing wells. Wells installed prior to January 16, 2007 may still be in use.

2.5 SITE HISTORY

This section provides a detailed discussion of the NPL-11 site history, including a detailed description of site operations and previous investigations conducted at the Site.

2.5.1 Site Operations

The NPL-11 Site is 1 of 16 discrete sites located in Ottawa, Illinois, that are known to contain or have contained elevated levels of radium-226. Collectively, these sites are known as the Ottawa Radiation Areas Site. Radium-226 contamination resulted from activities associated with two

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radium dial painting companies, the Radium Dial Company (Radium Dial), which operated in Ottawa from 1920 until 1932, and Luminous Processes, Inc. (LPI), which operated in Ottawa from 1932 until 1978. Radium Dial and LPI used radium sulfate ($RaSO_4$) paint in their dial painting operations, of which radium-226 is the primary isotope of $RaSO_4$. During the course of operations at these two companies, the buildings, equipment, and surrounding areas became contaminated with radium-226.

The Radium Dial facility was demolished in 1968, and the resulting demolition debris is believed to have been buried and used as fill material at various locations in and around Ottawa, Illinois. The LPI facility was dismantled in 1985 under the supervision of the Illinois Department of Nuclear Safety (IDNS; presently the Illinois Emergency Management Agency [IEMA]). Demolition debris (bricks and other radium-contaminated material) from the LPI facility was transported and disposed of as low-level radioactive waste at the United States Department of Energy (U.S. DOE) Hanford Reservation in Richland, Washington. The following year, contaminated soil surrounding the former LPI facility was excavated and disposed at the U.S. DOE Hanford Reservation.

2.5.2 Previous Investigations

2.5.2.1 Aerial Radiological Survey, 1986

In May 1986, U.S. DOE contracted with EG&G Energy Measurements, Inc., to perform an aerial radiological survey of the City of Ottawa. Eleven areas were identified as having elevated radioactivity levels based on the presence of bismuth-214, a progeny of radium-226. Beginning in July 1986, IDNS conducted extensive radiological surveys of these areas and of other locations identified by other parties. Based on the results of the IDNS surveys, soil removal actions were implemented at several residences.

2.5.2.2 Site Inspection, 1987

In December 1987, the EPA conducted site inspections throughout the area with support from the EPA Office of Radiation Programs Eastern Environmental Radiation Facility, the EPA

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Region V Air and Radiation Division, the EPA Emergency Enforcement Response Branch, and the EPA Technical Assistance Team contractor. As part of these site inspections, a gamma-radiation survey van was used to perform a street-by-street survey of Ottawa to locate additional areas with anomalous radiation levels. Gamma radiation sources were then verified by ground-survey teams. In addition, 23 soil samples were collected to determine if the isotopic ratios of radium, thorium, and uranium were similar to those of natural soils. The 1987 inspections resulted in the findings summarized below.

- Access to many of the sites was unrestricted.
- Five additional sites with anomalous levels of radiation were identified.
- Radium-contaminated soil was found at the ground surface and at depths exceeding 3 ft bgs.
- Analysis of soil samples indicated that radium-226 was the predominant radioactive element present.
- The ratio of radium-226 to uranium in the soil samples indicated that the radium-226 was not naturally occurring. In addition, a small vial of soil with high radiation emissions was collected from one site (NPL-9), providing further evidence that the radium-226 was from an industrial source.

2.5.2.3 ANL Landfill Studies, 1988

In 1988, the Argonne National Laboratory (ANL) conducted extent-of-contamination studies at five historical landfill sites, including one site that later would be identified as NPL-1. The Illinois Department of Energy and Natural Resources identified these sites as former strip mines used as area landfills. The ANL studies included topographical surveys, surface and subsurface radiation surveys, and subsurface soil sampling.

2.5.2.4 NPL-11 Actions, 1988

In 1988, a radon reduction system was installed at the residential dwelling located on Parcel 1 due to the presence of radon gas in the home. In 1990, the EPA relocated the house located on Parcel 2 to a new location at 355 Bellevue Avenue due to the presence of radon gas in the home.

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2.5.2.5 National Priorities Listing, 1991

On July 19, 1991, 14 locations, referred to as NPL-1 through NPL-14, were proposed as a single site for inclusion on the National Priorities List (NPL) and were subsequently published in the *Federal Register* on July 29, 1991. In 1994, EPA was awarded funding to conduct removal actions at 13 of the sites. The fourteenth site, NPL-8, was to be investigated under the EPA Remedial Program. Two additional locations, known as the Illinois Power Building and LPI Adjacent Site, were later identified as containing elevated levels of radium-226.

2.5.2.6 Background Study, 1994

In 1994, EPA and IDNS conducted a study to determine the background concentration of radium-226 in the Ottawa, Illinois area. As a result of the study, the background concentration of radium-226 in the Ottawa, Illinois area was determined to be 1.2 picoCuries per gram (pCi/g). According to Section 40 of the *Code of Federal Regulations* Part 192 (40 CFR 192), the health-based surface soil standard for radium-226 is 5 pCi/g above the background level. Therefore, the health-based surface soil standard for the Ottawa, Illinois area is 6.2 pCi/g. As a result of this study, the health-based surface soil standard of 6.2 pCi/g has been used as the preliminary remediation goal (PRG) for radium-226 in soil at the NPL-11 Site. The PRG used for total radium in groundwater is the IEPA Groundwater Quality Standards for Class I Groundwater of 5 pCi/L. PRGs are developed to determine the extent of contamination and not to establish cleanup levels or remedial action objectives (RAOs). PRGs are acceptable levels (as determined by various state and federal agencies) for each contaminant detected at a site and each exposure route that can serve as cleanup levels protective of both human health and the environment. EPA's decision concerning final remediation goals or cleanup standards for surface and subsurface soils at the NPL-11 Site may differ from this PRG based on EPA's evaluation of future land-use assumptions, supplemental standards under 40 CFR 192, and the nine-criteria analysis required under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

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2.5.2.7 Removal Action, 1995-1997

From 1995 through 1997, under contract with the United States Army Corps of Engineers (USACE) and as part of a removal action, over 40,000 tons of radium-contaminated soil was excavated and transported by rail from 12 of the sites (NPL-1, NPL-2, NPL 3, NPL-5, NPL-6, NPL 7, NPL-9, NPL-10, NPL-11, NPL-12, NPL-13, and NPL-14) to the Envirocare Landfill in Clive, Utah. Although radium-contaminated soil was excavated from the NPL-1, NPL-9, and NPL-11 sites, site remediation was not completed and radium-contaminated soil remained at these sites. The following paragraphs detail the removal action activities completed at the NPL-11 site.

From August 1995 to May 1996, under contract with USACE and as part of a removal action at the NPL-11 site, OHM Remediation Services Corporation (OHM) excavated and disposed of a total of 4,176 tons of radium-226-contaminated soil from the NPL-11 site (Parcels 1 through 3). Prior to backfilling the excavated areas, IDNS conducted a gamma survey using a gamma radiation detector and collected composite verification soil samples to verify that radium-226 contamination had been sufficiently removed. The gamma survey and verification sample results for Parcel 1 indicated that all radium contaminated soil had been removed. The excavation was backfilled with clean material from an off-site source and the radon reduction system in the residence located at Parcel 1 was disconnected.

Verification samples collected from Parcels 2 and 3 indicated radium-226 concentrations up to 298.5 pCi/g. The maximum radium-226 concentration was detected at Parcel 2. Seven additional verification samples had concentrations of radium-226 exceeding the PRG of 6.2 pCi/g, including four samples collected from Parcel 2 and two samples collected from Parcel 3.

During the excavation activities, dewatering techniques were implemented to manage the influx of groundwater into the excavation. However, the unconsolidated aquifer generated a greater volume of groundwater than the dewatering system could handle. Therefore, the excavation terminated at the groundwater table because of difficulties associated with excavating material below the groundwater table (elevation of 490.35 ft above mean sea level [amsl]). The gamma

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survey indicated that radium-226 contamination had been sufficiently removed above elevation 491.25 ft amsl. Contamination below elevation 491.25 ft amsl was left in place. The interface between the contaminated material and clean backfill was identified with a layer of crushed rock and limestone, and the remainder of the excavation was backfilled with clean sandy clay from an approved off-site source. **Figure 2-3** depicts the extents of the excavation, verification sample locations, and radium-226 concentrations exceeding the PRG of 6.2 pCi/g.

2.5.2.8 Human Health Risk Assessment, 1999

In October 1999, a baseline human health risk assessment was conducted to evaluate the potential human health impacts associated with the NPL-11 site under a no-action alternative (that is, in the absence of remedial [corrective] action). The basis for the risk assessment included data collected as part of the verification sampling during the removal action conducted in 1996. The risks were determined to be primarily due to a cinder artifact collected from the bottom of the excavation with a radium-226 concentration of 6,016 pCi/g.

2.5.2.9 Site Characterization Study, 2000

On June 6 and 7, 2000, the EPA Remedial Program and WESTON conducted a site characterization study to determine the extent of radium-contaminated soil remaining at the NPL-11 site. The specific objectives of the site characterization study were to determine the nature and extent of radium-226 contamination in soil using analytical and non-analytical methods; and to determine the nature of chemical contamination in soil. Field investigation tasks conducted in order to achieve these objectives included a soil boring investigation, a down-hole gamma radiation survey, and subsurface soil sampling.

As part of the site characterization study, 12 soil borings (SB-01 through SB-12) were advanced on Parcel 3 (**Figure 2-4**). The soil boring locations were determined based on the results of the IDNS surface radiation survey conducted after initial site excavation activities and based on knowledge of the site history. A down-hole gamma radiation survey was conducted in each soil boring using a Ludlum Model 44-2 (1-inch by 1-inch) sodium iodide (NaI) detector coupled with

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a Ludlum Model 2221 Scalar/Ratemeter. Gamma levels were measured by lowering the NaI detector directly into the open borehole. Readings were recorded at 1-foot intervals beginning at the ground surface. A 1-minute counting time was employed at each depth interval. Saturated conditions occurred at all of the boring locations beginning at 5 to 6 ft bgs. The NaI detector cannot be used below the water table; therefore, readings were restricted to 2 to 5 ft bgs.

Gamma readings at the site ranged from 2,036 to 6,112 counts per minute (cpm); however, most readings were in the 4,000- to 6,000-cpm range. The highest reading at the site (6,112 cpm) was measured in boring SB-07 (at 4 ft bgs).

A total of 24 soil samples (and 3 field duplicate samples) were collected from the soil borings and analyzed for radium-226. Sampling depths were selected based on radiological field screening results. One investigative sample was collected from each boring from the ground surface to 6 ft bgs, and another sample was collected from greater than 6 ft bgs. All samples were collected from 2 to 12 ft bgs. The soil sample analytical results for radium-226 were compared to the site-specific PRG of 6.2 pCi/g. The sample results indicated radium-226 concentrations up to 19.5 pCi/g. The maximum radium-226 concentration was detected at SB-07, from 6 to 8 ft bgs. The soil boring locations and radium-226 concentrations exceeding the PRG of 6.2 pCi/g are shown on **Figure 2-4**.

A total of three soil samples (and one field duplicate sample) were collected from the soil borings and analyzed for Target Analyte List (TAL) metals, pesticides and polychlorinated biphenyls (PCB), Target Compound List (TCL) volatile organic compounds (VOC), and TCL semivolatile organic compounds (SVOC). Samples were collected from the same depth interval as the radium-226 samples.

Soil samples collected and analyzed for organic compounds were compared to (1) the EPA Soil Screening Levels (SSL) for the residential ingestion and inhalation exposure routes; (2) the EPA Region III risk-based concentrations (RBC) for the residential ingestion exposure route; (3) the IEPA Tiered Approach to Corrective Action Objectives (TACO) Tier I residential soil remediation objectives for the inhalation and ingestion exposure routes; or (4) the IEPA non-

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metropolitan background concentrations, whichever was the most conservative (stringent) risk-based screening value.

For inorganic compounds, the soil sample analytical results were compared to the most conservative risk-based values listed above unless the most conservative value was below the IEPA non-metropolitan background concentration for the constituent. In such instances, the IEPA non-metropolitan background concentration was used.

Analytical results indicated that arsenic exceeded the screening criterion of 11.3 milligrams per kilogram (mg/kg) in two samples and iron exceeded the screening criterion of 23,000 mg/kg in one investigative sample (and one field duplicate sample). The arsenic and iron concentrations exceeding screening levels were detected in samples collected from soil borings SB-08 and SB-09. However, because the average arsenic and iron concentrations were below their respective screening criteria, metals are not considered contaminants of concern (COC) at the Site.

2.5.2.10 Remedial Action, 2005-2007

From August 2005 to May 2007, WESTON conducted a remedial action at the NPL-11 Site. The remedial action included a subsurface soil investigation to further delineate the extent of radium-226 contamination and a treatability study to assess potential dewatering and water treatment technologies.

On August 23, 2005, as part of the treatability study, three temporary wells (NPL11-MWA through NPL11-MWC) were installed around the anticipated area of excavation at the NPL-11 site (**Figure 2-5**). Temporary wells NPL11-MWA and NPL11-MWB were installed on Parcel 3, and temporary well NPL11-MWC was installed on Parcel 2. The purpose of the temporary wells was to determine groundwater elevation, groundwater flow direction, and the effectiveness of a water filtration system. These temporary wells were not installed to characterize the groundwater underlying the Site. Since the temporary wells were installed to determine the groundwater elevation and groundwater flow direction, an annular seal was not placed above the sand pack

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and the wells were not completed to satisfy the Illinois Water Well Code. The temporary wells were screened from 5 to 15 ft bgs, within the fill and silt overlying the bedrock. Immediately after installation, the static water levels in these wells ranged from 7 to 10 ft bgs.

From September to November 2005, as part of the treatability study, a ground elevation survey and hydraulic conductivity testing (slug-testing) was conducted for the temporary wells to determine the direction of groundwater flow and the hydraulic conductivity of the backfilled excavation area. Results of the study indicated that the groundwater flow direction is to the south toward Goose Creek and that the hydraulic conductivity of the backfilled excavation material ranged from 1×10^{-2} to 1×10^{-1} centimeters per second (cm/sec).

On November 17, 2006, as part of the treatability study, unfiltered groundwater samples were collected from the three temporary wells and analyzed for radium-226. Groundwater analytical results indicated radium-226 concentrations ranging from 0.8 to 16.98 pCi/L. Analytical results for temporary wells NPL11-MWA and NPL11-MWB indicated background concentrations of radium-226, and temporary well NPL11-MWC indicated a radium-226 concentration of 16.98 pCi/L. Because the temporary well was screened in the fill material, the elevated levels of radium-226 were attributed to the presence of insoluble $RaSO_4$ bound to particulate matter in the unfiltered sample. The radium-226 concentrations exceeding the PRG in the groundwater samples collected from the NPL-11 site are shown on **Figure 2-5**.

On January 12, 2007, as part of the treatability study, temporary well NPL11-MWC was re-sampled to assess the effectiveness of a water filtration treatment system in removing elevated levels of radium-226 bound to suspended solids in the groundwater. The temporary wells were not purged prior to sampling in order to collect a turbid sample that would be representative of groundwater infiltrating an excavation during a remedial action. One unfiltered groundwater sample and one filtered groundwater sample collected through a 0.5-micron in-line filter were submitted for radium-226 analysis. The radium-226 concentrations in samples collected from temporary well NPL11-MWC were 3.3 pCi/L in the unfiltered sample and 0.6 pCi/L in the filtered sample. Because a turbid sample was collected and the temporary well was screened in

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the fill material, the radium-226 concentrations are attributed to radium bound to particulate matter in the sample. This is further supported by the fact that the concentration of radium was reduced by filtering the sample. In addition, the static water level in well NPL11-MWC was measured at 4.48 ft bgs indicating that the water table had risen several ft since August 2005 when the wells were installed. The temporary wells were decommissioned after the sampling event.

On May 18, 2007, also as part of the remedial action, a total of 18 soil borings (NPL11-SB01 through NPL11-SB18) were advanced to the bedrock at the Site. The soil boring locations were selected to delineate the elevated radium-226 concentration of 16.98 pCi/L detected in the groundwater sample collected from temporary monitoring well NPL11-MWC. The soil borings were advanced approximately 10 to 15 ft apart in four rows: one row of four soil borings north of temporary monitoring well NPL11-MWC, one row of five soil borings in alignment with NPL11-MWC, and two rows containing nine borings south of NPL11-MWC. The soil borings were advanced in an area that extended approximately 40 ft from north to south and 60 ft from east to west. A total of 22 soil samples were collected from 17 of the soil borings at depths ranging from 8 to 17 ft bgs. The soil samples were analyzed for radium-226, and results were compared to the PRG for radium-226 of 6.2 pCi/g.

Soil sample analytical results indicated radium-226 concentrations ranging from 1.69 to 18.4 pCi/g. Radium-226 concentrations exceeded the PRG of 6.2 pCi/g in three samples collected from soil borings advanced on Parcel 2: NPL11-SB02 (from 8 to 9 ft bgs) at a concentration of 16.1 pCi/g, NPL11-SB02 (from 12 to 13 ft bgs) at a concentration of 9.43 pCi/g, and NPL11-SB10 (from 10 to 11 ft bgs) at a concentration of 18.4 pCi/g. Radium-226 concentrations in soil samples collected from Parcel 3 did not exceed the PRG of 6.2 pCi/g. The soil boring locations and radium-226 concentrations exceeding the PRG of 6.2 pCi/g are shown on **Figure 2-5**.

2.5.2.11 Human Health Risk Assessment, 2009

In August 2009, a baseline human health risk assessment was conducted to evaluate the potential human health impacts associated with the NPL-11 site under a no-action alternative (that is, in

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the absence of remedial [corrective] action). The basis for the risk assessment included data collected as part of the site characterization study conducted in 2000 and the remedial action activities conducted in 2006 and 2007.

2.5.2.12 Feasibility Study, 2010

In March 2010, a feasibility study (FS) was conducted to present remedial alternatives developed and analyzed for the NPL-11 site in order to select a site remedy. As a result of the FS, EPA selected the institutional controls alternative as the site remedy. The institutional controls, such as an environmental covenant under the Illinois Uniform Environmental Covenants Act, 765 ILCS Ch. 122 (UECA), would impose the following perpetual activity and use limitations on the NPL-11 site:

- Prohibit excavation of soil at the site below an elevation of 491.25 ft amsl in the area demarcated as extent of contamination on **Figure 2-6**, unless conducted pursuant to a EPA- or IEMA-approved work plan;
- Prohibit construction of any building in the area demarcated as extent of contamination (see **Figure 2-6**), unless a radon reduction system is operated and maintained to ensure that levels of radon in such buildings do not exceed 4 pCi/L;
- Require that material excavated from any portion of the site be tested and disposed of in accordance with applicable regulations; and
- Prohibit use of groundwater at the NPL-11 site.

In November 2010, IEPA raised a concern regarding whether elevated concentrations of radium-226 in groundwater are migrating off-site and impacting Goose Creek or nearby resident populations. IEPA requested that EPA collect additional documentation to address these concerns and support a Record of Decision (ROD) Amendment.

2.5.3 Development of Preliminary Remediation Goals

As introduced in Section 2.5.2.6, PRGs were developed for the Ottawa Radiation Areas site to provide a means for determining the extent of contamination. The following subsections discuss the development of PRGs for the affected media, including soil/sediment, groundwater, and air.

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2.5.3.1 Soil/Sediment

On August 29, 1994, EPA issued an amended Action Memorandum to document the cleanup level for radionuclides at the Ottawa Radiation Areas Site in Ottawa, Illinois. According to the Memorandum, "For the purpose of the Ottawa Radiation Sites removal, As Low As Reasonably Achievable (ALARA) shall be interpreted as a preference for excavating all radium-contaminated materials believed to have been generated by or been associated with the Radium Dial Company or LPI, to below 5 pCi/g above background." In addition, 40 CFR 192 lists a health-based surface soil standard for radium-226 of 5 pCi/g above the background level. Previous removal activities at the Ottawa Radiation Areas Site established that the background radium-226 concentration in soil is 1.2 pCi/g. Therefore, the PRG for radium-226 for soil at the Ottawa Radiation Areas Site is 6.2 pCi/g. The established PRG for radium-226 in soil is also used as the PRG for sediment.

2.5.3.2 Groundwater

The PRG for total radium (radium-226 plus radium-228) in groundwater was developed by using the most conservative value of Illinois groundwater quality standards as described in Section 35 of the *Illinois Administrative Code* Part 620 (35 IAC 620); EPA Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act; and the EPA Region III recommended limit for tap water based on contaminant ingestion. The EPA MCL of 5 pCi/L is used as the PRG for total radium.

2.5.3.3 Air

Indoor radon guidelines from EPA's radon program were used as the basis for the radon-222 gas PRG. Under this non-regulatory program, EPA recommends that radon-222 gas levels should not exceed 4 pCi/L of air. Potential air quality concerns are associated with radon-222 gas.

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3. SAMPLING ACTIVITIES

This section discusses the sediment, groundwater, residential radon, and investigation-derived waste (IDW) sampling activities conducted at the Site. **Appendix A** provides photographic documentation of the activities conducted at the Site.

3.1 SEDIMENT SAMPLING

On June 13, 2011, WESTON collected five sediment samples (plus one duplicate sample) from accumulated sediments in Goose Creek to verify that radium-226 is not migrating off-site and impacting Goose Creek. Sediment sample NPL11-SB-01-061311 was collected upstream of the Site, sediment samples NPL11-SB-02-061311 through NPL11-SB-04-061311 (and field duplicate sample NPL11-SB-02-061311-DUP) were collected adjacent to the Site, and sediment sample NPL11-SB-05-061311 was collected downstream of the Site (see **Figure 3-1**). Sediment sampling was conducted in a progression from downstream to upstream in order to minimize the impact of disturbed sediment from upstream locations. The sediment samples were collected from approximately 0 to 6 inches below the sediment surface using a disposable scoop. The sediment was homogenized prior to being transferred to the sample container. The sediment samples were submitted to Pace Analytical Services in Green Bay, Wisconsin, for radium-226 analysis. The analytical data results for the sediment investigations are discussed in Section 4.1.

3.2 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

WESTON subcontracted drilling services through Testing Service Corporation (TSC) of Carol Stream, Illinois to install monitoring wells to verify that elevated concentrations of radium-226 in groundwater are not migrating off-site. Drilling and monitoring well installation activities occurred between June 13 and 15, 2011. Under the direction of a WESTON Geologist, TSC installed three shallow monitoring wells (MW-1S, MW-2S, and MW-3S) and three bedrock monitoring wells (MW-1D, MW-2D, and MW-3D) at the Site using a CME-750 rubber track-mounted rotary drill rig with a 4.25-inch inside diameter hollow stem auger. The shallow and bedrock monitoring wells were co-located. Monitoring wells MW-1S and MW-1D were installed

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on the northern border of the Site to serve as a background location; monitoring wells MW-2S and MW-2D were installed on the west-central border of the Site, and monitoring wells MW-3S and MW-3D were installed in the southeast corner of the Site (see **Figure 3-2**). The monitoring wells were constructed of 2-inch inner-diameter polyvinyl chloride (PVC) pipe. The shallow monitoring wells were installed to the bedrock surface (maximum depth of 15 ft bgs), with a 5-to-10-ft well screen, and sealed with bentonite. The bedrock monitoring wells (maximum depth of 25 ft bgs), with a 5-ft well screen, and sealed with bentonite. Each monitoring well was completed with a flush-mount well cover and a concrete pad. **Figure 3-3** presents a monitoring well construction diagram. Prior to demobilization, the landscaping of the Site was restored to its original condition.

After completing the monitoring wells, a well elevation survey was conducted to determine the direction of groundwater flow at the Site. TSC measured each of the wells for vertical and horizontal reference using level survey methods. The horizontal locations were tied in from the 2-story residence immediately east of the Site. Elevations of the ground surface and top of PVC riser were determined using a benchmark described as the northeast flange bolt on the fire hydrant located at the northeast corner of Bellevue Avenue and Lee Street (Elevation 100.00). The surveyed elevations are further discussed in relation to the hydrogeologic investigation in Section 5.

Following the well installation, TSC developed the monitoring wells to facilitate hydraulic communication between the screened formation and the monitoring wells. The wells were developed using surge and purge methods until relatively clear water was produced. Initial static water level and total depth of the wells were measured and recorded in the logbook. Well volumes were calculated and recorded. Before removal of each well volume, the wells were surged by moving a weighted bailer in the screened interval. This agitated and displaced any silt or fine sand build-up in the filter pack. A minimum of three well volumes were removed from each well. After removing the third well volume, the readings for pH, temperature, and specific conductance were recorded. Well development continued until these readings stabilized for two consecutive purge volumes.

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Single well permeability tests (slug tests) were performed at each of the monitoring wells to estimate the rates of groundwater flow and contaminant transport in the screened formation. A Global Water Systems WL16S-01S Data Logger, equipped with an electronic pressure transducer, was used to record the water levels. The transducer was positioned approximately 1 to 2 ft above the bottom of the well and connected to the data logger at the surface. Submerging a solid PVC slug into the water initiated the test. Measurements of the rate of water level loss and/or recovery were collected by the data logger at prescribed logarithmic time intervals. Subsequent rising head data was also recorded after removal of the slug. Water level data was analyzed using AQTESOLV for Windows version 4.5, based on the Bouwer and Rice graphical method. The slug test results are discussed in Section 5.

WESTON conducted a total of four groundwater sampling events between June 16, 2011 and April 13, 2012. The first round of groundwater sampling occurred on June 16 and 17, 2011. The second round of groundwater sampling occurred on September 12 and 13, 2011. The third round of groundwater sampling occurred on December 28, 2011. The fourth and final round of groundwater sampling occurred on April 13, 2012. During each groundwater sampling event, WESTON collected six groundwater samples (plus one duplicate sample). In addition, a single rinsate sample was collected for quality purposes. The analytical data results for the groundwater investigations are discussed in Section 4.2.

Groundwater sampling occurred in a progression from the least to most contaminated well, when possible. Low-flow sampling procedures were implemented using a stainless-steel bladder pump and disposable Teflon tubing. Field measurements, including groundwater depth, purged volume, pH, conductivity, temperature, oxidation-reduction potential, and turbidity, were recorded during purging and prior to collecting the sample and are presented in **Table 3-1**. The submersible pump was decontaminated between sample locations. New Teflon tubing was used in each well. The samples were submitted to Pace Analytical Services in Green Bay, Wisconsin, for total dissolved solids (TDS), total suspended solids (TSS), filtered radium-226/radium-228, and unfiltered radium-226/radium-228. Filtered radium-226/radium-228 samples were collected unfiltered in the field. Each designated sample was filtered in the laboratory prior to analysis.

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3.3 RESIDENTIAL RADON SAMPLING

Residential radon sampling was conducted at one residence adjacent to the Site. Residential radon sampling was implemented to help verify residential impacts as a result of potential vapor intrusion associated with contaminated soil. On June 13, 2011, WESTON deployed two radon samplers at the residence to the east of the Site (355 Bellevue Avenue), one in the crawl space and one on the first floor. Radon samplers were not placed in the residence to the west of the Site (349 Bellevue Avenue) due to lack of an access agreement. On October 20, 2011, WESTON retrieved the radon samplers and submitted them to Landauer laboratory for analysis of radon. On December 12, 2013, WESTON deployed two radon samplers at the residence to the east of the Site (355 Bellevue Avenue). On April 9, 2014, WESTON retrieved the radon samplers and submitted them to Landauer laboratory for analysis of radon. The analytical results are discussed in Section 4.3.

3.4 INVESTIGATION DERIVED WASTE SAMPLING

On June 17, 2011, WESTON collected one composite soil sample (NPL11-DISPOSAL-061711) from soil cuttings produced during monitoring well installation activities. The composite soil sample was submitted to Pace Analytical Services for disposal parameters analysis including radium-226, toxicity characteristic leaching procedure (TCLP) metals, total metals, corrosivity, cyanide, sulfide, VOCs, and SVOCs. On December 12, 2013, one composite sample (NPL11-121213) was collected to supplement the sample collected in 2011 and analyzed for TCLP pesticides/herbicides and total PCBs to complete the disposal profile for these drums. Eleven drums of IDW soil cuttings are staged at theNPL-4 Site pending off-site disposal. The analytical results are discussed in Section 4.4.

4. ANALYTICAL RESULTS

The analytical results for sediment, groundwater, radon, and IDW samples are discussed in this section.

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4.1 SEDIMENT SAMPLING RESULTS

On June 13, 2011, WESTON collected five investigative sediment samples (and one duplicate sediment sample) from Goose Creek to verify that radium-226 is not migrating off-site and impacting Goose Creek. **Table 4-1** summarizes the sediment sample analytical results for radium-226. **Appendix B** provides the laboratory analytical and data validation reports for the sediment samples submitted to Pace Analytical Services.

The sediment sample results were compared with the health-based surface soil standard listed for radium-226 in 40 CFR 192 as 5 pCi/g above the background level (1.2 pCi/g), or 6.2 pCi/g. The analytical results for radium-226 ranged from 1.15 to 2.55 pCi/g. The maximum radium-226 concentration was detected in sediment sample NPL11-SB-02-061311. None of the sediment sample results exceeded the health-based surface soil standard of 6.2 pCi/g for radium-226.

4.2 GROUNDWATER SAMPLING RESULTS

WESTON conducted a total of four groundwater sampling events between June 16, 2011 and April 13, 2012 to verify that elevated concentrations of radium-226 in groundwater are not migrating off-site. **Table 4-2** summarizes the groundwater sample analytical results for radium-226 and radium-228, TDS, and TSS. **Appendix C** provides the laboratory analytical and data validation reports for the groundwater samples submitted to Pace Analytical Services.

The groundwater sample results were compared with the EPA MCL for total radium of 5 pCi/L. The radium-226 and radium-228, TDS, and TSS results are summarized below.

- **Total Radium (see Table 4-2)**: The analytical results for total radium (radium-226 plus radium-228) ranged from 0.0963 to 3.343 pCi/L. The maximum concentration of total radium was detected in monitoring well MW-2S. None of the results exceeded the PRG for total radium of 5 pCi/L.
- **TDS (see Table 4-2)**: The analytical results for TDS ranged from 584 to 2,460 milligrams per liter (mg/L). The maximum concentration of TDS was detected in monitoring well MW-3S.

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- **TSS (see Table 4-2)**: The analytical results for TSS ranged from 2.8 to 118 m/L. The maximum concentration of TSS was detected in monitoring well MW-3S.

4.3 RESIDENTIAL RADON SAMPLING

The residential radon sample results for the residence to the east of the Site were compared with the EPA radon program recommended non-regulatory value for radon-222 gas of 4 pCi/L. The radon results are presented on **Table 4-3** and summarized below.

- **Round 1 (June – October 2011)**: The analytical results for radon were 1.3 +/- 0.08 (crawl space), and 1.1 +/-0.07 pCi/L (kitchen). Results did not exceed the PRG for radon-222 gas of 4 pCi/L.
- **Round 2 (December 2013 – February 2014):** The analytical results for radon were 2.4 +/- 0.13 (crawl space), and 2.1 +/-0.12 pCi/L (kitchen). Results did not exceed the PRG for radon-222 gas of 4 pCi/L.

Appendix D provides the laboratory analytical reports for the radon samples submitted to Landauer.

4.4 DISPOSAL SAMPLING

The IDW soil cuttings were analyzed for radium-226, TCLP metals, total metals, corrosivity, cyanide, sulfide, VOCs, SVOCs, TCLP pesticides/herbicides and total PCBs. The analytical results for radium-226 were compared to the health-based surface soil standard for radium-226 of 6.2 pCi/g. **Table 4-4** provides the analytical results and a summary is presented as follows:

- **Radium-226**: The radium-226 result for soil sample NPL11-DISPOSAL-061711 was 1.57 pCi/L. Therefore, soil sample NPL11-DISPOSAL-061711 does not exceed the PRG for radium-226 of 6.2 pCi/g.
- **TCLP Metals**: The TCLP metals results were all non-detect in soil sample NPL11-DISPOSAL-061711. Therefore, this soil sample does not represent a material that meets the definition of a hazardous waste for the toxicity characteristic as stated in 40 CFR 261.24.

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- **TCLP Pesticides/Herbicides**: The TCLP pesticides/herbicides results were all non-detect in soil sample NPL11-121213. Therefore, this soil sample does not represent a material that meets the definition of a hazardous waste for the toxicity characteristic as stated in 40 CFR 261.24.
- **Total Metal**s: The total metals concentrations were compared to the pH-specific soil remediation objectives for inorganics for the soil component of the groundwater ingestion route for Class I groundwater set forth in in 35 IAC Part 742, Appendix B, Table C. Metals concentrations did not exceed the criteria in soil sample NPL11-DISPOSAL-061711.
- **Corrosivity**: The pH result for soil sample NPL11-DISPOSAL-061711 was 7.0 standard units. Therefore, soil sample NPL11-DISPOSAL-061711 does not represent a material that meets the definition of a hazardous waste for the characteristic of corrosivity as stated in 40 CFR 261.22.
- **Cyanide:** Cyanide was not detected in soil sample NPL11-DISPOSAL-061711.
- **Sulfide:** Sulfide was not detected in soil sample NPL11-DISPOSAL-061711.
- **PCBs:** PCBs were note detected in soil sample NPL11-121213.
- **VOCs:** One VOC (methylene chloride) was detected at a concentration of 15.6 micrograms per kilogram (µg/kg) in soil sample NPL11-DISPOSAL-061711. The methylene chloride concentration does not exceed the IEPA Tier 1 Soil Remediation Objectives for Residential Properties value of 20 µg/kg.
- **SVOCs:** SVOCs were not detected in soil sample NPL11-DISPOSAL-061711.

Appendix E provides the laboratory analytical and data validation reports for the IDW samples submitted to Pace Analytical Services.

5. HYDROGEOLOGIC INVESTIGATION RESULTS

Illinois groundwater quality standards are described in Title 35, Part 620 of the Illinois Administrative Code (35 IAC 620). Part 620, Subpart B presents the groundwater classification. Section 210 of 35 IAC 620 classifies groundwater as Class I if it is located 10 ft or more below the land surface and within any geologic material that has a hydraulic conductivity of 1.0E-04 cm/sec or greater. Groundwater that does not meet the requirement found in Section 210 of 35 IAC 620 is classified as Class II groundwater. **Table 5-1** presents groundwater elevations. Groundwater potentiometric surface maps were created for the shallow and deep monitoring wells. **Figures 5-1** through **5-8** present the potentiometric surface maps for the shallow and deep

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monitoring wells for each of the four sampling events in which groundwater levels were measured.

Hydraulic conductivity was determined for the shallow overburden wells and bedrock wells located at the Site. The results are presented in **Table 5-2** and the data and associated plots are included in **Appendix F**. Hydraulic conductivity determined from slug tests conducted in the shallow overburden ranged from 5.73E-06 to 9.04E-02 cm/sec. The site-wide average of hydraulic conductivity of the shallow overburden was determined to be 2.37E-02 cm/sec and the geometric mean is 8.10-03 cm/sec.

Hydraulic conductivity determined from slug tests conducted in the deep wells is estimated to range from 8.47E-05 to 3.75E-03 cm/sec. The site-wide average of hydraulic conductivity of the bedrock aquifer was determined to be 9.07E-04 and the geometric mean is 6.52-04 cm/sec. Based on the requirements set forth in 35 IAC 620, the groundwater underlying the NPL-11 Site qualifies as Class I groundwater. Groundwater quality standards are presented in 35 IAC 620.410 for Class I groundwater.

6. CONCLUSIONS

The conclusions of the NPL-11 site investigation area summarized as follows:

- Sediment sample analytical results do not exceed the health-based surface soil standard of 6.2 pCi/g for radium-226.
- Groundwater analytical results from four sampling events did not exceed the total radium standard of 5 pCi/L.
- Residential radon sampling results do not indicate the presence of radon above the non-regulatory value for radon-222 gas of 4 pCi/L; thus residents are not impacted by vapor intrusion.
- IDW sample analytical results did not indicate soil collected from drill cuttings at the Site is hazardous.

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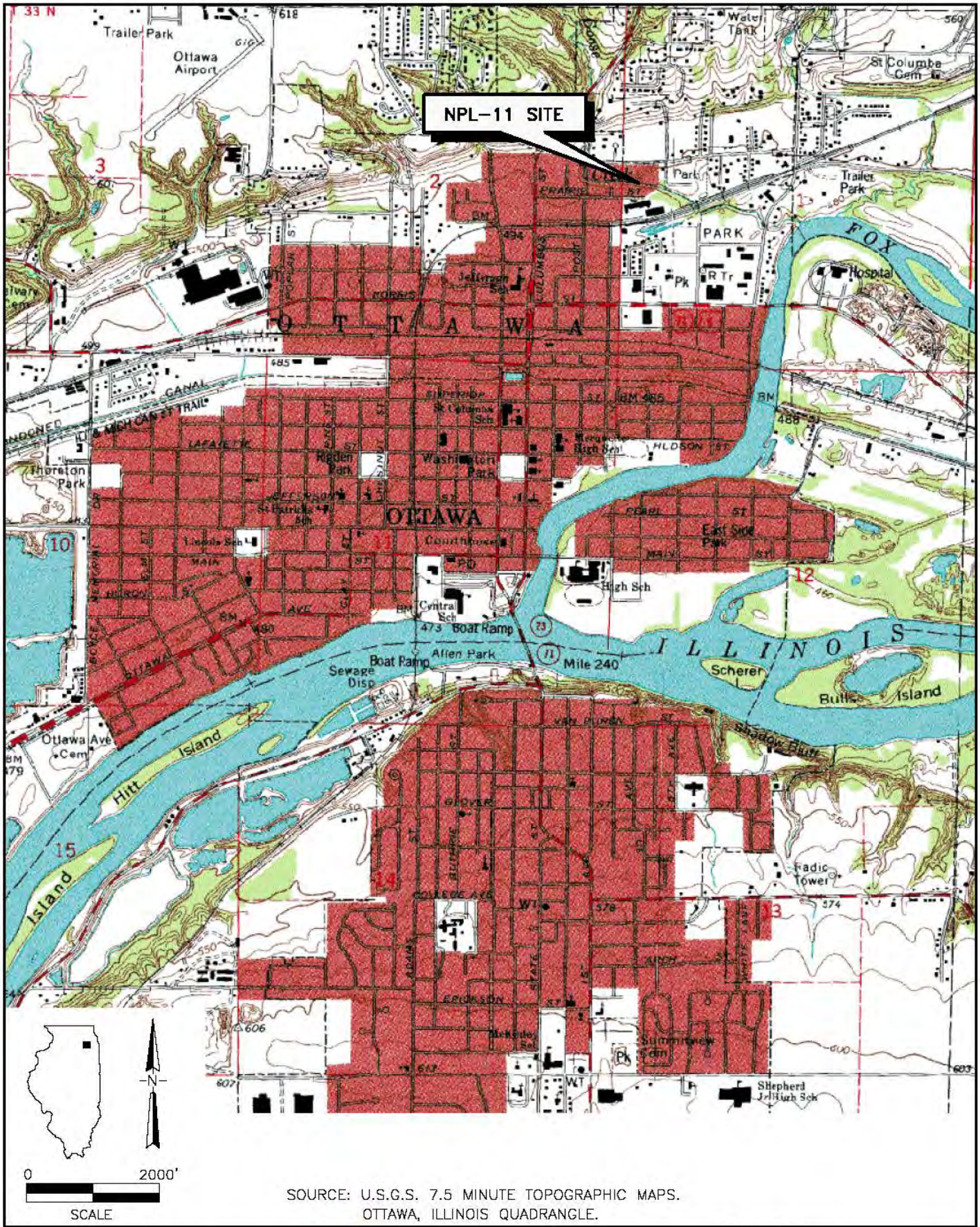
FIGURES



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAPS.
OTTAWA, ILLINOIS QUADRANGLE.

Prepared For: U.S. EPA. REGION V Contract No: EP-S5-06-04 TDD NO: S05-0008-0802-008 DCN: 385-2A-AOSZ	Prepared By: WESTON SOLUTIONS, INC 20 N. Wacker Drive Suite 2035 Chicago, Illinois 60606	**Figure 2-1** **Site Location Map** Ottawa Radiation Areas NPL-11 Site Ottawa, Illinois

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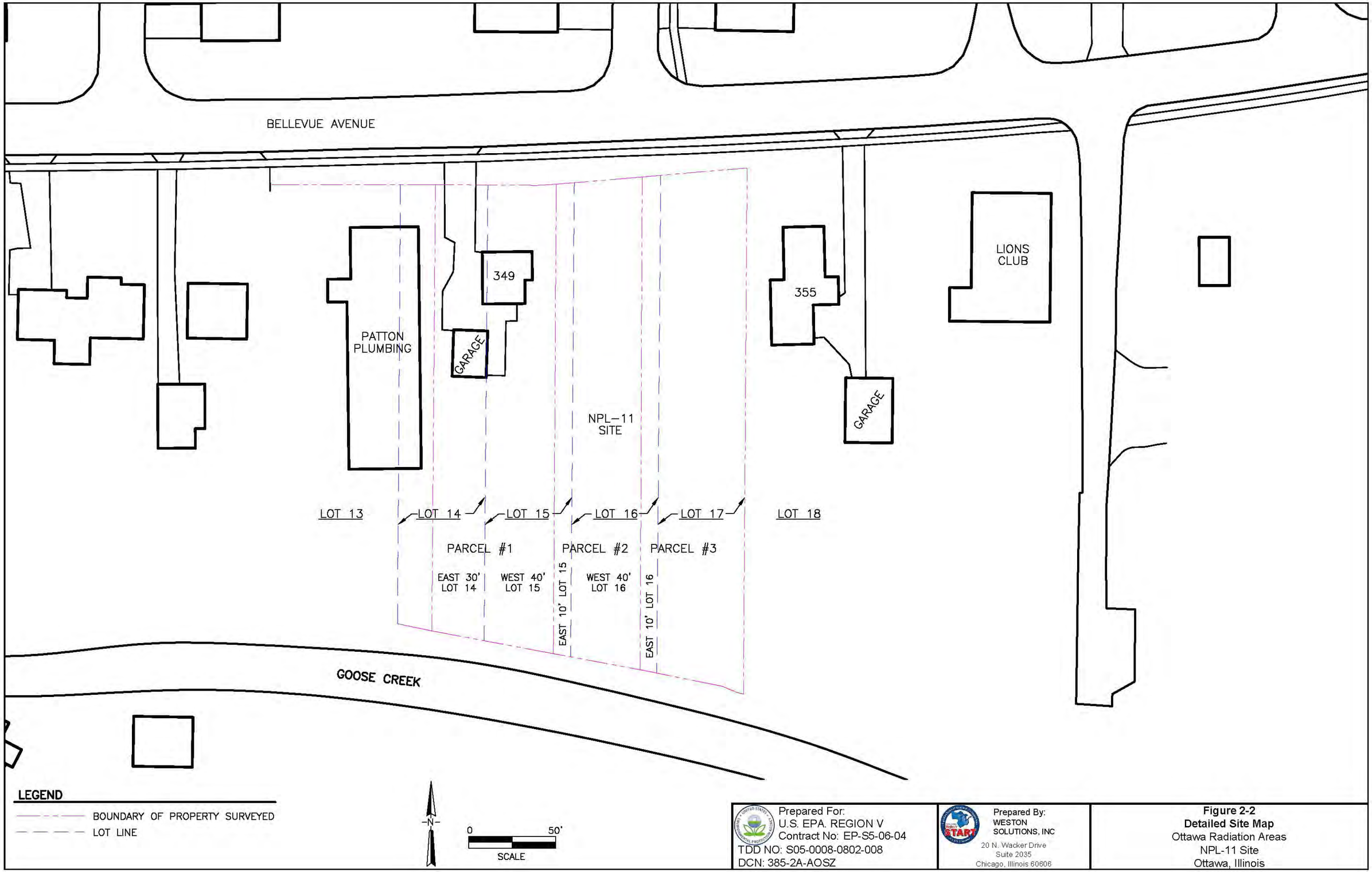

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DCN: 385-2A-AOSZ

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Figure 2-2
Detailed Site Map
Ottawa Radiation Areas
NPL-11 Site
Ottawa, Illinois

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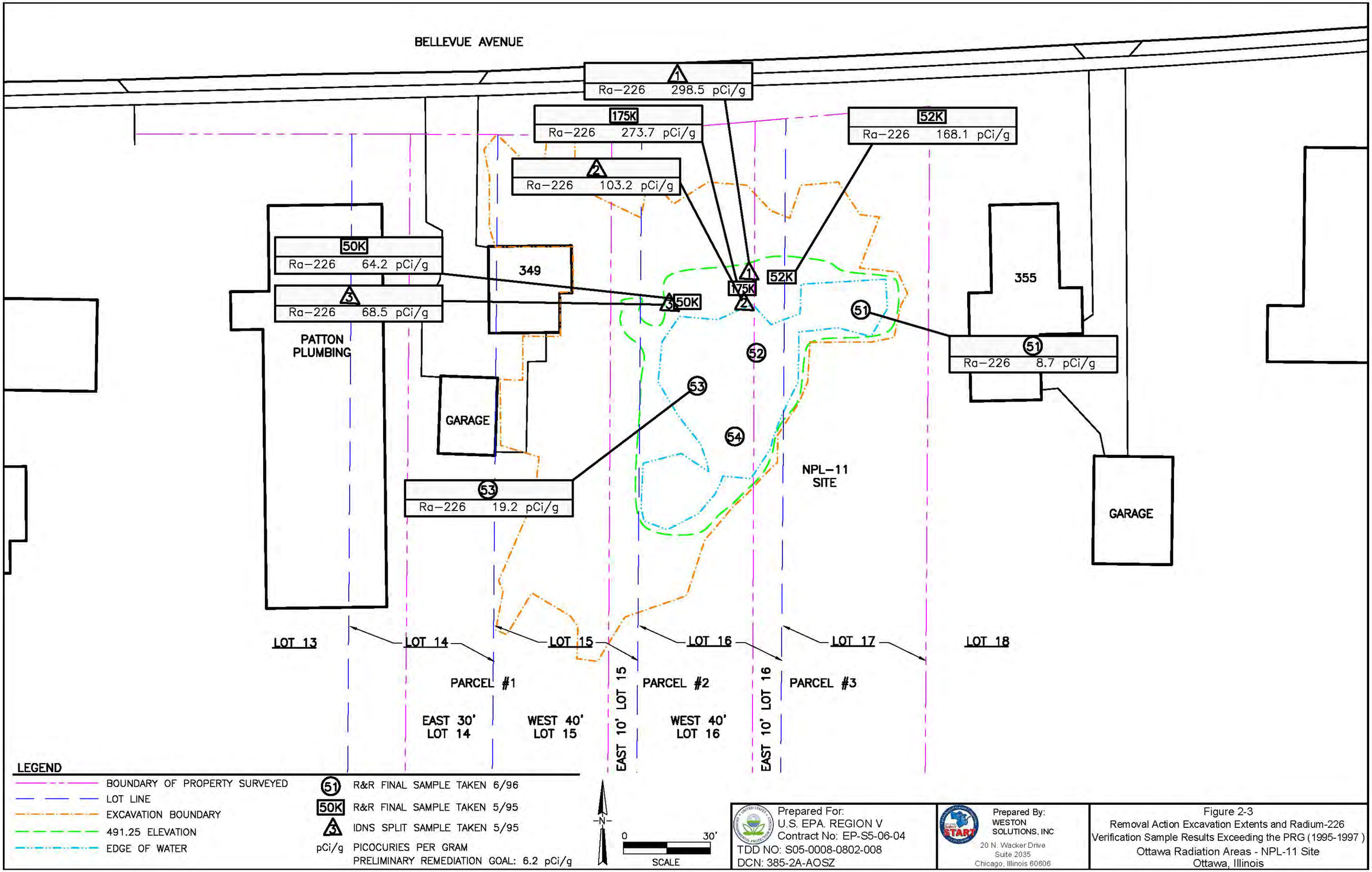

Figure 2-3
Removal Action Excavation Extents and Radium-226
Verification Sample Results Exceeding the PRG (1995-1997)
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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BELLEVUE AVENUE

SB-07 (6-8FT BGS)
Ra-226 19.5 pCi/g

SB-10
SB-07
SB-12
SB-01
SB-03
SB-05
SB-02
SB-06
SB-04
SB-08
SB04
SB-11
SB03
SB-09
SB01
SB05
SB02
SB09
SB06
SB10
SB11
SB08
SB12

349
355
PATTON PLUMBING
GARAGE
GARAGE
NPL-11 SITE

LOT 13
LOT 14
LOT 15
LOT 16
LOT 17
LOT 18

PARCEL #1
PARCEL #2
PARCEL #3

EAST 30' LOT 14
WEST 40' LOT 15
EAST 10' LOT 15
WEST 40' LOT 16
EAST 10' LOT 16

LEGEND

- BOUNDARY OF PROPERTY SURVEYED
- LOT LINE
- EXCAVATION BOUNDARY
- 491.25 ELEVATION
- EDGE OF WATER
- SOIL BORING LOCATION
- pCi/g PICOCURIES PER GRAM
  PRELIMINARY REMEDIATION GOAL: 6.2 pCi/g

N

0 30'
SCALE

Prepared For:
U.S. EPA. REGION V
Contract No: EP-S5-06-04
TDD NO: S05-0008-0802-008
DCN: 385-2A-AOSZ

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Chicago, Illinois 60606

Figure 2-4
Site Characterization Study Soil Boring Locations and Radium-226 Soil Sample Results Exceeding the PRG (June 2000)
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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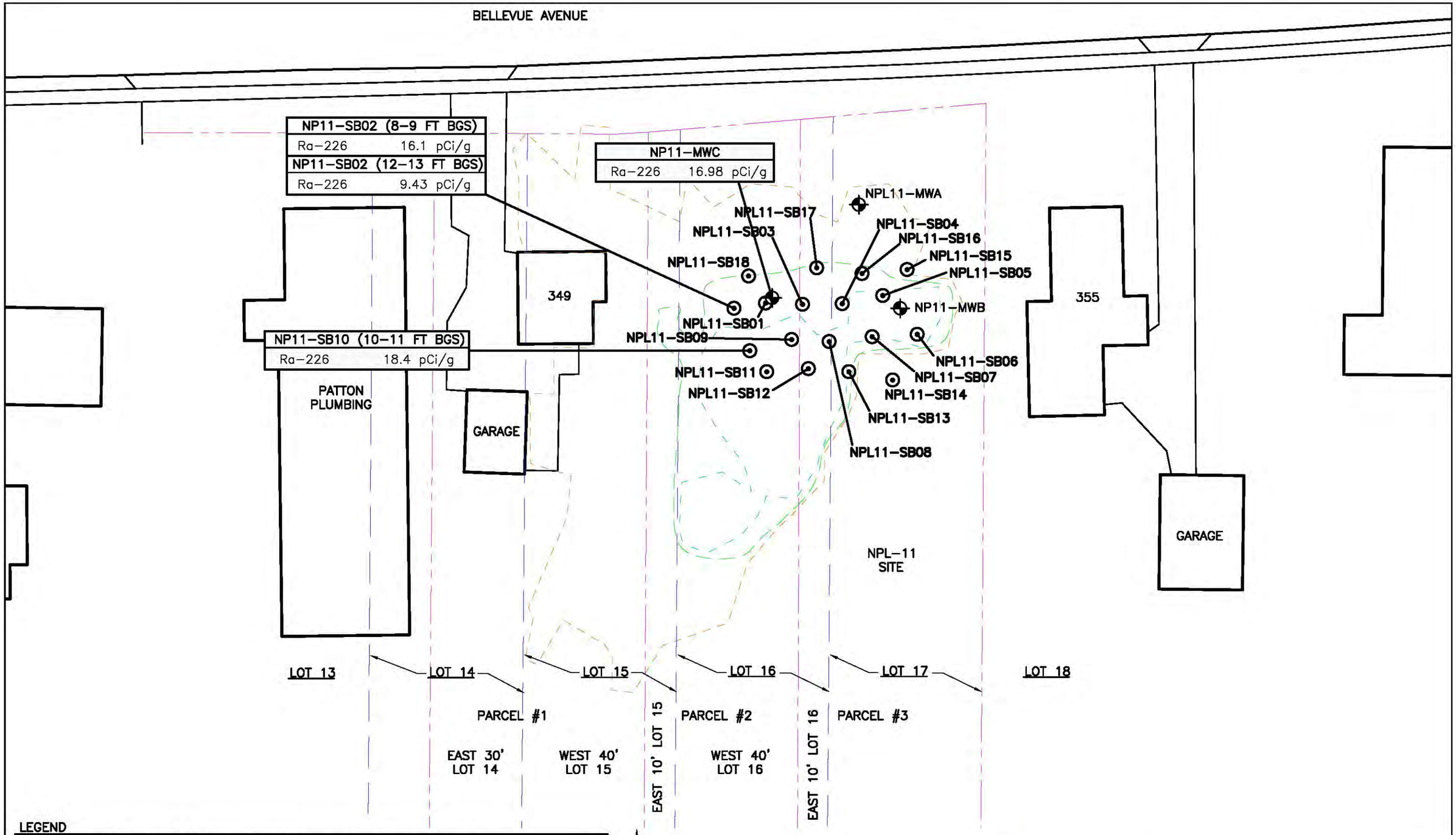

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Figure 2-5
Remedial Action Radium-226 Groundwater and Soil Sample Results Exceeding the PRG (2005-2007)
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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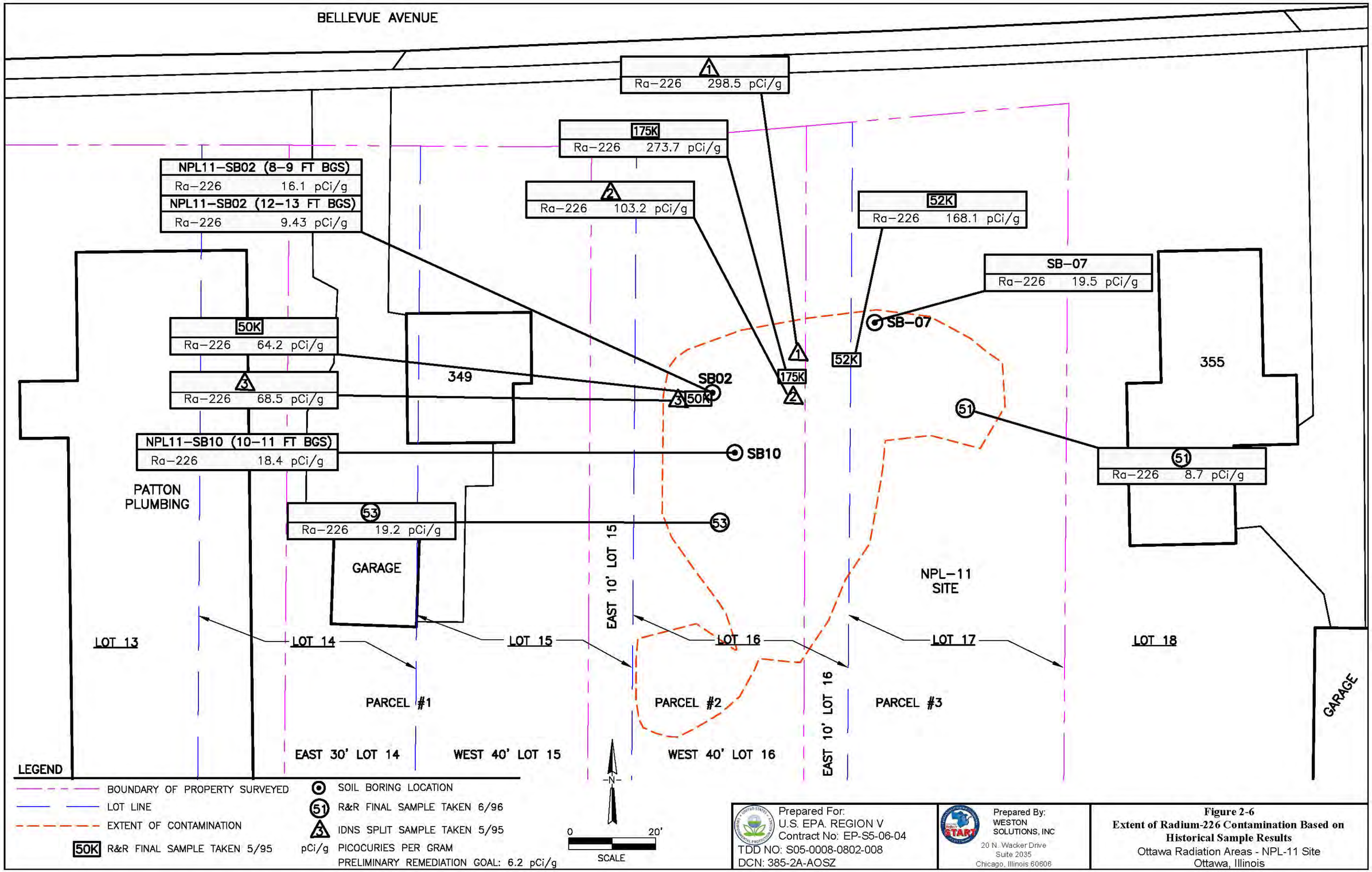

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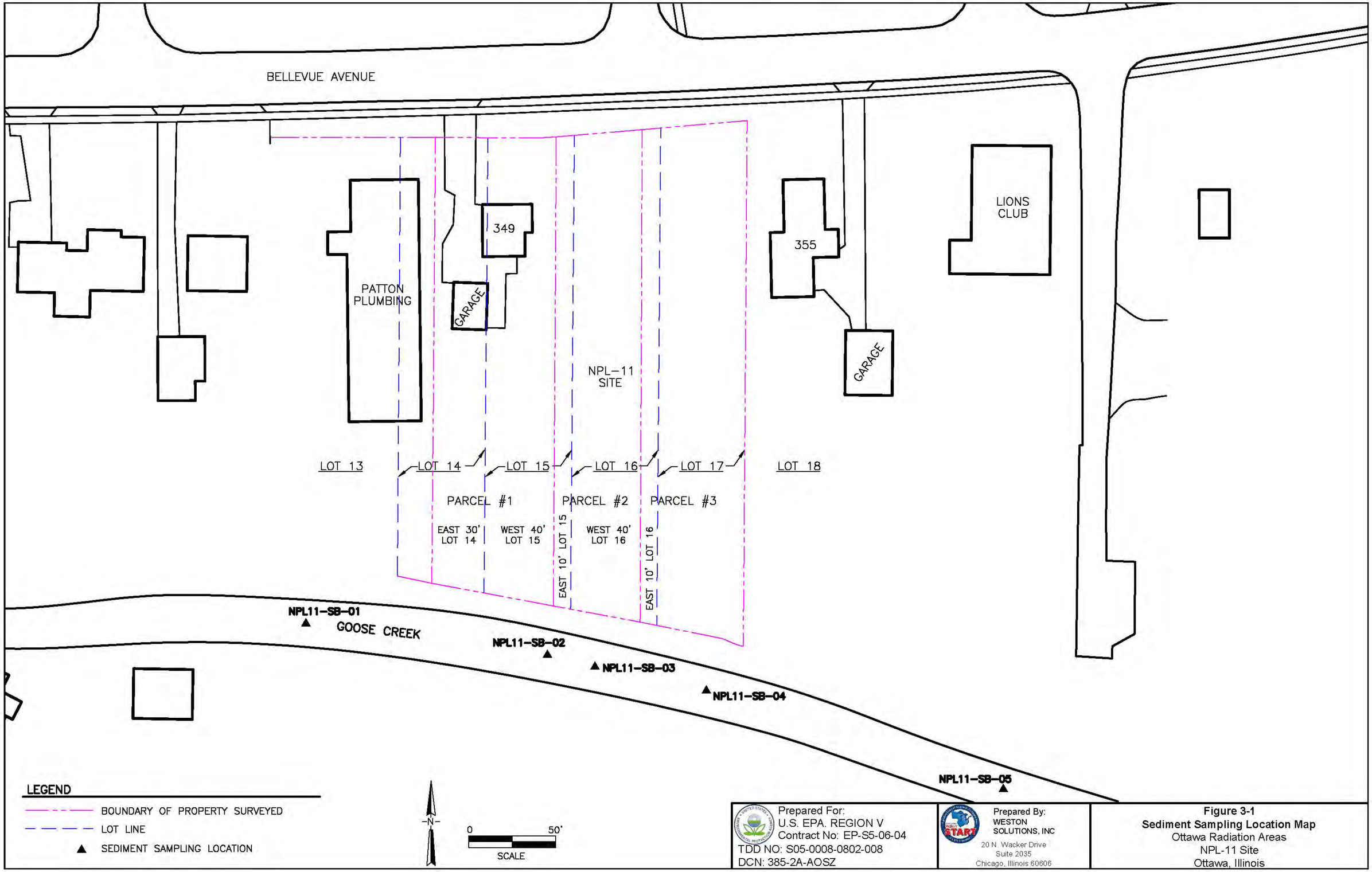

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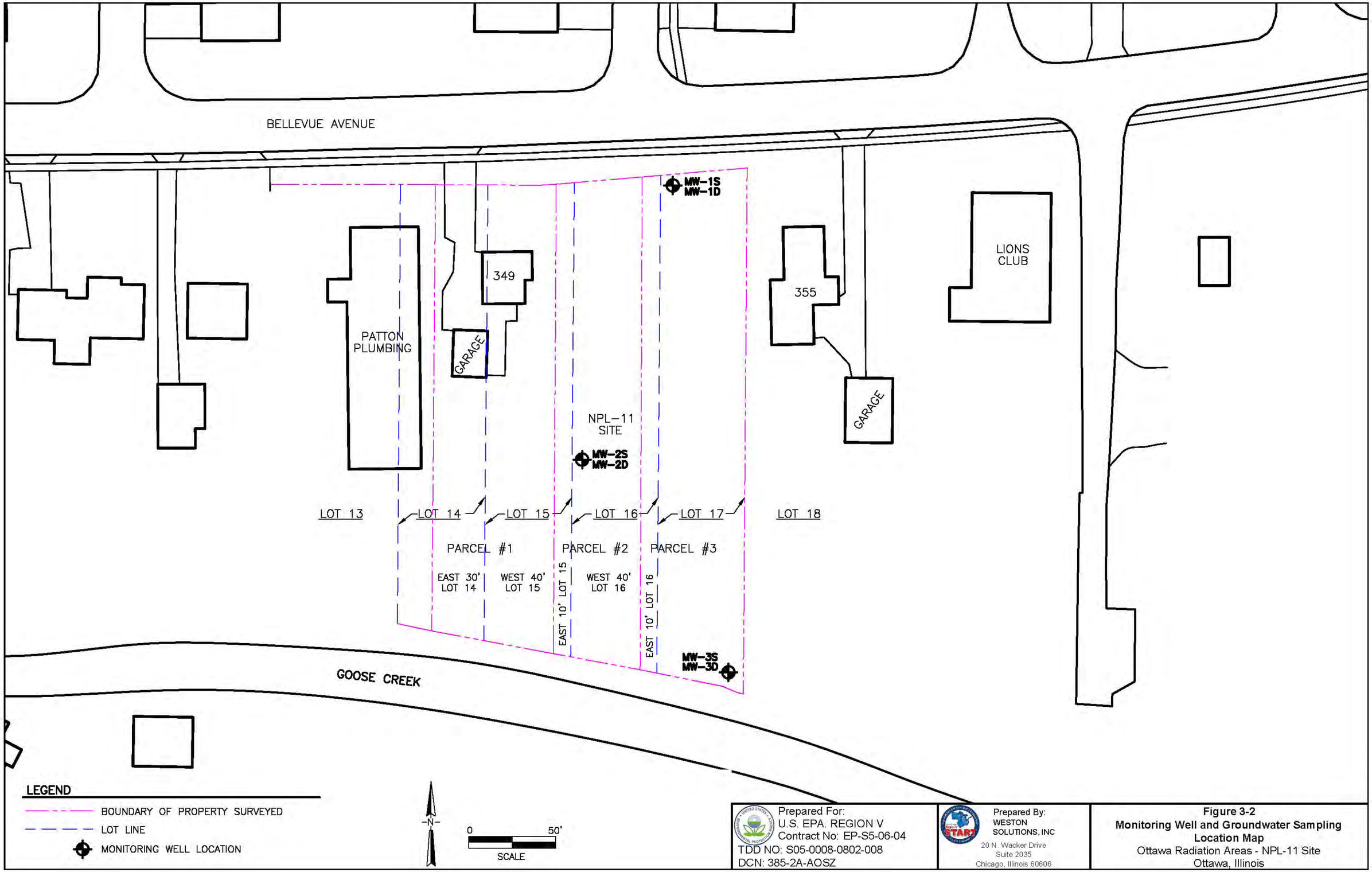

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Figure 3-2
Monitoring Well and Groundwater Sampling Location Map
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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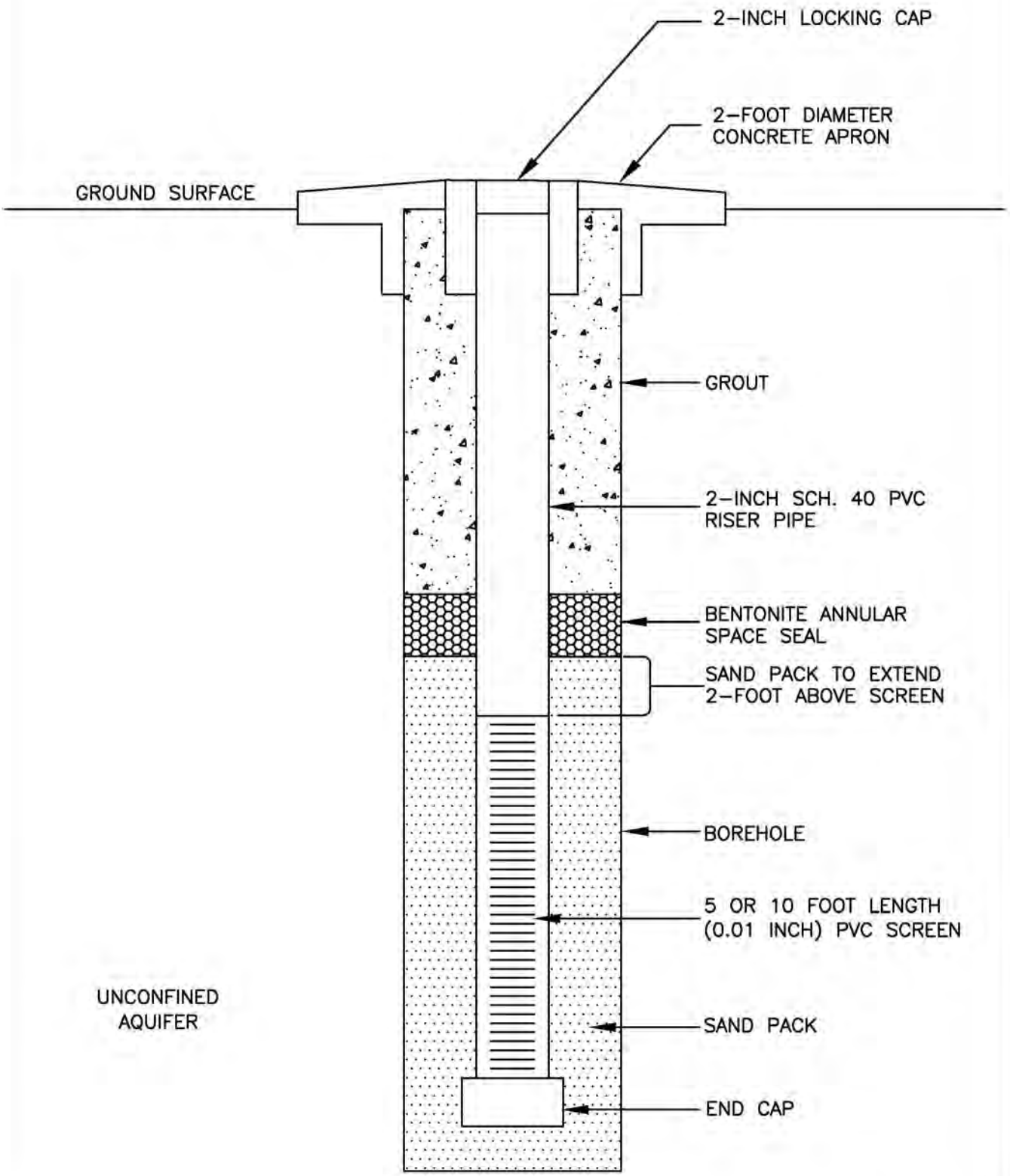

NOT TO SCALE

Prepared For: U.S. EPA. REGION V Contract No: EP-S5-06-04 TDD NO: S05-0008-0802-008 DCN: 385-2A-AOSZ	Prepared By: WESTON SOLUTIONS, INC 20 N. Wacker Drive Suite 2035 Chicago, Illinois 60606	**Figure 3-3** **Monitoring Well Construction Diagram** Ottawa Radiation Areas NPL-11 Site Ottawa, Illinois

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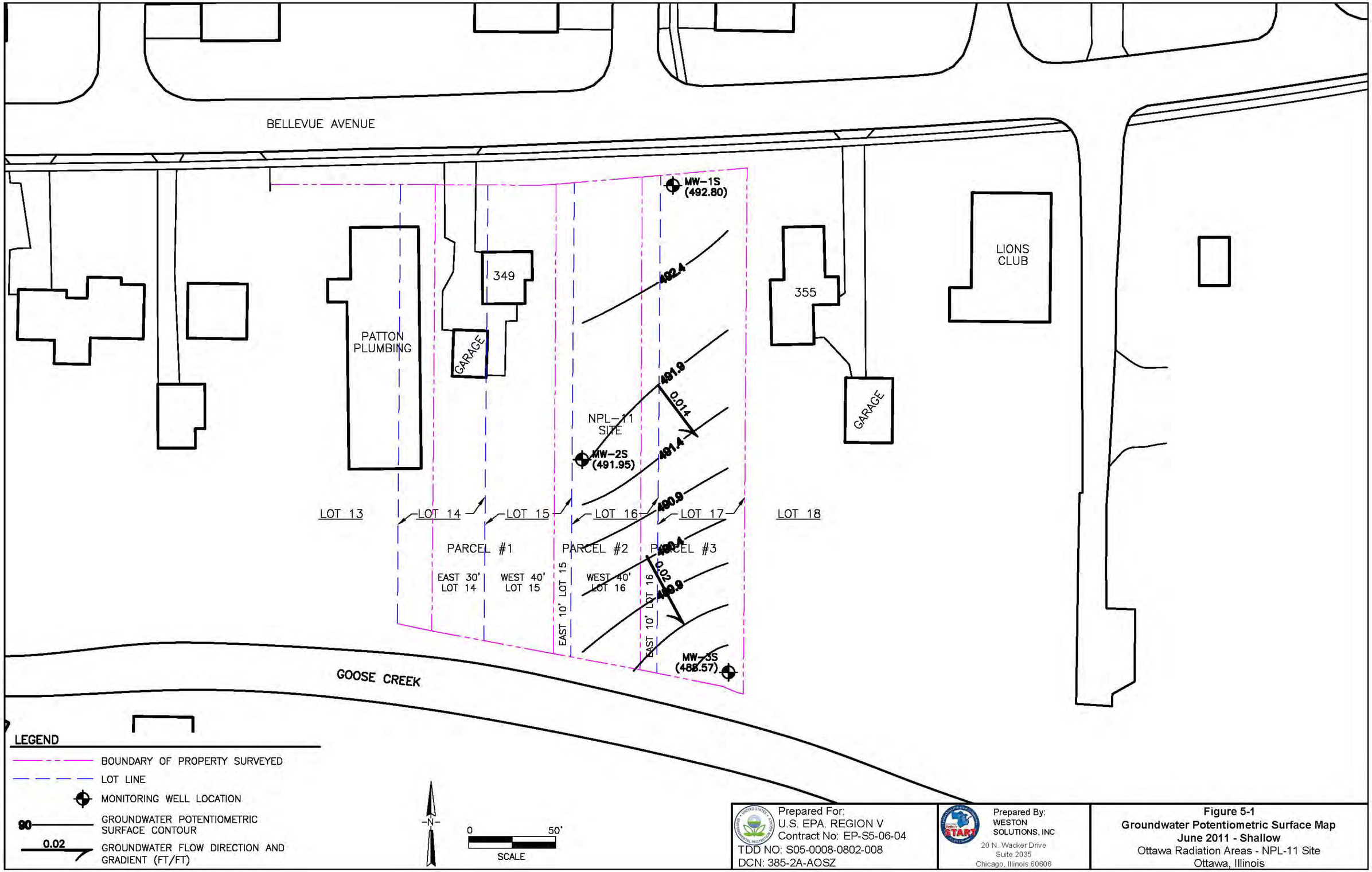

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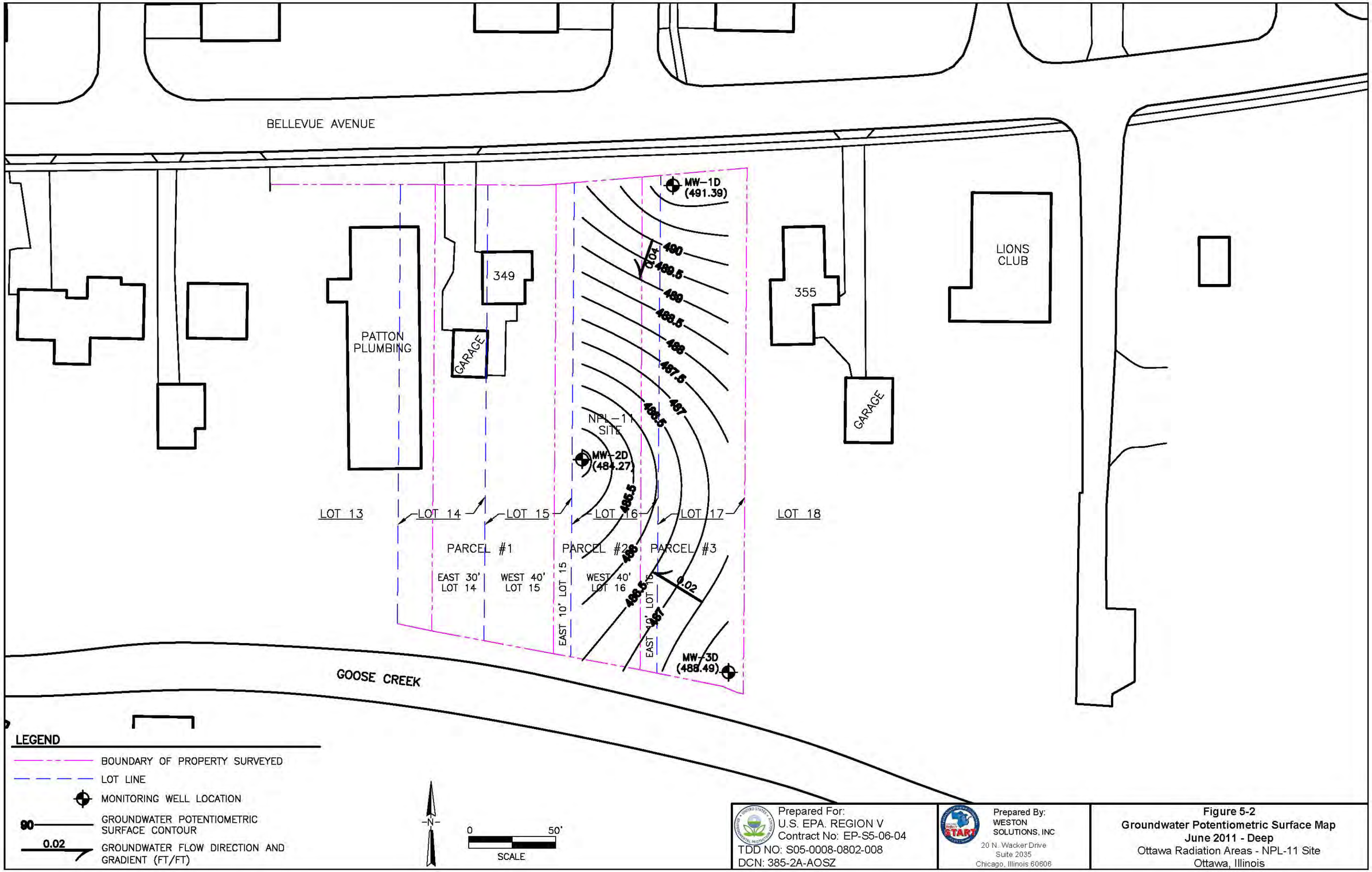

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Figure 5-2
Groundwater Potentiometric Surface Map
June 2011 - Deep
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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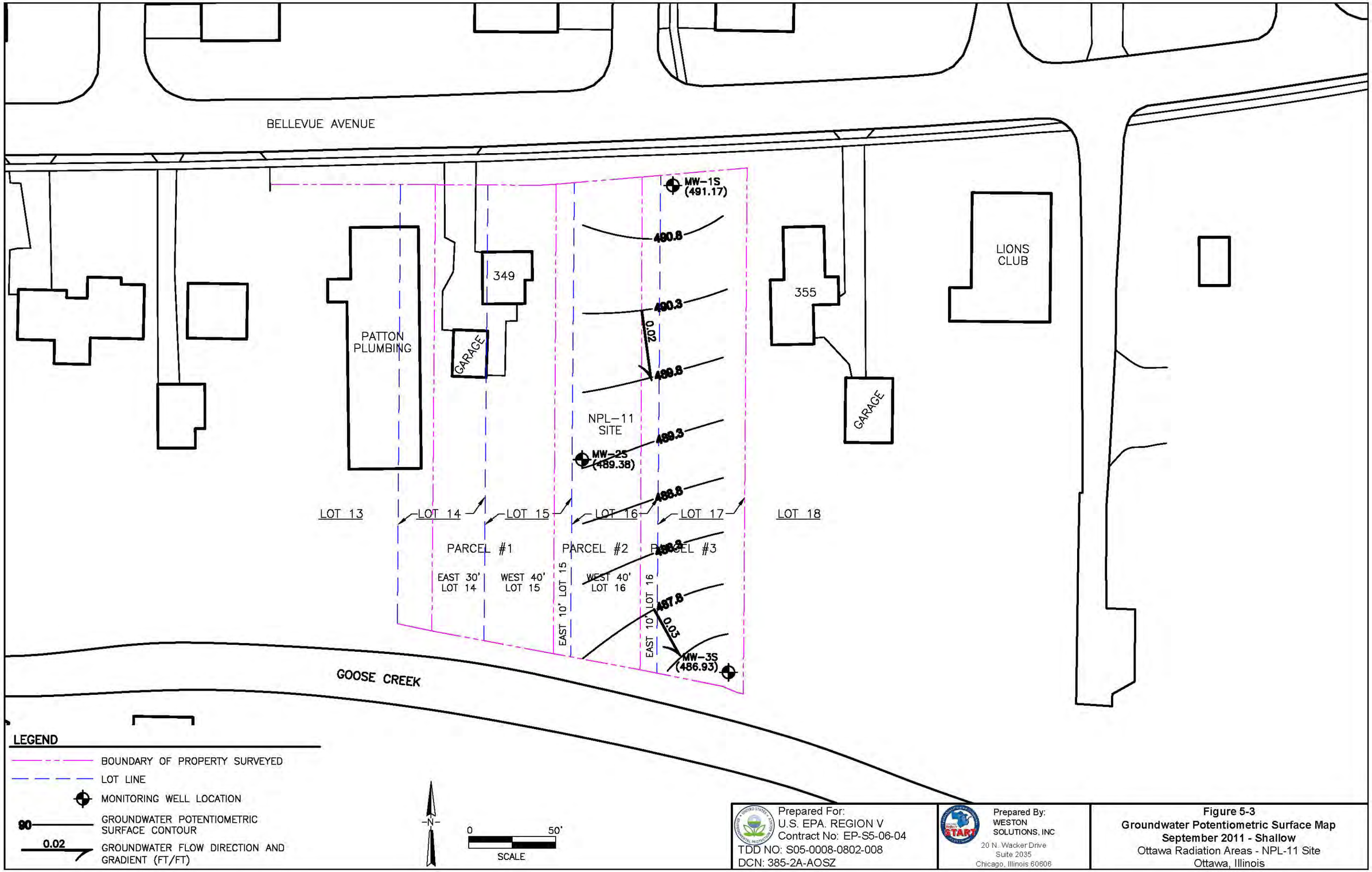

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Figure 5-3
Groundwater Potentiometric Surface Map
September 2011 - Shallow
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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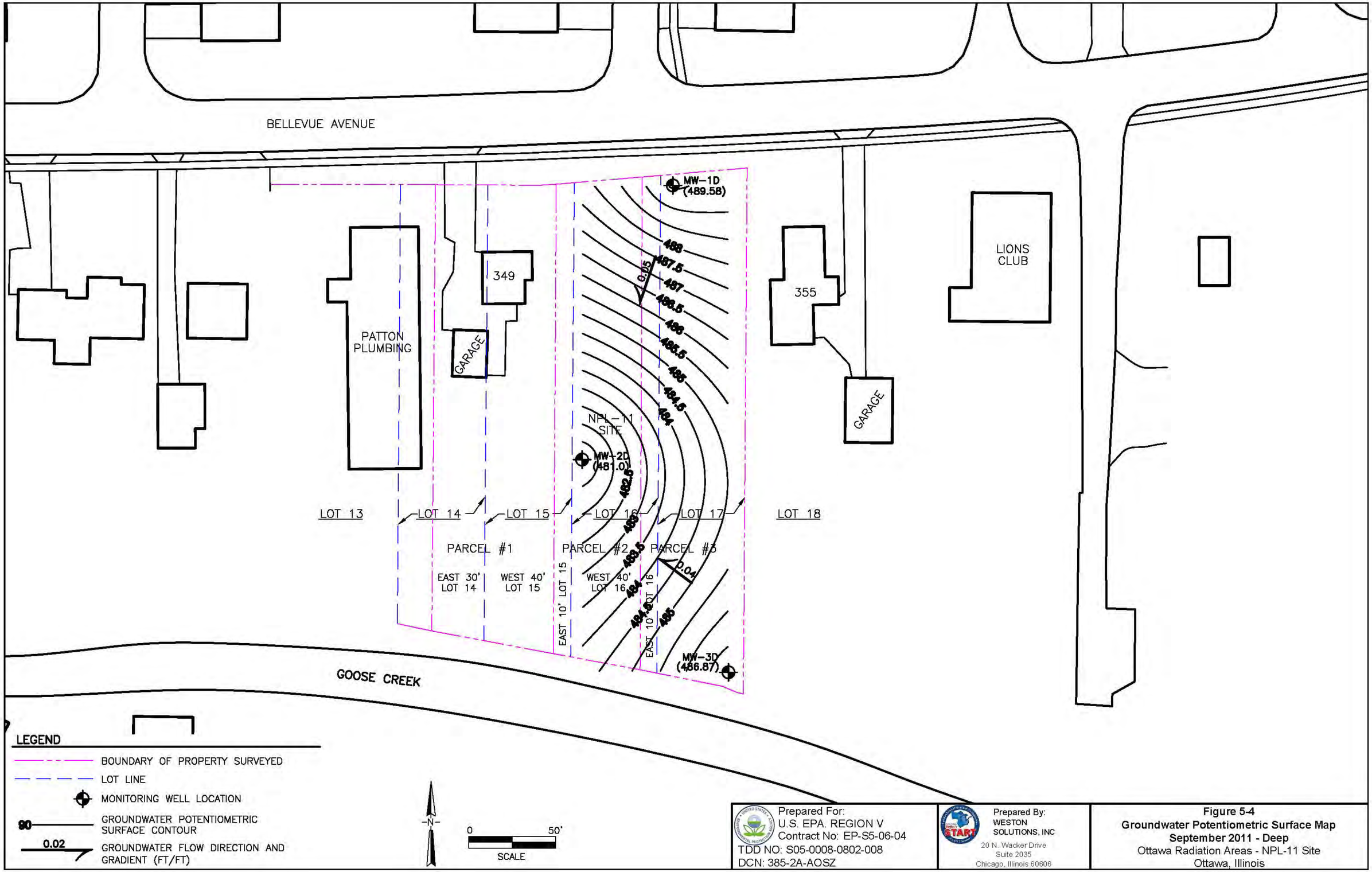

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Figure 5-4
Groundwater Potentiometric Surface Map
September 2011 - Deep
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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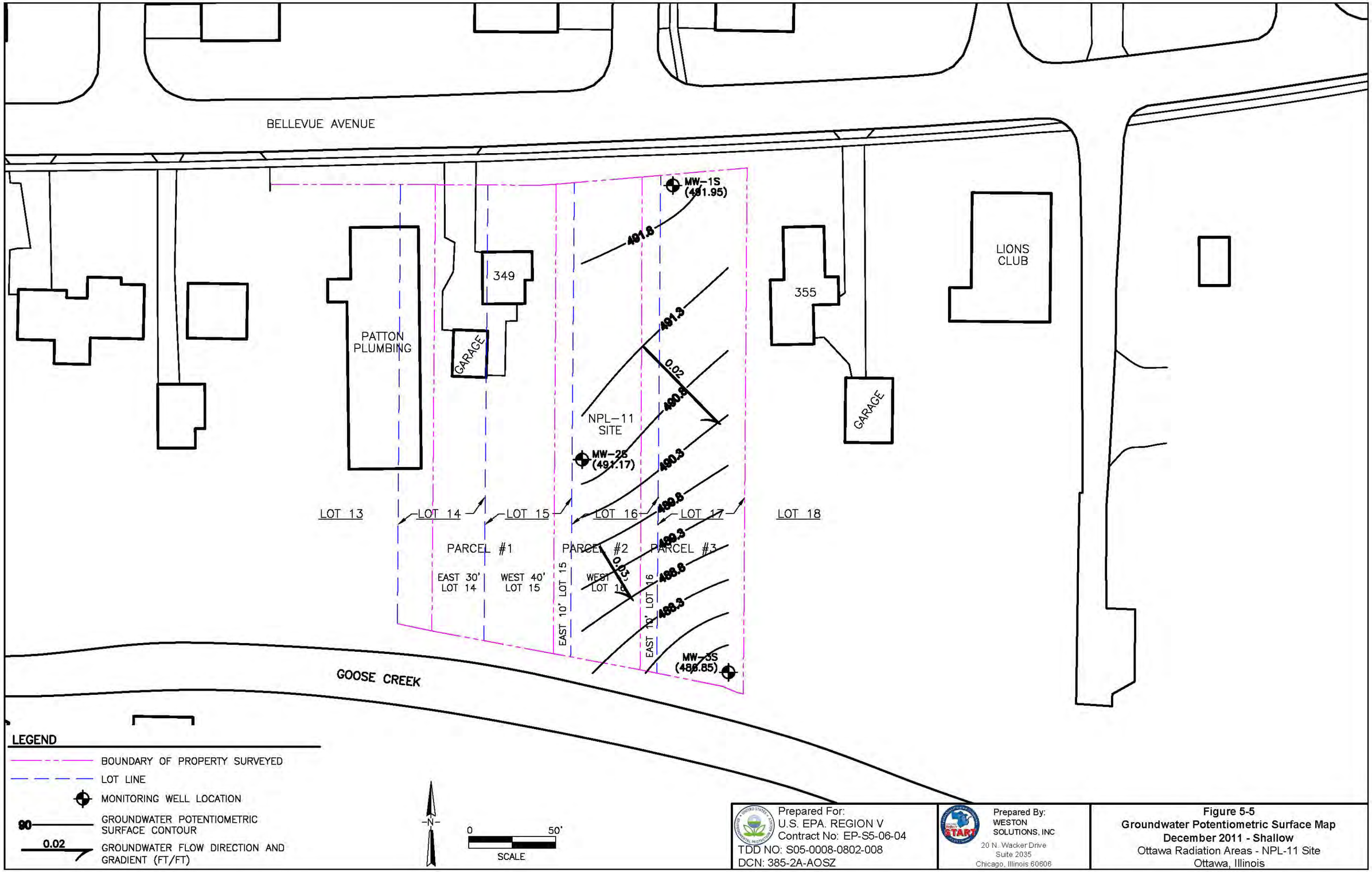

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DCN: 385-2A-AOSZ

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SOLUTIONS, INC
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Suite 2035
Chicago, Illinois 60606

Figure 5-5
Groundwater Potentiometric Surface Map
December 2011 - Shallow
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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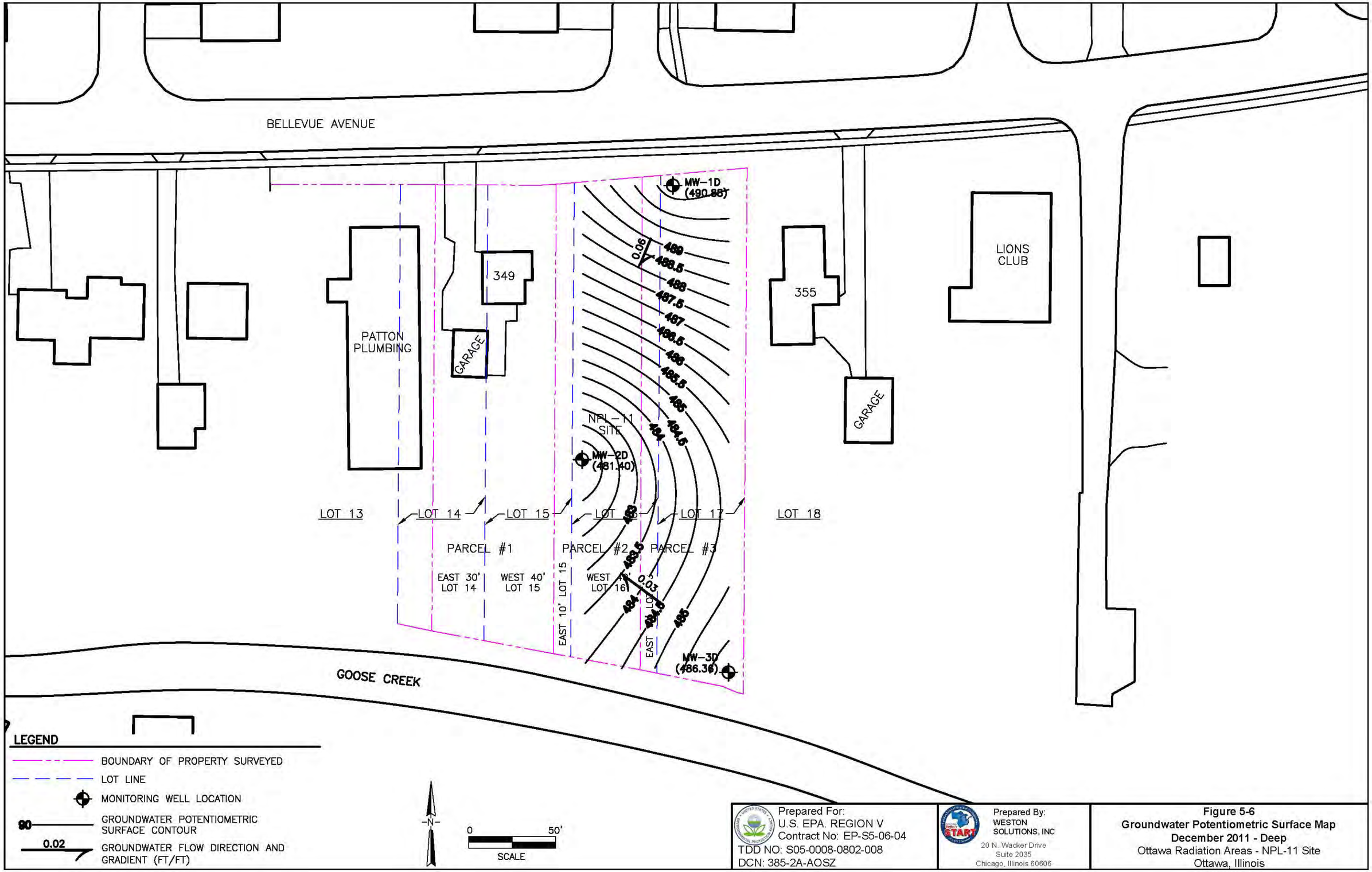

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DCN: 385-2A-AOSZ

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Figure 5-6
Groundwater Potentiometric Surface Map
December 2011 - Deep
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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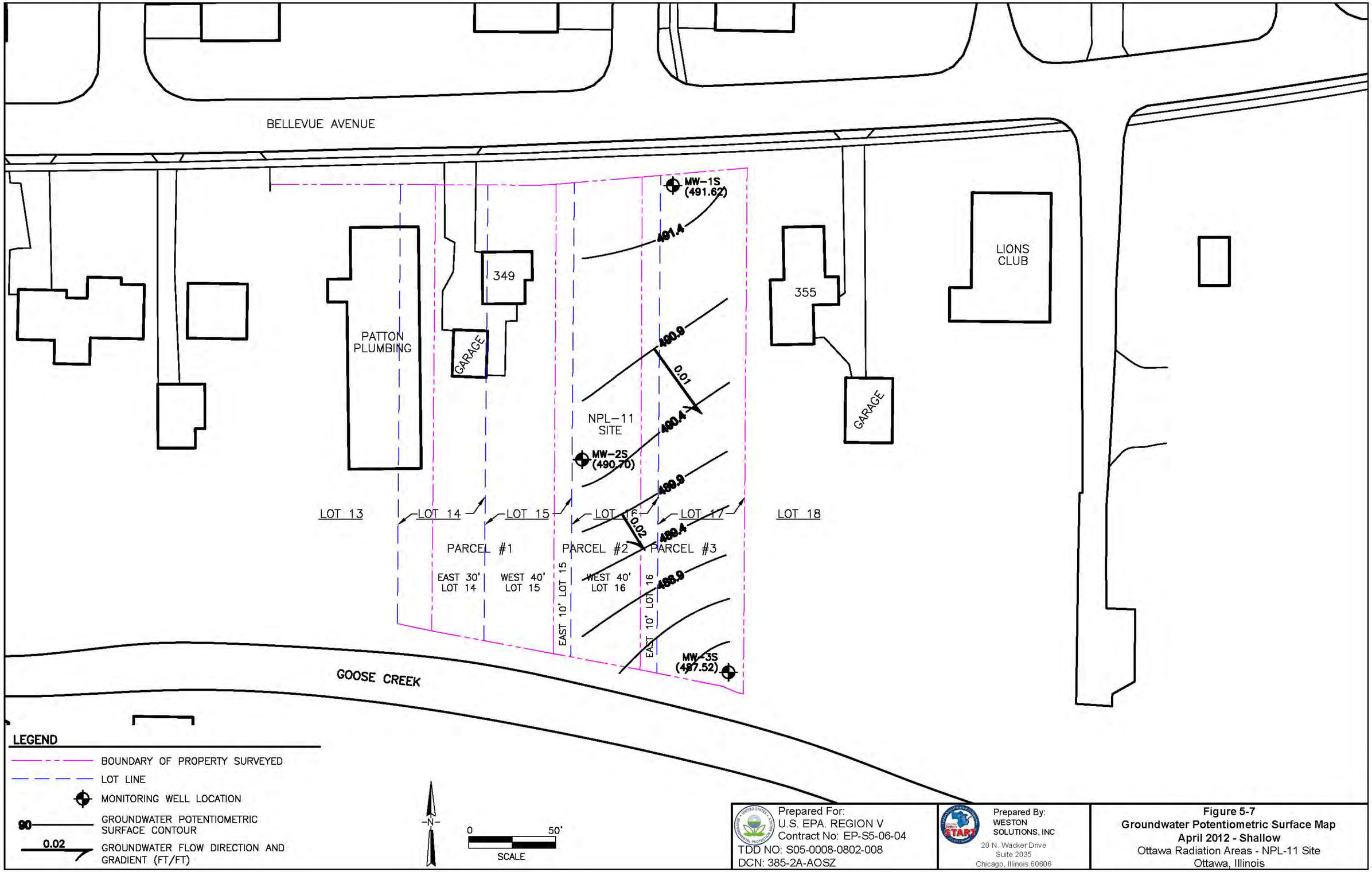

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DCN: 385-2A-AOSZ

Prepared By:
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Chicago, Illinois 60606

Figure 5-7
Groundwater Potentiometric Surface Map
April 2012 - Shallow
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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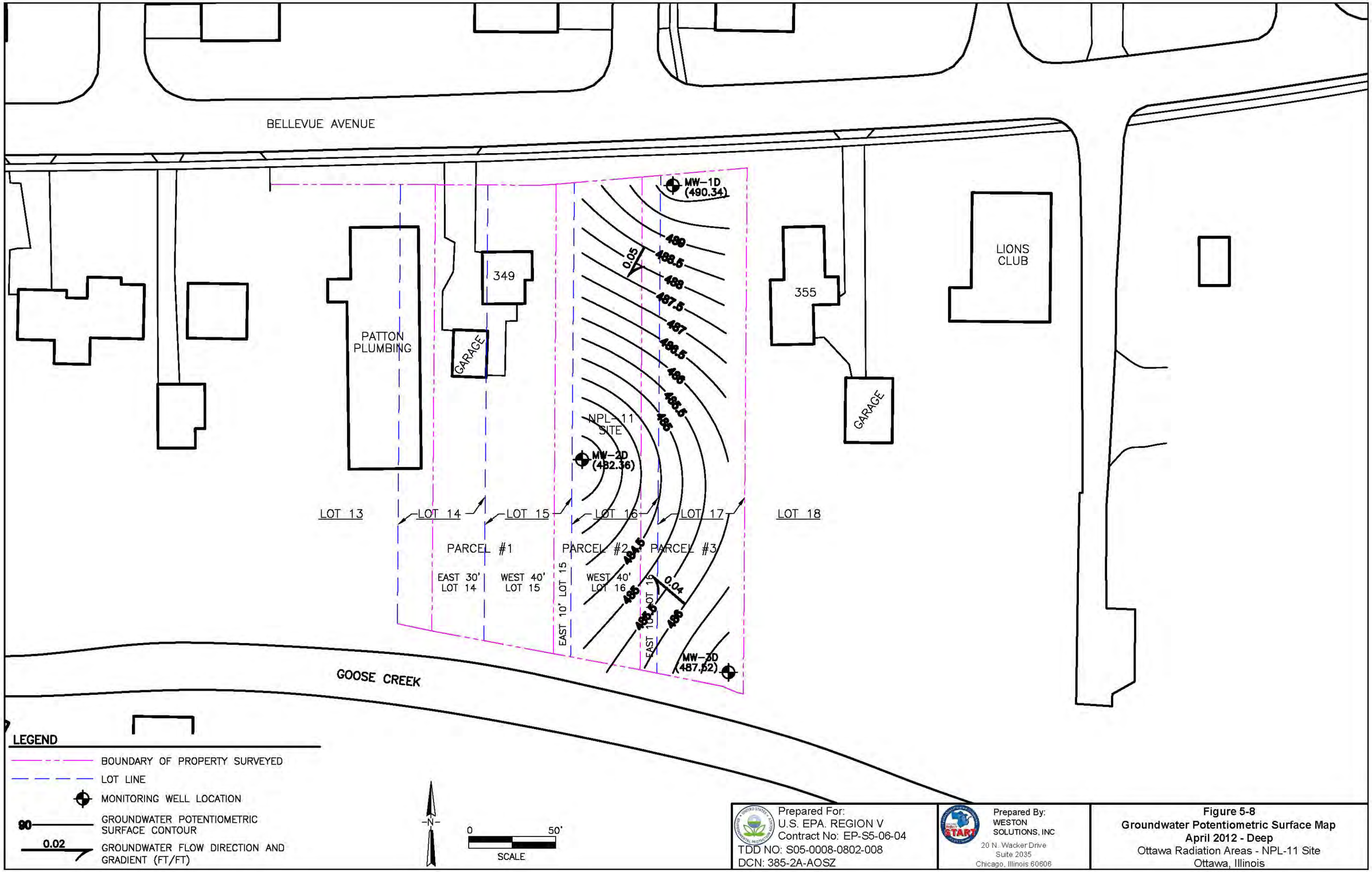

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DCN: 385-2A-AOSZ

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Chicago, Illinois 60606

Figure 5-8
Groundwater Potentiometric Surface Map
April 2012 - Deep
Ottawa Radiation Areas - NPL-11 Site
Ottawa, Illinois

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TABLES

Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-1S	16-Jun-2011	---	5.59	7.41	1,329	14.93	10.00	>1000	Start purging at 13:05
		1.8	5.62	7.39	1,325	14.23	10.10	>1000	
		3.5	5.61	7.41	1,328	14.07	10.30	>1000	
		5.3	5.60	7.40	1,332	13.97	10.40	>1000	
		7.0	5.60	7.41	1,326	13.99	10.60	>1000	
		8.8	5.60	7.43	1,339	13.83	10.70	>1000	
		10.5	5.60	7.43	1,339	13.67	10.90	>1000	
		12.3	5.60	7.44	1,337	13.58	11.10	>1000	
		14.0	5.60	7.45	1,333	13.57	11.30	650	
		15.8	5.60	7.46	1,328	13.44	11.40	450	
		17.5	5.60	7.44	1,329	13.41	11.70	400	
		19.8	5.60	7.44	1,330	13.45	12.50	280	
		21.5	5.60	7.42	1,322	13.43	14.20	240	
		23.3	5.60	7.41	1,317	13.40	15.00	210	
		25.0	5.60	7.41	1,323	13.40	15.20	110	
		26.8	5.60	7.41	1,322	13.45	15.60	85	
		28.5	5.60	7.41	1,321	13.48	15.90	80	
		30.3	5.60	7.41	1,318	13.49	16.60	55	
		32.0	5.60	7.41	1,320	13.45	16.70	45	
		33.8	5.60	7.41	1,321	13.40	16.80	45	
		35.5	5.60	7.41	1,320	13.42	16.80	45	
MW-1D	16-Jun-2011	---	5.97	7.53	1,057	15.65	12.00	800	Start purging at 15:25
		1.8	8.75	7.42	1,046	13.78	14.40	65	
		3.5	9.34	7.43	1,046	14.43	14.10	60	
		5.3	9.90	7.45	1,050	14.51	13.90	45	
		7.0	10.23	7.44	1,047	14.56	14.50	45	
		8.8	10.49	7.43	1,037	14.43	15.50	45	
		10.5	10.52	7.43	1,030	14.44	15.90	45	
		12.3	10.48	7.44	1,020	14.77	16.00	45	
		14.0	10.48	7.44	1,020	14.76	16.00	45	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-2S	16-Jun-2011	---	1.29	---	---	---	10.3	>1000	Start purging at 07:45
		2.0	1.32	7.44	1,171	13.5	4.2	>1000	
		4.0	1.33	7.45	1,172	13.3	1.3	>1000	
		6.0	1.35	7.50	1,161	13.2	-1.4	>1000	
		8.0	1.35	7.53	1,149	13.2	-2.7	170.0	
		10.0	1.35	7.54	1,142	13.1	-2.8	32.0	
		12.0	1.35	7.54	1,139	13.2	-2.8	14.0	
		14.0	1.35	7.54	1,137	13.2	-2.2	12.0	
		16.0	1.35	7.54	1,134	13.2	-2.1	6.3	
		18.0	1.35	7.54	1,133	13.1	-2.1	3.5	
MW-2D	16-Jun-2011	---	8.42	---	---	---	-40.2	>1000	Start purging at 09:05
		1.25	9.04	8.04	1,140	15.4	-36.8	>1000	
		2.50	10.55	8.11	1,138	14.1	-38.9	750.00	
		3.75	11.30	8.13	1,137	13.9	-40.5	420.00	
		5.00	12.15	8.13	1,136	13.9	-39.6	40.00	
		6.25	12.95	8.13	1,137	13.7	-40.0	19.00	
		7.50	13.75	8.14	1,138	13.9	-41.0	13.20	
		8.75	14.06	8.15	1,139	13.8	-41.6	11.00	
		10.00	14.49	8.17	1,138	13.7	-41.4	5.50	
		11.25	14.91	8.17	1,139	13.7	-41.7	3.90	
MW-3S	16-Jun-2011	---	5.43	---	---	---	---	>1000	Start purging at 17:00
		1.25	6.00	7.46	2,005	20.4	1.2	>1000	
		2.50	6.87	7.31	1,984	20.3	5.8	300.00	
		3.75	7.98	7.28	1,974	20.3	10.2	320.00	
		5.00	7.98	7.60	1,965	20.4	14.8	280.00	
		6.25	8.03	7.05	1,961	20.4	16.7	65.00	
		7.50	8.00	6.93	1,964	20.4	34.2	65.00	
		8.75	8.54	6.91	1,982	20.4	39.3	60.00	
		10.00	8.80	6.87	1,997	20.3	40.4	55.00	
		11.25	---	6.88	2,007	20.3	43.1	45.00	water level below top of pump
		12.50	---	6.89	2,019	20.3	43.0	45	
		13.75	---	6.89	2,025	18.0	42.8	55	
		15.00	---	6.89	2,029	17.2	41.3	50	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-3D	17-Jun-2011	---	4.79	---	---	---	-17.0	>1000	Start purging at 11:30
		1.50	5.92	7.74	1,825	13.9	-16.8	900	
		3.00	6.50	7.66	1,829	12.8	-11.7	750	
		4.50	6.85	7.69	1,822	12.6	-14.2	100	
		6.00	6.93	7.74	1,806	12.4	-17.6	28	
		7.50	6.99	7.75	1,788	12.5	-17.1	45	
		9.00	6.99	7.73	1,787	12.5	-16.9	28	
		10.50	6.99	7.73	1,785	12.5	-16.1	23	
		12.00	6.99	7.74	1,786	12.3	-16.3	12.3	
		13.50	6.99	7.75	1,789	12.3	-16.3	7.5	
		15	6.99	7.75	1,799	12.30	-16.30	4.25	
MW-1S	12-Sep-2011	---	7.21	---	---	---	---	---	Start purging at 08:45
		1.3	7.20	6.89	1,397	17.97	157.00	>1000	
		2.5	7.21	6.42	1,137	18.04	151.20	>1000	
		3.8	7.20	6.47	1,256	18.10	149.70	>1000	
		5.0	7.20	6.47	1,245	18.05	150.80	>1000	
		6.3	7.20	6.47	1,235	18.05	152.80	>1000	
		7.5	7.20	6.47	1,233	18.05	157.00	774	
		8.8	7.20	6.48	1,227	18.10	155.70	500	
		10.0	7.20	6.50	1,224	18.07	156.40	229	
		11.3	7.20	6.49	1,221	18.12	156.90	112	
		12.5	7.20	6.50	1,220	18.12	156.90	78.4	
		13.8	7.20	6.53	1,221	18.17	155.10	58.1	
		15.0	7.20	6.57	1,220	18.15	154.60	60.2	
		16.3	7.20	6.56	1,220	18.19	155.50	58.5	
		17.5	7.20	6.57	1,220	18.22	154.90	59.2	
MW-1D	12-Sep-2011	---	8.30	---	---	---	---	---	Start purging at 10:20
		1.3	9.78	7.01	1,028	17.70	35.30	31.8	
		2.5	10.05	7.06	1,032	17.95	10.60	13.5	
		3.8	10.10	7.09	1,033	18.18	-17.60	9.64	
		5.0	10.10	7.04	1,033	18.74	-21.90	8.63	
		6.3	10.10	7.02	1,041	18.02	-28.50	8.41	
		7.5	10.10	7.01	1,034	18.05	-21.90	7.29	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-2S	12-Sep-2011	---	3.75	---	---	---	---	---	Start purging at 12:45
		1.5	3.75	6.54	1,575	18.3	93.5	>1000	
		3.0	3.80	6.52	1,607	17.9	106.6	>1000	
		4.5	3.80	6.55	1,639	17.7	107.3	>1000	
		6.0	3.80	6.56	1,646	17.7	107.4	>1000	
		7.5	3.80	6.58	1,649	17.7	105.9	62.4	
		9.0	3.80	6.58	1,650	17.7	105.0	43.6	
		10.5	3.80	6.58	1,652	17.7	106.8	27.6	
		12.0	3.80	6.58	1,652	17.7	166.4	10.0	
MW-2D	12-Sep-2011	---	12.75	---	---	---	---	---	Start purging at 11:25
		1.25	13.92	6.66	1,357	16.2	31.8	27.50	
		2.50	14.71	6.66	1,353	16.6	27.1	24.90	
		3.75	14.79	6.71	1,364	17.0	17.7	20.30	
		5.00	14.85	6.76	1,382	17.6	13.2	18.80	
		5.25	14.93	6.78	1,380	18.1	7.6	15.70	
		7.50	15.00	6.80	1,413	18.4	-0.4	13.30	
		8.75	15.05	6.80	1,435	18.6	-3.7	9.48	
		10.00	15.10	6.81	1,450	18.7	-3.9	8.44	
MW-3S	12-Sep-2011	---	6.85	---	---	---	---	---	Start purging at 15:10
		1.50	7.12	6.39	2,467	16.4	91.9	51.40	
		3.00	7.40	6.31	2,965	16.6	124.3	50.20	
		4.50	7.65	6.30	2,931	16.8	128.8	51.80	
		6.00	7.81	6.31	2,863	16.8	132.6	30.10	
		7.50	8.20	6.29	2,854	16.8	134.1	16.60	
		9.00	8.31	6.29	2,841	16.8	135.6	8.20	
MW-3D	12-Sep-2011	---	6.55	---	---	---	---	---	Start purging at 14:20
		1.50	7.75	6.29	1,780	15.8	87.8	>1000	
		3.00	7.83	6.35	1,788	15.4	70.6	104	
		4.50	7.83	6.39	1,809	15.1	51.3	44.5	
		6.00	7.83	6.39	1,804	15.0	42.7	26.3	
		7.50	7.83	6.4	1,792	14.9	39.1	21.6	
		9.00	7.83	6.4	1,780	14.9	37.9	15.2	
		10.50	7.83	6.4	1,779	14.9	38.2	9.23	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-1S	28-Dec-2011	---	---	---	---	---	---	---	
		1.6	6.38	7.05	926	12.93	93.00	>1000	
		3.2	6.38	7.04	926	13.15	93.00	>1000	
		4.8	6.38	7.02	928	13.21	94.90	>1000	
		6.4	6.38	7.01	930	13.25	95.30	666	
		8.0	6.38	7.00	932	13.30	95.00	413	
		9.6	6.38	6.99	935	13.33	95.10	265	
		11.2	6.38	6.98	936	13.40	96.30	219	
		12.8	6.38	6.97	938	13.40	96.00	67.6	
		14.4	6.38	6.97	939	13.41	96.30	53.7	
		16.0	6.38	6.96	940	13.50	96.40	31	
		17.6	6.38	6.95	942	13.60	96.40	28.8	
		19.2	6.38	6.95	943	13.63	96.50	20.5	
		20.8	6.38	6.95	944	13.61	96.50	18.5	
		22.4	6.38	6.95	944	13.54	96.10	17.1	
		24.0	6.38	6.94	944	13.55	96.60	13.8	
		25.6	6.38	6.94	945	13.55	96.50	11.3	
		27.2	6.38	6.94	946	13.64	96.60	10.3	
MW-1D	28-Dec-2011	---	7.95	---	---	---	---	---	Start purging at 10:50
		1.5	8.80	7.03	859	12.30	-21.20	>1000	
		3.0	9.90	7.05	862	12.89	-22.80	65	
		4.5	10.40	7.00	901	12.79	-20.00	45	
		6.0	10.65	6.97	925	12.61	-18.30	30	
		7.5	10.85	6.96	935	12.62	-17.20	22	
		9.0	10.95	6.96	939	12.64	-17.10	17.2	
		10.5	10.98	6.93	942	12.63	-16.10	12.1	
		13.0	10.98	6.94	937	12.64	-16.30	10.2	
		14.5	10.98	6.93	939	12.63	-17.10	9.8	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-2S	28-Dec-2011	---	1.95	---	---	---	---	---	Start purging at 07:45
		---	1.97	6.82	1,079	9.70	74.0	>1000	
		---	1.95	6.84	1,077	9.72	66.8	299.00	
		---	1.95	6.84	1,071	9.71	59.9	75.9	
		---	1.95	6.85	1,068	9.72	55.7	30.5	
		---	1.95	6.86	1,065	9.79	51.6	15.2	
		---	1.95	6.87	1,066	9.78	51.1	14.8	
		---	1.95	6.86	1,065	9.82	51.0	11.3	
		---	1.95	6.86	1,065	9.90	51.0	8.3	
MW-2D	28-Dec-2011	---	---	---	---	---	---	---	Start purging at 12:40
		---	12.05	6.79	1,058	11.07	-18.9	406.00	
		---	13.70	6.91	1,086	11.94	-40.5	209.00	
		---	15.90	6.97	1,091	12.00	-23.1	13.40	
		---	16.40	6.96	1,093	11.76	-26.1	9.61	
		---	16.90	6.96	1,096	11.20	-33.8	6.85	
		---	17.00	6.94	1,096	10.79	-37.2	6.30	
MW-3S	28-Dec-2011	---	6.28	---	---	---	---	---	Start purging at 13:45
		1.50	6.30	6.25	2,252	10.4	22.0	85.00	
		3.00	7.10	6.22	2,257	10.4	24.2	55.00	
		4.50	7.30	6.24	2,246	10.3	23.1	50.00	
		6.00	7.45	6.22	2,239	10.3	23.8	19.10	
		7.50	7.50	6.23	2,235	10.2	23.8	12.80	
		9.00	7.51	6.23	2,236	10.5	23.7	9.73	
MW-3D	28-Dec-2011	---	6.70	---	---	---	---	---	Start purging at 14:50
		0.25	6.30	6.66	1,301	10.76	-29.0	82.1	
		0.50	6.25	6.7	1,305	10.28	-36.1	60.4	
		0.75	6.25	6.67	1,315	10.01	-32.5	48.5	
		1.00	6.25	6.66	1,324	9.94	-39.6	36.4	
		1.25	6.25	6.66	1,329	9.84	-41.5	25.6	
		1.50	6.25	6.64	1,332	9.79	-41.8	21.3	
		1.75	6.25	6.64	1,331	9.70	-44.1	15.7	
		2.00	6.25	6.64	1,330	9.68	-43.6	13.2	
		2.25	6.25	6.64	1,330	9.57	-43.0	12	
		2.5	6.25	6.63	1,330	9.46	-41.90	10.3	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-1S	13-Apr-2012	---	7.82	---	---	---	---	---	Start purging at 13:05
		1.5	7.82	6.98	1,215	11.45	-15.20	>1000	
		3.0	7.82	6.85	1,203	11.30	-9.40	750	
		6.0	7.82	7.00	1,213	11.09	-16.50	400	
		9.0	7.82	7.02	1,223	11.08	-18.20	85	
		12.0	7.82	7.03	1,226	11.08	-17.30	50	
		16.5	7.82	7.02	1,225	11.03	-17.50	25	
		19.5	7.82	7.03	1,225	11.05	-17.40	16	
		22.5	7.82	7.04	1,227	11.11	-17.90	10	
MW-1D	13-Apr-2012	---	9.12	---	---	---	---	---	Start purging at 14:45
		3.0	9.92	7.16	933	12.60	154.7	240	
		4.5	10.72	7.19	959	12.65	-27.1	210	
		6.0	10.72	7.19	963	12.73	-18.7	150	
		7.5	10.72	7.20	972	12.84	-17.7	130	
		9.0	11.41	7.16	975	12.80	-36.2	90	
		10.5	11.65	7.19	950	12.79	-52.0	80	
		12.0	11.79	7.21	1,001	12.80	-58.9	70	
		13.5	11.91	7.26	1,003	12.82	-65.5	65	
		15.0	11.98	7.29	1,007	12.85	-70.8	55	
		16.5	12.20	8.47	1,011	12.90	-77.8	50	
		18.0	12.17	8.48	1,014	12.94	-85.2	39	
		19.5	12.16	8.50	1,016	12.95	-89.5	36	
		21.0	12.17	8.51	1,017	12.98	-92.3	35	
MW-2S	13-Apr-2012	---	2.39	---	---	---	---	---	Start purging at 12:00
		2.0	2.41	8.83	1,354	9.91	-6.9	75	
		4.0	2.41	6.83	1,359	9.86	-9.1	31	
		6.0	2.42	6.88	1,358	9.88	-9.6	22	
		8.0	2.41	6.90	1,356	9.80	-10.8	9.3	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^{o}C)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-2D	13-Apr-2012	---	10.97	---	---	---	---	---	Start purging at 10:45
		1.50	12.70	6.88	1,305	11.96	-10.10	100	
		3.00	14.20	6.98	1,305	11.86	-13.80	40	
		4.50	14.93	6.95	1,305	11.91	-13.10	34	
		6.00	16.12	6.96	1,305	12.04	-13.40	27	
		7.50	16.60	6.96	1,307	12.13	-13.90	20	
		9.00	16.82	6.97	1,304	12.31	-14.50	14	
		10.50	17.08	6.97	1,306	12.33	-14.60	9.01	
MW-3S	13-Apr-2012	---	6.70	---	---	---	---	---	Start purging at 09:15
		1.40	7.20	6.90	2,479	10.55	2.90	284.00	
		2.80	8.00	7.01	2,474	10.81	2.60	168.00	
		4.20	8.02	6.82	2,472	10.98	-3.30	141.00	
		5.60	8.01	6.81	2,466	10.97	-5.60	155.00	
		7.00	8.01	6.80	2,449	11.07	-5.40	127.00	
		8.40	8.01	6.89	2,440	11.07	-5.70	84.60	
		9.80	8.01	6.91	2,425	11.12	-5.10	67.90	
		11.20	8.02	6.87	2,418	11.18	-5.20	47.50	
		12.60	8.01	7.00	2,411	11.21	-4.90	27.00	
		14.00	8.01	7.02	2,401	11.28	0.20	17.50	
		15.40	8.01	6.80	2,397	11.30	-0.10	13.8	
		16.80	8.01	6.79	2,382	11.35	-1.40	10.1	
		18.20	8.01	6.81	2,368	11.47	-1.50	8.46	
		19.60	8.02	6.80	2,351	11.50	1.00	5.72	

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Table 3-1
Monitoring Well Purging Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID	Purge Date	Volume Purged (liters)	Depth to Groundwater (Feet Below Top of Inner Casing)	pH (Standard Units)	Specific Conductivity (µS/cm)	Temperature (^oC)	Oxidation/Reduction Potential (mV)	Turbidity (NTU)	Observations
MW-3D	13-Apr-2012	---	6.95	---	---	---	---	---	Start purging at 12:52
		1.40	6.95	7.08	1,694	10.64	-33.3	348	
		2.80	6.95	7.08	1,701	10.68	-36.9	137	
		4.20	6.94	7.08	1,710	10.73	-41.6	75.7	
		5.60	6.93	7.07	1,715	10.70	-42.0	48.9	
		7.00	6.92	7.07	1,716	10.69	-42.7	33.9	
		8.40	6.90	7.06	1,719	10.70	-42.4	27.4	
		9.80	6.90	7.04	1,734	10.73	-41.8	19.8	
		11.20	6.89	7.02	1,748	10.75	-41.7	14.5	
		12.60	6.87	7.02	1,749	70.77	-43.7	13.8	
		14.00	6.87	7.01	1,752	10.78	-41.8	11.7	
		15.40	6.89	7.00	1,753	10.78	-42.50	9.8	

Notes:
^oC - degrees Celsius
µS/cm - microsiemens per centimeter
mV - millivolt
NTU - nephelometric turbidity units
--- - value not collected

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Table 4-1
Sediment Sample Results Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

			Location ID	NPL11-SB01		NPL11-SB02	
			Field Sample ID	NPL11-SB-01-061311		NPL11-SB-02-061311	
			Sample Date	6/13/2011		6/13/2011	
Analytical Method	**Chemical Name**	**PRG**	**Unit**	**Result**	**Error**	**Result**	**Error**
EPA 901.1m	RADIUM-226	6.2	pCi/g	1.52	0.201	2.55	0.290

			Location ID	NPL11-SB02-DUP		NPL11-SB03	
			Field Sample ID	NPL11-SB-02-061311-DUP		NPL11-SB-03-061311	
			Sample Date	6/13/2011		6/13/2011	
Analytical Method	**Chemical Name**	**PRG**	**Unit**	**Result**	**Error**	**Result**	**Error**
EPA 901.1m	RADIUM-226	6.2	pCi/g	1.79	0.210	1.30	0.164

			Location ID	NPL11-SB04		NPL11-SB05	
			Field Sample ID	NPL11-SB-04-061311		NPL11-SB-05-061311	
			Sample Date	6/13/2011		6/13/2011	
Analytical Method	**Chemical Name**	**PRG**	**Unit**	**Result**	**Error**	**Result**	**Error**
EPA 901.1m	RADIUM-226	6.2	pCi/g	1.15	0.139	1.38	0.172

Notes:
ID = Identification
pCi/g = picoCuries per gram
PRG = Preliminary remediation goal used is the EPA Maximum Contaminant Level (MCL) under the Safe Drinking Water Act.

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Table 4-2
Groundwater Sample Results Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID		MW-1S											
Field Sample ID		NPL11-MW1S-061611	NPL11-MW1S-061611-FILT	NPL11-MW1S-061611-D	NPL11-MW1S-061611-D-FILT	MW-1S-091211	MW-1S-091211 - FILTERED	NPL11-MW1S-122811	NPL11-MW1S-122811 DIS	NPL11-MW1S-122811-DUP	NPL11-MW1S-122811-DUP DIS	NPL-11-MW-1S-041312	NPL-11-MW-1S-041312 - DISS
Sample Date		6/16/2011	6/16/2011	6/16/2011	6/16/2011	9/12/2011	9/12/2011	12/28/2011	12/28/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG												
RADIUM-226 (pCi/L)	---	0.142 +/- 0.394	0.0746 +/- 0.254	0.235 +/- 0.462	0.135 +/- 0.324	-0.08 +/- 0.351	0.426 +/- 0.449	0.243 +/- 0.517	1.24 +/- 0.834	-0.103 +/- 0.578	0.426 +/- 0.576	0.342 +/- 0.478	0 +/- 0.332
RADIUM-228 (pCi/L)	---	0.418 +/- 0.427	0.829 +/- 0.526	0.736 +/- 0.572	0.568 +/- 0.47	0.721 +/- 0.529	0.546 +/- 0.471	0.367 +/- 0.424	0.382 +/- 0.45	0.721 +/- 0.5	0.344 +/- 0.419	0.333 +/- 0.414	-0.138 +/- 0.366
RADIUM-226+228 (pCi/L)	5	0.56	0.9036	0.971	0.703	0.641	0.972	0.61	1.622	0.618	0.77	0.675	-0.138
TOTAL DISSOLVED SOLIDS (mg/L)	---	802	---	786	---	648	---	636	---	634	---	734	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	11	---	11	---	34.8	---	6.8	---	6.6	---	3.6	---

Location ID		MW-1D							
Field Sample ID		NPL11-MW1D-061711	NPL11-MW1D-061711-FILT	MW-1D-091211	MW-1D-091211 - FILTERED	NPL11-MW1D-122811	NPL11-MW1D-122811 DIS	NPL11-MW-1D-041312	NPL11-MW-1D-041312 - DISS
Sample Date		6/16/2011	6/17/2011	9/12/2011	9/12/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG								
RADIUM-226 (pCi/L)	---	0.339 +/- 0.445	0.611 +/- 0.462	0.64 +/- 0.656	1.27 +/- 0.822	1.1 +/- 0.824	1.4 +/- 0.837	0.901 +/- 0.589	1.62 +/- 0.806
RADIUM-228 (pCi/L)	---	1.35 +/- 0.56	1.42 +/- 0.556	0.471 +/- 0.482	0.918 +/- 0.544	1.09 +/- 0.49	1.15 +/- 0.508	0.597 +/- 0.486	1.24 +/- 0.515
RADIUM-226+228 (pCi/L)	5	1.689	2.031	1.111	2.188	2.19	2.55	1.498	2.86
TOTAL DISSOLVED SOLIDS (mg/L)	---	686	---	584	---	626	---	630	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	30.4	---	11.1	---	14	---	12	---

Location ID		MW-2S									
Field Sample ID		NPL11-MW2S-061711	NPL11-MW2S-061711-FILT	MW-2S-091211	MW-2S-091211 - FILTERED	MW-2S-091211-DUP	MW-2S-091211-DUP - FILTERED	NPL11-MW2S-122811	NPL11-MW2S-122811 DIS	NPL-11-MW-2S-041312	NPL-11-MW-2S-041312 - DISS
Sample Date		6/17/2011	6/17/2011	9/12/2011	9/12/2011	9/12/2011	9/12/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG										
RADIUM-226 (pCi/L)	---	0.135 +/- 0.326	-0.063 +/- 0.213	0.354 +/- 0.372	0.132 +/- 0.411	0.483 +/- 0.482	0.311 +/- 0.293	0.256 +/- 0.589	0.481 +/- 0.68	0.238 +/- 0.273	0.273 +/- 0.537
RADIUM-228 (pCi/L)	---	1.25 +/- 0.51	1.2 +/- 0.505	0.744 +/- 0.495	0.909 +/- 0.533	2.86 +/- 1.93	1.04 +/- 0.534	0.872 +/- 0.506	0.685 +/- 0.455	0.251 +/- 0.42	0.893 +/- 0.488
RADIUM-226+228 (pCi/L)	5	1.385	1.137	1.098	1.041	3.343	1.351	1.128	1.166	0.489	1.166
TOTAL DISSOLVED SOLIDS (mg/L)	---	708	---	848	---	854	---	736	---	810	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	3.6	---	11.3	---	14.3	---	8	---	6	---

Location ID		MW-2D							
Field Sample ID		NPL11-MW2D-061711	NPL11-MW2D-061711-FILT	MW-2D-091211	MW-2D-091211 - FILTERED	NPL11-MW2D-122811	NPL11-MW2D-122811 DIS	NPL-11-MW-2D-041312	NPL-11-MW-2D-041312 - DISS
Sample Date		6/17/2011	6/17/2011	9/12/2011	9/12/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG								
RADIUM-226 (pCi/L)	---	0.828 +/- 0.68	0.524 +/- 0.418	0.885 +/- 0.573	0.161 +/- 0.226	0.638 +/- 0.731	0.843 +/- 0.787	0.358 +/- 0.337	0.798 +/- 0.605
RADIUM-228 (pCi/L)	---	1.36 +/- 0.552	0.755 +/- 0.441	1.16 +/- 0.578	0.617 +/- 0.512	0.594 +/- 0.406	1.04 +/- 0.471	0.864 +/- 0.525	1.14 +/- 0.52
RADIUM-226+228 (pCi/L)	5	2.188	1.279	2.045	0.778	1.232	1.883	1.222	1.938
TOTAL DISSOLVED SOLIDS (mg/L)	---	694	---	778	---	714	---	766	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	10.4	---	41	---	12	---	88	---

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Table 4-2
Groundwater Sample Results Summary
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Location ID		MW-3S									
Field Sample ID		NPL11-MW3S-061611	NPL11-MW3S-061611-FILT	MW-3S-091211	MW-3S-091211 - FILTERED	NPL11-MW3S-122811	NPL11-MW3S-122811 DIS	NPL11-MW-3S-041312	NPL11-MW-3S-041312 - DISS	NPL11-MW-3S-041312D	NPL11-MW-3S-041312D - DISS
Sample Date		6/16/2011	6/16/2011	9/12/2011	9/12/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG										
RADIUM-226 (pCi/L)	---	0.355 +/- 0.438	0.512 +/- 0.485	0.552 +/- 0.421	-0.13 +/- 0.46	0.478 +/- 0.668	-0.067 +/- 0.543	0.36 +/- 0.429	0.144 +/- 0.283	0.0677 +/- 0.297	0 +/- 0.269
RADIUM-228 (pCi/L)	---	0.858 +/- 0.501	0.553 +/- 0.442	-0.189 +/- 0.396	0.433 +/- 0.471	0.178 +/- 0.446	1.04 +/- 0.546	0.0067 +/- 0.367	-0.034 +/- 0.393	0.0286 +/- 0.427	0.292 +/- 0.414
RADIUM-226+228 (pCi/L)	5	1.213	1.065	0.363	0.303	0.656	0.973	0.3667	0.11	0.0963	0.292
TOTAL DISSOLVED SOLIDS (mg/L)	---	1870	---	2460	---	1950	---	1970	---	1980	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	118	---	56.4	---	2.8	---	16.6	---	7.9	---

Location ID		MW-3D							
Field Sample ID		NPL11-MW3D-061711	NPL11-MW3D-061711-FILT	MW-3D-091211	MW-3D-091212 - FILTERED	NPL11-MW3D-122811	NPL11-MW3D-122811 DIS	NPL11-MW-3D-041312	NPL11-MW-3D-041312 - DISS
Sample Date		6/17/2011	6/17/2011	9/12/2011	9/12/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG								
RADIUM-226 (pCi/L)	---	0.572 +/- 0.542	0.215 +/- 0.316	0.389 +/- 0.427	0.168 +/- 0.364	0.584 +/- 0.715	0.513 +/- 0.794	-0.125 +/- 0.247	0.16 +/- 0.51
RADIUM-228 (pCi/L)	---	0.991 +/- 0.529	0.787 +/- 0.509	0.451 +/- 0.459	0.894 +/- 0.469	1.07 +/- 0.547	1.18 +/- 0.556	0.902 +/- 0.535	0.29 +/- 0.411
RADIUM-226+228 (pCi/L)	5	1.563	1.002	0.84	1.062	1.654	1.693	0.777	0.45
TOTAL DISSOLVED SOLIDS (mg/L)	---	1490	---	1090	---	1110	---	1710	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	60.3	---	44.7	---	28.4	---	19.6	---

Location ID		RINSE BLANK					
Field Sample ID		NPL11-RB-091211	NPL11-RB-091211 - FILTERED	NPL11-RB-122811	NPL11-RB-122811 DIS	NPL-11-RB-041312	NPL-11-RB-041312 - DISS
Sample Date		9/12/2011	9/12/2011	12/28/2011	12/28/2011	4/13/2012	4/13/2012
Sample Description		Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
Parameter	PRG						
RADIUM-226 (pCi/L)	---	0.0974 +/- 0.455	2.23 +/- 1.04	-0.236 +/- 0.519	-0.099 +/- 0.556	0.0678 +/- 0.298	-0.211 +/- 0.242
RADIUM-228 (pCi/L)	---	0.494 +/- 0.479	-0.0469 +/- 0.449	0.258 +/- 0.403	0.782 +/- 0.432	-0.202 +/- 0.356	0.142 +/- 0.362
RADIUM-226+228 (pCi/L)	5	0.5914	2.1831	0.022	0.683	-0.1342	-0.069
TOTAL DISSOLVED SOLIDS (mg/L)	---	---	---	20 U	---	20	---
TOTAL SUSPENDED SOLIDS (mg/L)	---	1.1 U	---	2 U	---	1.4	---

Notes;
DIS/DISS = dissolved
DUP = duplicate
ID = Identification
mg/L = milligrams per liter
pCi/L = picoCuries per Liter
PRG = Preliminary remediation goal used is the EPA Maximum Contaminant Level (MCL) under the Safe Drinking Water Act.

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Table 4-3
Radon Sample Results
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

		Location:	355 Bellevue		355 Bellevue		355 Bellevue		355 Bellevue	
		Starting Date	6/13/2011		6/13/2011		12/12/2013		12/12/2013	
		Ending Date	10/20/2011		10/20/2011		4/9/2014		4/9/2014	
		Location	Crawl Space		Kitchen		Crawl Space		Kitchen	
Chemical Name	**PRG**	**Unit**	**Result**	**Error**	**Result**	**Error**	**Result**	**Error**	**Result**	**Error**
Radium-226	4	pCi/L	1.3	+/- 0.822	1.1	+/- 0.07	2.4	+/- 0.13	2.1	+/- 0.12

Notes:
ID = Identification
pCi/L = picoCuries per liter
PRG = Preliminary remediation goal used is the non-regulatory value for radon-222 gas of 4 pCi/L

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Table 4-4
Investigation-Derived Waste Sample Results
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

		Field Sample ID	NPL11-DISPOSAL-061711		NPL11-121213
		Sample Date	6/17/2011		12/12/2013
Chemical Name	**Criteria[1]**	**Unit**	**Result**	**Error**	**Result**
Radium-226	6.2	pCi/g	**1.57**	**0.236**	---
Total Metals					
Aluminum	NA	mg/kg	**13,600**		---
Antimony	ND	mg/kg	2.2 U		---
Arsenic	29	mg/kg	**5.2**		---
Barium	1,700	mg/kg	**62**		---
Beryllium	140	mg/kg	**0.82**		---
Cadmium	11	mg/kg	**0.61**		---
Calcium	NA	mg/kg	**6,370**		---
Chromium	36	mg/kg	**20.8**		---
Cobalt	NA	mg/kg	**9.3**		---
Copper	200,000	mg/kg	**15.2**		---
Iron	NA	mg/kg	**16,800**		---
Lead	107	mg/kg	**16.2**		---
Magnesium	NA	mg/kg	**4,580**		---
Manganese	NA	mg/kg	**414**		---
Mercury	3.3	mg/kg	**0.019**		---
Nickel	180	mg/kg	**26.5**		---
Potassium	NA	mg/kg	**2,600**		---
Selenium	ND	mg/kg	2.2 U		---
Silver	ND	mg/kg	1.1 U		---
Sodium	ND	mg/kg	108 U		---
Thallium	ND	mg/kg	4.3 U		---
Vanadium	980	mg/kg	**30.7**		---
Zinc	7,500	mg/kg	**56.1**		---
TCLP Metals					
Arsenic	ND	mg/L	0.05 U		---
Barium	ND	mg/L	0.5 U		---
Cadmium	ND	mg/L	0.005 U		---
Chromium	ND	mg/L	0.05 U		---
Lead	ND	mg/L	0.0075 U		---
Mercury	ND	ug/L	0.2 U		---
Selenium	ND	mg/L	0.05 U		---
Silver	ND	mg/L	0.05 U		---
TCLP Pesticides/Herbicides					
Chlordane (Technical), TCLP	ND	ug/L	---		10 U
Endrin, TCLP	ND	ug/L	---		1 U
gamma-BHC (Lindane), TCLP	ND	ug/L	---		0.5 U
Heptachlor epoxide, TCLP	ND	ug/L	---		0.5 U
Methoxychlor, TCLP	ND	ug/L	---		5 U
Toxaphene, TCLP	ND	ug/L	---		30 U
2,4,5-TP (Silvex), TCLP	ND	mg/L	---		0.02 U
2,4-D, TCLP	ND	mg/L	---		0.02 U
PCBs					
PCB, Total	ND	ug/kg	---		70.3 U
PCB-1016 (Aroclor 1016)	ND	ug/kg	---		70.3 U
PCB-1221 (Aroclor 1221)	ND	ug/kg	---		70.3 U
PCB-1232 (Aroclor 1232)	ND	ug/kg	---		70.3 U
PCB-1242 (Aroclor 1242)	ND	ug/kg	---		70.3 U
PCB-1248 (Aroclor 1248)	ND	ug/kg	---		70.3 U
PCB-1254 (Aroclor 1254)	ND	ug/kg	---		70.3 U
PCB-1260 (Aroclor 1260)	ND	ug/kg	---		70.3 U

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Table 4-4
Investigation-Derived Waste Sample Results
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

		Field Sample ID	NPL11-DISPOSAL-061711		NPL11-121213
		Sample Date	6/17/2011		12/12/2013
Chemical Name	**Criteria[1]**	**Unit**	**Result**	**Error**	**Result**
Semivolatile Organic Compounds					
Acenaphthene	ND	ug/kg	196 U		---
Acenaphthylene	ND	ug/kg	196 U		---
Anthracene	ND	ug/kg	196 U		---
Benzo(a)anthracene	ND	ug/kg	196 U		---
Benzo(a)pyrene	ND	ug/kg	196 U		---
Benzo(b)fluoranthene	ND	ug/kg	196 U		---
Benzo(g,h,i)perylene	ND	ug/kg	196 U		---
Benzo(k)fluoranthene	ND	ug/kg	196 U		---
4-Bromophenylphenyl ether	ND	ug/kg	196 U		---
Butylbenzylphthalate	ND	ug/kg	196 U		---
Carbazole	ND	ug/kg	196 U		---
4-Chloro-3-methylphenol	ND	ug/kg	196 U		---
4-Chloroaniline	ND	ug/kg	391 U		---
bis(2-Chloroethoxy)methane	ND	ug/kg	196 U		---
bis(2-Chloroethyl) ether	ND	ug/kg	196 U		---
2-Chloronaphthalene	ND	ug/kg	196 U		---
2-Chlorophenol	ND	ug/kg	196 U		---
4-Chlorophenylphenyl ether	ND	ug/kg	196 U		---
Chrysene	ND	ug/kg	196 U		---
Dibenz(a,h)anthracene	ND	ug/kg	196 U		---
Dibenzofuran	ND	ug/kg	196 U		---
1,2-Dichlorobenzene	ND	ug/kg	196 U		---
1,3-Dichlorobenzene	ND	ug/kg	196 U		---
1,4-Dichlorobenzene	ND	ug/kg	196 U		---
3,3'-Dichlorobenzidine	ND	ug/kg	196 U		---
2,4-Dichlorophenol	ND	ug/kg	196 U		---
Diethylphthalate	ND	ug/kg	196 U		---
2,4-Dimethylphenol	ND	ug/kg	196 U		---
Dimethylphthalate	ND	ug/kg	196 U		---
Di-n-butylphthalate	ND	ug/kg	196 U		---
4,6-Dinitro-2-methylphenol	ND	ug/kg	196 U		---
2,4-Dinitrophenol	ND	ug/kg	782 U		---
2,4-Dinitrotoluene	ND	ug/kg	196 U		---
2,6-Dinitrotoluene	ND	ug/kg	196 U		---
Di-n-octylphthalate	ND	ug/kg	196 U		---
bis(2-Ethylhexyl)phthalate	ND	ug/kg	196 U		---
Fluoranthene	ND	ug/kg	196 U		---
Fluorene	ND	ug/kg	196 U		---
Hexachloro-1,3-butadiene	ND	ug/kg	196 U		---
Hexachlorobenzene	ND	ug/kg	196 U		---
Hexachlorocyclopentadiene	ND	ug/kg	196 U		---
Hexachloroethane	ND	ug/kg	196 U		---
Indeno(1,2,3-cd)pyrene	ND	ug/kg	196 U		---
Isophorone	ND	ug/kg	196 U		---
2-Methylnaphthalene	ND	ug/kg	196 U		---
2-Methylphenol(o-Cresol)	ND	ug/kg	196 U		---
3&4-Methylphenol(m&p Cresol)	ND	ug/kg	196 U		---
Naphthalene	ND	ug/kg	196 U		---
2-Nitroaniline	ND	ug/kg	196 U		---
3-Nitroaniline	ND	ug/kg	196 U		---
4-Nitroaniline	ND	ug/kg	196 U		---

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Table 4-4
Investigation-Derived Waste Sample Results
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

		Field Sample ID	NPL11-DISPOSAL-061711		NPL11-121213
		Sample Date	6/17/2011		12/12/2013
Chemical Name	**Criteria[1]**	**Unit**	**Result**	**Error**	**Result**
Nitrobenzene	ND	ug/kg	196	U	---
2-Nitrophenol	ND	ug/kg	196	U	---
4-Nitrophenol	ND	ug/kg	196	U	---
N-Nitroso-di-n-propylamine	ND	ug/kg	196	U	---
N-Nitrosodiphenylamine	ND	ug/kg	196	U	---
2,2'-Oxybis(1-chloropropane)	ND	ug/kg	196	U	---
Pentachlorophenol	ND	ug/kg	387	U	---
Phenanthrene	ND	ug/kg	196	U	---
Phenol	ND	ug/kg	196	U	---
Pyrene	ND	ug/kg	196	U	---
1,2,4-Trichlorobenzene	ND	ug/kg	196	U	---
2,4,5-Trichlorophenol	ND	ug/kg	196	U	---
2,4,6-Trichlorophenol	ND	ug/kg	196	U	---
Volatile Organic Compounds					
Acetone	ND	ug/kg	23.4	U	---
Benzene	ND	ug/kg	5.9	U	---
Bromodichloromethane	ND	ug/kg	5.9	U	---
Bromoform	ND	ug/kg	5.9	U	---
Bromomethane	ND	ug/kg	5.9	U	---
2-Butanone (MEK)	ND	ug/kg	23.4	U	---
Carbon disulfide	ND	ug/kg	5.9	U	---
Carbon tetrachloride	ND	ug/kg	5.9	U	---
Chlorobenzene	ND	ug/kg	5.9	U	---
Chloroethane	ND	ug/kg	5.9	U	---
Chloroform	ND	ug/kg	5.9	U	---
Chloromethane	ND	ug/kg	5.9	U	---
Dibromochloromethane	ND	ug/kg	5.9	U	---
1,1-Dichloroethane	ND	ug/kg	5.9	U	---
1,2-Dichloroethane	ND	ug/kg	5.9	U	---
1,1-Dichloroethene	ND	ug/kg	5.9	U	---
cis-1,2-Dichloroethene	ND	ug/kg	5.9	U	---
trans-1,2-Dichloroethene	ND	ug/kg	5.9	U	---
1,2-Dichloropropane	ND	ug/kg	5.9	U	---
cis-1,3-Dichloropropene	ND	ug/kg	5.9	U	---
trans-1,3-Dichloropropene	ND	ug/kg	5.9	U	---
Ethylbenzene	ND	ug/kg	5.9	U	---
2-Hexanone	ND	ug/kg	5.9	U	---
Methylene Chloride	20	ug/kg	**15.6**		---
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	5.9	U	---
Methyl-tert-butyl ether	ND	ug/kg	5.9	U	---
Styrene	ND	ug/kg	5.9	U	---
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.9	U	---
Tetrachloroethene	ND	ug/kg	5.9	U	---
Toluene	ND	ug/kg	5.9	U	---
1,1,1-Trichloroethane	ND	ug/kg	5.9	U	---
1,1,2-Trichloroethane	ND	ug/kg	5.9	U	---
Trichloroethene	ND	ug/kg	5.9	U	---
Vinyl chloride	ND	ug/kg	5.9	U	---
Xylene (Total)	ND	ug/kg	17.6	U	---

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Table 4-4
Investigation-Derived Waste Sample Results
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

		Field Sample ID	NPL11-DISPOSAL-061711		NPL11-121213
		Sample Date	6/17/2011		12/12/2013
Chemical Name	**Criteria[1]**	**Unit**	**Result**	**Error**	**Result**
Total Cyanide					
Cyanide	ND	mg/kg	0.47	U	---
Total Sulfide					
Sulfide	ND	mg/kg	58.6	U	---
Corrosivity					
pH at 25 Degrees C	<2 or >12	Std. Units	**7**		---

NOTES:

[1]The analytical results for radium-226 were compared to the health-based surface soil standard for radium-226 of 6.2 pCi/g. Analytical results for TCLP metals, corrosivity, cyanide, and sulfide were compared to the hazardous waste criteria outlined in 40 CFR, Part 261, Subpart C. Analytical results for total metals, VOCs, and SVOCs were compared with the IEPA Tier 1 Soil Remediation Objectives for Residential Properties.
--- = Not analyzed
Bolded values indicated a result above the detection limit.
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
NA = not applicable; no associated criteria for this substance
ND = not detected, criteria not applicable
pCi/g = picoCuries per gram
PCB = polychlorinated biphenyl
U = not detected; the associated numerical value is the detection limit
ug/kg = micrograms per kilogram
ug/L = micrograms per liter

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Table 5-1
Water Table Surface Elevation Data
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Monitoring Well	Ground Surface Elevation (feet AMSL)	Top of PVC Elevation (feet AMSL)	Depth to Groundwater (June 2011) (feet)	Depth to Groundwater (September 2011) (feet)	Depth to Groundwater (December 2011) (feet)	Depth to Groundwater (April 2012) (feet)
MW-1S	498.73	498.33	5.53	7.16	6.38	6.71
MW-1D	498.58	498.03	6.64	8.45	7.15	7.69
MW-2S	493.36	493.07	1.12	3.69	1.90	2.37
MW-2D	493.50	493.19	8.92	12.19	11.79	10.83
MW-3S	493.84	493.55	4.98	6.62	6.70	6.03
MW-3D	494.02	493.66	5.17	6.79	7.30	6.14

Notes:
Reference elevation is the top of the inner (PVC) well casing.
Vertical datum is NAVD 88.
AMSL - above mean sea level

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Table 5-1
Water Table Surface Elevation Data
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Monitoring Well	Ground Surface Elevation (feet AMSL)	Top of PVC Elevation (feet AMSL)	Groundwater Surface Elevation (June 2011) (feet AMSL)	Groundwater Surface Elevation (September 2011) (feet AMSL)	Groundwater Surface Elevation (December 2011) (feet AMSL)	Groundwater Surface Elevation (April 2012) (feet AMSL)
MW-1S	498.73	498.33	492.80	491.17	491.95	491.62
MW-1D	498.58	498.03	491.39	489.58	490.88	490.34
MW-2S	493.36	493.07	491.95	489.38	491.17	490.70
MW-2D	493.50	493.19	484.27	481.00	481.40	482.36
MW-3S	493.84	493.55	488.57	486.93	486.85	487.52
MW-3D	494.02	493.66	488.49	486.87	486.36	487.52

Notes:
Reference elevation is the top of the inner (PVC) well casing.
Vertical datum is NAVD 88.
AMSL - above mean sea level

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Table 5-2
Hydraulic Conductivity Testing Results
Ottawa Radiation Areas NPL-11 Site
Ottawa, LaSalle County, Illinois

Bouwer and Rice Method for Hydraulic Conductivity			
Monitoring Well ID	**Falling Head Test (cm/sec)**	**Rising Head Test (cm/sec)**	**Mean (cm/sec)**
MW-01S	5.73E-06	9.04E-02	4.52E-02
MW-02S	3.87E-05	5.07E-02	2.54E-02
MW-03S	9.58E-05	8.30E-04	4.63E-04
		Average	2.37E-02
		Geometric Mean	8.10E-03
Bouwer and Rice Method for Hydraulic Conductivity			
Monitoring Well ID	**Falling Head Test (cm/sec)**	**Rising Head Test (cm/sec)**	**Mean (cm/sec)**
MW-01D	3.95E-04	1.66E-04	2.81E-04
MW-02D	1.08E-04	3.75E-03	1.93E-03
MW-03D	8.47E-05	9.38E-04	5.11E-04
		Average	9.07E-04
		Geometric Mean	6.52E-04

Notes:
cm/sec = Centimeters per second
ID = Identification

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APPENDIX A
PHOTOGRAPHIC DOCUMENTATION

Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 1 **Date:** 6/13/11
Direction: South **Photographer:** Tim Walls
Subject: Drillers set up at monitoring well location MW-1D

Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 2 **Date:** 6/13/11
Direction: West **Photographer:** Tim Walls
Subject: Goose Creek

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Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 3 **Date:** 6/13/11
Direction: West **Photographer:** Tim Walls
Subject: Goose Creek

Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 4 **Date:** 6/13/11
Direction: Down **Photographer:** Tim Walls
Subject: Location of sediment sample NPL11-SB01

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Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 5 **Date:** 6/14/11
Direction: West **Photographer:** Tim Walls
Subject: Drilling at monitoring well location MW-2D

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Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 6 **Date:** 6/14/11
Direction: East **Photographer:** Tim Walls
Subject: Drilling at monitoring well location MW-3D

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Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 7 **Date:** 6/17/11
Direction: Southwest **Photographer:** Tim Walls
Subject: Completed monitoring wells MW-3D and MW-3S

Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 8 **Date:** 6/17/11
Direction: Southwest **Photographer:** Tim Walls
Subject: Completed monitoring wells MW-2D and MW-2S

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Site: Ottawa Radiation Areas NPL-11 Site
Photograph No.: 9 **Date:** 6/17/11
Direction: South **Photographer:** Tim Walls
Subject: Completed monitoring wells MW-1D and MW-1S

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APPENDIX B
SEDIMENT SAMPLE LABORATORY ANALYTICAL AND DATA VALIDATION REPORTS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

July 27, 2011

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4047149

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory between June 16, 2011 and June 17, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel

laurie.woelfel@pacelabs.com
Project Manager

Enclosures

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1241 Bellevue Street - Suite 9
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(920)469-2436

CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4047149

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

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SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4047149

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4047149001	**NPL11-SB-05-061311**	Solid	06/13/11 13:50	06/16/11 10:00
4047149002	**NPL11-SB-04-061311**	Solid	06/13/11 14:00	06/16/11 10:00
4047149003	**NPL11-SB-03-061311**	Solid	06/13/11 14:10	06/16/11 10:00
4047149004	**NPL11-SB-02-061311**	Solid	06/13/11 14:18	06/16/11 10:00
4047149005	**NPL11-SB-02-061311-DUP**	Solid	06/13/11 14:18	06/17/11 09:27
4047149006	**NPL11-SB-01-061311**	Solid	06/13/11 14:25	06/16/11 10:00

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4047149

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4047149001	**NPL11-SB-05-061311**	EPA 901.1m	AEH	2	PASI-PA
4047149002	**NPL11-SB-04-061311**	EPA 901.1m	AEH	2	PASI-PA
4047149003	**NPL11-SB-03-061311**	EPA 901.1m	AEH	2	PASI-PA
4047149004	**NPL11-SB-02-061311**	EPA 901.1m	AEH	2	PASI-PA
4047149005	**NPL11-SB-02-061311-DUP**	EPA 901.1m	AEH	2	PASI-PA
4047149006	**NPL11-SB-01-061311**	EPA 901.1m	AEH	2	PASI-PA

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-05-061311 **Lab ID: 4047149001** Collected: 06/13/11 13:50 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.38 ± 0.172 (0.0880)**	pCi/g	07/12/11 11:23	13982-63-3	
Radium-228	EPA 901.1m	**0.819 ± 0.150 (0.096)**	pCi/g	07/12/11 11:23	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-04-061311 **Lab ID: 4047149002** Collected: 06/13/11 14:00 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.15 ± 0.139 (0.0770)**	pCi/g	07/12/11 12:45	13982-63-3	
Radium-228	EPA 901.1m	**0.567 ± 0.116 (0.114)**	pCi/g	07/12/11 12:45	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-03-061311 **Lab ID: 4047149003** Collected: 06/13/11 14:10 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.30 ± 0.164 (0.104)**	pCi/g	07/12/11 14:01	13982-63-3	
Radium-228	EPA 901.1m	**0.731 ± 0.163 (0.154)**	pCi/g	07/12/11 14:01	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-02-061311 **Lab ID: 4047149004** Collected: 06/13/11 14:18 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**2.55 ± 0.290 (0.0990)**	pCi/g	07/12/11 15:57	13982-63-3	
Radium-228	EPA 901.1m	**0.779 ± 0.171 (0.154)**	pCi/g	07/12/11 15:57	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-02-061311-DUP **Lab ID: 4047149005** Collected: 06/13/11 14:18 Received: 06/17/11 09:27 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.79 ± 0.210 (0.0950)**	pCi/g	07/13/11 08:27	13982-63-3	
Radium-228	EPA 901.1m	**0.604 ± 0.146 (0.126)**	pCi/g	07/13/11 08:27	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-01-061311 **Lab ID: 4047149006** Collected: 06/13/11 14:25 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.52 ± 0.201 (0.133)**	pCi/g	07/13/11 09:29	13982-63-3	
Radium-228	EPA 901.1m	**1.11 ± 0.215 (0.189)**	pCi/g	07/13/11 09:29	15262-20-1	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047149

QC Batch: RADC/8688 Analysis Method: EPA 901.1m
QC Batch Method: EPA 901.1m Analysis Description: 901.1 Gamma Spec
Associated Lab Samples: 4047149001, 4047149002, 4047149003, 4047149004, 4047149005, 4047149006

METHOD BLANK: 311155 Matrix: Solid
Associated Lab Samples: 4047149001, 4047149002, 4047149003, 4047149004, 4047149005, 4047149006

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.001000 ± 0.0540 (0.105)	pCi/g	07/13/11 10:31	
Radium-228	-0.018 ± 0.132 (0.162)	pCi/g	07/13/11 10:31	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4047149

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

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OTTAWA OU2 NPL-11 SITE
OTTAWA, ILLINOIS
DATA VALIDATION REPORT

Date: August 15, 2011
Laboratory: Pace Analytical (Pace), Green Bay, Wisconsin
Laboratory Project #: 4047149
Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)
Weston Analytical TDD/Work Order #: S05-0008-1101-006/20405.016.008.1347.00

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for six soil samples collected for the Ottawa OU2 NPL-11 Site that were analyzed for the following parameters and methods:

- Radium-226 and Radium-228 by United States Environmental Protection Agency (U.S. EPA)Method 901.1m

A level II data package was requested from Pace. The data validation was conducted in general accordance with the U.S. EPA "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" dated January 2010 and the U.S. Department of Energy "Evaluation of Radiochemical Data Usability" dated April 1997. The Attachment contains the results summary sheets.

RADIUM 226 AND RADIUM 228 BY U.S. EPA METHOD 901.1m

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-SB-05-061311	4047149001	Soil	6/13/2011	7/12/2011
NPL11-SB-04-061311	4047149002	Soil	6/13/2011	7/12/2011
NPL11-SB-03-061311	4047149003	Soil	6/13/2011	7/12/2011
NPL11-SB-02-061311	4047149004	Soil	6/13/2011	7/12/2011
NPL11-SB-02-061311-DUP	4047149005	Soil	6/13/2011	7/13/2011
NPL11-SB-01-061311	4047149006	Soil	6/13/2011	7/13/2011

2. Holding Times

The samples were analyzed within the required holding time limit of 180 days from sample collection to analysis.

3. Blank Results

A method blank was analyzed with the samples and was method blank result is less than its minimum detectable concentration (MDC) as required.

4. Field Duplicate Results

Sample NPL11-SB-02-061311-DUP is a field duplicate of sample NPL11-SB-02-061311. There is no set QC limit for field duplicates; however, a standard QC limit of 50 relative percent difference (RPD) or less is typically used. The RPDs were calculated and were 35 percent for Radium-226 and 25 percent for Radium-228. These RPDs were acceptable indicating good correlation between the two samples.

5. Overall Assessment

The Radium 226 and Radium 228 data are acceptable for use based on the information received.

ATTACHMENT

PACE ANALYTICAL
RESULTS SUMMARY

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-05-061311 **Lab ID: 4047149001** Collected: 06/13/11 13:50 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.38 ± 0.172 (0.0880)**	pCi/g	07/12/11 11:23	13982-63-3	
Radium-228	EPA 901.1m	**0.819 ± 0.150 (0.096)**	pCi/g	07/12/11 11:23	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-04-061311 **Lab ID: 4047149002** Collected: 06/13/11 14:00 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.15 ± 0.139 (0.0770)**	pCi/g	07/12/11 12:45	13982-63-3	
Radium-228	EPA 901.1m	**0.567 ± 0.116 (0.114)**	pCi/g	07/12/11 12:45	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-03-061311 **Lab ID: 4047149003** Collected: 06/13/11 14:10 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.30 ± 0.164 (0.104)**	pCi/g	07/12/11 14:01	13982-63-3	
Radium-228	EPA 901.1m	**0.731 ± 0.163 (0.154)**	pCi/g	07/12/11 14:01	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-02-061311 **Lab ID: 4047149004** Collected: 06/13/11 14:18 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**2.55 ± 0.290 (0.0990)**	pCi/g	07/12/11 15:57	13982-63-3	
Radium-228	EPA 901.1m	**0.779 ± 0.171 (0.154)**	pCi/g	07/12/11 15:57	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-02-061311-DUP **Lab ID: 4047149005** Collected: 06/13/11 14:18 Received: 06/17/11 09:27 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.79 ± 0.210 (0.0950)**	pCi/g	07/13/11 08:27	13982-63-3	
Radium-228	EPA 901.1m	**0.604 ± 0.146 (0.126)**	pCi/g	07/13/11 08:27	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047149

Sample: NPL11-SB-01-061311 **Lab ID: 4047149006** Collected: 06/13/11 14:25 Received: 06/16/11 10:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.52 ± 0.201 (0.133)**	pCi/g	07/13/11 09:29	13982-63-3	
Radium-228	EPA 901.1m	**1.11 ± 0.215 (0.189)**	pCi/g	07/13/11 09:29	15262-20-1	

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APPENDIX C
GROUNDWATER SAMPLE LABORATORY ANALYTICAL AND DATA VALIDATION REPORTS

Pace Analytical Services, Inc.
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Green Bay, WI 54302
(920)469-2436

July 12, 2011

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4047261

Dear Lisa Graczck/Dynamac:

Enclosed are the analytical results for sample(s) received by the laboratory between June 20, 2011 and June 21, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel

laurie.woelfel@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4047261

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
California Certification #: 09268CA
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

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SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4047261

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4047261001	**NPL11-MW2S-061711**	Water	06/17/11 08:30	06/20/11 13:45
4047261002	**NPL11-MW2D-061711**	Water	06/17/11 09:50	06/20/11 13:45
4047261003	**NPL11-MW2S-061711-FILT**	Water	06/17/11 08:30	06/21/11 09:50
4047261004	**NPL11-MW2D-061711-FILT**	Water	06/17/11 09:50	06/21/11 09:50

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4047261

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4047261001	**NPL11-MW2S-061711**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047261002	**NPL11-MW2D-061711**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047261003	**NPL11-MW2S-061711-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
4047261004	**NPL11-MW2D-061711-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2S-061711 **Lab ID: 4047261001** Collected: 06/17/11 08:30 Received: 06/20/11 13:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**708**	mg/L	20.0	1		06/21/11 15:26		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**3.6**	mg/L	1.4	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2D-061711 **Lab ID: 4047261002** Collected: 06/17/11 09:50 Received: 06/20/11 13:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**694**	mg/L	20.0	1		06/21/11 15:27		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**10.4**	mg/L	2.0	1		06/21/11 13:55		

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047261

QC Batch: WET/9186 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4047261001, 4047261002

METHOD BLANK: 466703 | Matrix: Water
Associated Lab Samples: 4047261001, 4047261002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	20.0	06/21/11 15:19	

LABORATORY CONTROL SAMPLE: 466704

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1200	1190	99	80-120	

SAMPLE DUPLICATE: 466705

Parameter	Units	4047261002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	694	720	4	10	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047261

QC Batch: WET/9184 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4047261001, 4047261002

METHOD BLANK: 466587 | Matrix: Water
Associated Lab Samples: 4047261001, 4047261002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	1.0	06/21/11 13:55	

LABORATORY CONTROL SAMPLE: 466588

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	96.6	86.0	89	80-120	

SAMPLE DUPLICATE: 466589

Parameter	Units	4047263003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	118	123	4	10	

SAMPLE DUPLICATE: 466590

Parameter	Units	4047264001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	60.3	63.0	4	10	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2S-061711 **Lab ID: 4047261001** Collected: 06/17/11 08:30 Received: 06/20/11 13:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.135 ± 0.326 (0.629)**	pCi/L	07/06/11 13:55	13982-63-3	
Radium-228	EPA 904.0	**1.25 ± 0.510 (0.806)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2D-061711 **Lab ID: 4047261002** Collected: 06/17/11 09:50 Received: 06/20/11 13:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.828 ± 0.680 (0.374)**	pCi/L	07/06/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**1.36 ± 0.552 (0.784)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2S-061711-FILT **Lab ID: 4047261003** Collected: 06/17/11 08:30 Received: 06/21/11 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.063 ± 0.213 (0.581)**	pCi/L	07/06/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**1.20 ± 0.505 (0.811)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2D-061711-FILT **Lab ID: 4047261004** Collected: 06/17/11 09:50 Received: 06/21/11 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.524 ± 0.418 (0.482)**	pCi/L	07/06/11 14:26	13982-63-3	
Radium-228	EPA 904.0	**0.755 ± 0.441 (0.795)**	pCi/L	07/05/11 12:12	15262-20-1	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047261

QC Batch: RADC/8789 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4047261001, 4047261002, 4047261003, 4047261004

METHOD BLANK: 315796 Matrix: Water
Associated Lab Samples: 4047261001, 4047261002, 4047261003, 4047261004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.537 ± 0.401 (0.786)	pCi/L	07/05/11 12:15	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047261

QC Batch: RADC/8773 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4047261001, 4047261002, 4047261003, 4047261004

METHOD BLANK: 314977 Matrix: Water
Associated Lab Samples: 4047261001, 4047261002, 4047261003, 4047261004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.154 ± 0.370 (0.922)	pCi/L	07/06/11 12:54	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4047261

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

SAMPLE QUALIFIERS

Sample: 4047261001

[1]

Sample: 4047261003

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047261004

[1] Sample was filtered by the laboratory prior to analysis.

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July 12, 2011

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4047263

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory on June 20, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel

laurie.woelfel@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4047263

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
California Certification #: 09268CA
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

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SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4047263

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4047263001	**NPL11-MW1S-061611**	Water	06/16/11 14:45	06/20/11 13:56
4047263002	**NPL11-MW1S-061611-D**	Water	06/16/11 14:45	06/20/11 13:56
4047263003	**NPL11-MW3S-061611**	Water	06/16/11 18:00	06/20/11 13:56
4047263004	**NPL11-MW1S-061611-FILT**	Water	06/16/11 14:45	06/20/11 15:12
4047263005	**NPL11-MW1S-061611-D-FILT**	Water	06/16/11 14:45	06/20/11 15:12
4047263006	**NPL11-MW3S-061611-FILT**	Water	06/16/11 18:00	06/20/11 15:12

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4047263

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4047263001	**NPL11-MW1S-061611**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	CMC	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047263002	**NPL11-MW1S-061611-D**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047263003	**NPL11-MW3S-061611**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	CMC	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047263004	**NPL11-MW1S-061611-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	CMC	1	PASI-PA
4047263005	**NPL11-MW1S-061611-D-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
4047263006	**NPL11-MW3S-061611-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	CMC	1	PASI-PA

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611 **Lab ID: 4047263001** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**802**	mg/L	20.0	1		06/21/11 15:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.0**	mg/L	1.7	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-D **Lab ID: 4047263002** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**786**	mg/L	20.0	1		06/21/11 15:22		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.0**	mg/L	1.4	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW3S-061611 **Lab ID: 4047263003** Collected: 06/16/11 18:00 Received: 06/20/11 13:56 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1870**	mg/L	20.0	1		06/21/11 15:25		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**118**	mg/L	5.0	1		06/21/11 13:55		

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047263

QC Batch: WET/9186 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4047263001, 4047263002, 4047263003

METHOD BLANK: 466703 | Matrix: Water
Associated Lab Samples: 4047263001, 4047263002, 4047263003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	20.0	06/21/11 15:19	

LABORATORY CONTROL SAMPLE: 466704

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1200	1190	99	80-120	

SAMPLE DUPLICATE: 466705

Parameter	Units	4047261002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	694	720	4	10	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047263

QC Batch: WET/9184 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4047263001, 4047263002, 4047263003

METHOD BLANK: 466587 | Matrix: Water
Associated Lab Samples: 4047263001, 4047263002, 4047263003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	1.0	06/21/11 13:55	

LABORATORY CONTROL SAMPLE: 466588

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	96.6	86.0	89	80-120	

SAMPLE DUPLICATE: 466589

Parameter	Units	4047263003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	118	123	4	10	

SAMPLE DUPLICATE: 466590

Parameter	Units	4047264001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	60.3	63.0	4	10	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611 **Lab ID: 4047263001** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.142 ± 0.394 (0.764)**	pCi/L	07/06/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**0.418 ± 0.427 (0.892)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-D **Lab ID: 4047263002** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.235 ± 0.462 (0.636)**	pCi/L	07/06/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**0.736 ± 0.572 (1.13)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW3S-061611 **Lab ID: 4047263003** Collected: 06/16/11 18:00 Received: 06/20/11 13:56 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.355 ± 0.438 (0.710)**	pCi/L	07/06/11 13:42	13982-63-3	
Radium-228	EPA 904.0	**0.858 ± 0.501 (0.882)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-FILT **Lab ID: 4047263004** Collected: 06/16/11 14:45 Received: 06/20/11 15:12 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0746 ± 0.254 (0.549)**	pCi/L	07/06/11 13:42	13982-63-3	
Radium-228	EPA 904.0	**0.829 ± 0.526 (0.982)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-D-FILT **Lab ID: 4047263005** Collected: 06/16/11 14:45 Received: 06/20/11 15:12 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.135 ± 0.324 (0.625)**	pCi/L	07/06/11 13:55	13982-63-3	
Radium-228	EPA 904.0	**0.568 ± 0.470 (0.913)**	pCi/L	06/30/11 16:01	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW3S-061611-FILT **Lab ID: 4047263006** Collected: 06/16/11 18:00 Received: 06/20/11 15:12 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.512 ± 0.485 (0.679)**	pCi/L	07/06/11 13:55	13982-63-3	
Radium-228	EPA 904.0	**0.553 ± 0.442 (0.882)**	pCi/L	06/27/11 15:12	15262-20-1	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047263

QC Batch: RADC/8773 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4047263001, 4047263002, 4047263003, 4047263004, 4047263005, 4047263006

METHOD BLANK: 314977 Matrix: Water
Associated Lab Samples: 4047263001, 4047263002, 4047263003, 4047263004, 4047263005, 4047263006

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.154 ± 0.370 (0.922)	pCi/L	07/06/11 12:54	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047263

QC Batch: RADC/8736 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4047263001, 4047263002, 4047263003, 4047263004, 4047263005, 4047263006

METHOD BLANK: 312960 Matrix: Water
Associated Lab Samples: 4047263001, 4047263002, 4047263003, 4047263004, 4047263005, 4047263006

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.792 ± 0.504 (0.936)	pCi/L	06/30/11 16:02	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4047263

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

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LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

SAMPLE QUALIFIERS

Sample: 4047263004

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047263005

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047263006

[1] Sample was filtered by the laboratory prior to analysis.

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July 12, 2011

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4047264

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory on June 20, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel

laurie.woelfel@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4047264

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
California Certification #: 09268CA
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

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SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4047264

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4047264001	**NPL11-MW3D-061711**	Water	06/17/11 12:20	06/20/11 13:58
4047264002	**NPL11-RB-061711**	Water	06/17/11 12:45	06/20/11 13:58
4047264003	**NPL11-MW1D-061711**	Water	06/16/11 13:05	06/20/11 13:58
4047264004	**NPL11-MW3D-061711-FILT**	Water	06/17/11 12:20	06/20/11 15:18
4047264005	**NPL11-RB-061711-FILT**	Water	06/17/11 12:45	06/20/11 15:18
4047264006	**NPL11-MW1D-061711-FILT**	Water	06/17/11 12:05	06/20/11 15:18

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4047264

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4047264001	**NPL11-MW3D-061711**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047264002	**NPL11-RB-061711**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047264003	**NPL11-MW1D-061711**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4047264004	**NPL11-MW3D-061711-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	RAN	1	PASI-PA
4047264005	**NPL11-RB-061711-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	CMC	1	PASI-PA
4047264006	**NPL11-MW1D-061711-FILT**	EPA 903.1	RMD	1	PASI-PA
		EPA 904.0	CMC	1	PASI-PA

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW3D-061711 **Lab ID: 4047264001** Collected: 06/17/11 12:20 Received: 06/20/11 13:58 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1490**	mg/L	20.0	1		06/21/11 15:29		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**60.3**	mg/L	3.3	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-RB-061711 **Lab ID: 4047264002** Collected: 06/17/11 12:45 Received: 06/20/11 13:58 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	ND	mg/L	20.0	1		06/21/11 15:29		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	ND	mg/L	1.2	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW1D-061711 **Lab ID: 4047264003** Collected: 06/16/11 13:05 Received: 06/20/11 13:58 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**686**	mg/L	20.0	1		06/21/11 15:26		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**30.4**	mg/L	2.0	1		06/21/11 13:55		

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047264

QC Batch: WET/9186 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4047264001, 4047264002, 4047264003

METHOD BLANK: 466703 | Matrix: Water
Associated Lab Samples: 4047264001, 4047264002, 4047264003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	20.0	06/21/11 15:19	

LABORATORY CONTROL SAMPLE: 466704

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1200	1190	99	80-120	

SAMPLE DUPLICATE: 466705

Parameter	Units	4047261002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	694	720	4	10	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047264

QC Batch: WET/9184 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4047264001, 4047264002, 4047264003

METHOD BLANK: 466587 | Matrix: Water
Associated Lab Samples: 4047264001, 4047264002, 4047264003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	1.0	06/21/11 13:55	

LABORATORY CONTROL SAMPLE: 466588

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	96.6	86.0	89	80-120	

SAMPLE DUPLICATE: 466589

Parameter	Units	4047263003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	118	123	4	10	

SAMPLE DUPLICATE: 466590

Parameter	Units	4047264001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	60.3	63.0	4	10	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW3D-061711 **Lab ID: 4047264001** Collected: 06/17/11 12:20 Received: 06/20/11 13:58 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.572 ± 0.542 (0.759)**	pCi/L	07/06/11 12:54	13982-63-3	
Radium-228	EPA 904.0	**0.991 ± 0.529 (0.950)**	pCi/L	06/30/11 15:57	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-RB-061711 **Lab ID: 4047264002** Collected: 06/17/11 12:45 Received: 06/20/11 13:58 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0731 ± 0.379 (0.787)**	pCi/L	07/06/11 12:54	13982-63-3	
Radium-228	EPA 904.0	**0.846 ± 0.509 (0.943)**	pCi/L	06/30/11 15:59	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW1D-061711 **Lab ID: 4047264003** Collected: 06/16/11 13:05 Received: 06/20/11 13:58 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.339 ± 0.445 (0.730)**	pCi/L	07/06/11 13:07	13982-63-3	
Radium-228	EPA 904.0	**1.35 ± 0.560 (0.902)**	pCi/L	06/30/11 15:58	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW3D-061711-FILT **Lab ID: 4047264004** Collected: 06/17/11 12:20 Received: 06/20/11 15:18 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.215 ± 0.316 (0.527)**	pCi/L	07/06/11 13:07	13982-63-3	
Radium-228	EPA 904.0	**0.787 ± 0.509 (0.957)**	pCi/L	06/27/11 15:10	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-RB-061711-FILT **Lab ID: 4047264005** Collected: 06/17/11 12:45 Received: 06/20/11 15:18 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0759 ± 0.258 (0.559)**	pCi/L	07/06/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**0.726 ± 0.421 (0.756)**	pCi/L	06/30/11 15:58	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW1D-061711-FILT **Lab ID: 4047264006** Collected: 06/17/11 12:05 Received: 06/20/11 15:18 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.611 ± 0.462 (0.567)**	pCi/L	07/06/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**1.42 ± 0.556 (0.874)**	pCi/L	06/30/11 15:59	15262-20-1	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047264

QC Batch: RADC/8773 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4047264001, 4047264002, 4047264003, 4047264004, 4047264005, 4047264006

METHOD BLANK: 314977 Matrix: Water
Associated Lab Samples: 4047264001, 4047264002, 4047264003, 4047264004, 4047264005, 4047264006

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.154 ± 0.370 (0.922)	pCi/L	07/06/11 12:54	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047264

QC Batch: RADC/8736 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4047264001, 4047264002, 4047264003, 4047264004, 4047264005, 4047264006

METHOD BLANK: 312960 Matrix: Water
Associated Lab Samples: 4047264001, 4047264002, 4047264003, 4047264004, 4047264005, 4047264006

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.792 ± 0.504 (0.936)	pCi/L	06/30/11 16:02	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4047264

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

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LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

SAMPLE QUALIFIERS

Sample: 4047264004

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047264005

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047264006

[1] Sample was filtered by the laboratory prior to analysis.

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September 30, 2011

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4050797

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory on September 14, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel

laurie.woelfel@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4050797

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

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SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4050797

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4050797001	**MW-3S-091211**	Water	09/12/11 15:40	09/14/11 10:50
4050797002	**MW-3S-091211 - FILTERED**	Water	09/12/11 15:40	09/14/11 10:50
4050797003	**NPL11-RB-091211**	Water	09/12/11 16:00	09/14/11 13:35
4050797004	**NPL11-RB-091211 - FILTERED**	Water	09/12/11 16:00	09/14/11 13:35
4050797005	**MW-1S-091211**	Water	09/12/11 09:55	09/14/11 13:35
4050797006	**MW-1S-091211 - FILTERED**	Water	09/12/11 09:55	09/14/11 13:35
4050797007	**MW-1D-091211**	Water	09/12/11 10:50	09/14/11 13:35
4050797008	**MW-1D-091211 - FILTERED**	Water	09/12/11 10:50	09/14/11 13:35
4050797009	**MW-2D-091211**	Water	09/12/11 12:05	09/14/11 13:35
4050797010	**MW-2D-091211 - FILTERED**	Water	09/12/11 12:05	09/14/11 13:35
4050797011	**MW-2S-091211**	Water	09/12/11 13:25	09/14/11 10:26
4050797012	**MW-2S-091211 - FILTERED**	Water	09/12/11 13:25	09/14/11 10:26
4050797013	**MW-2S-091211-DUP**	Water	09/12/11 13:25	09/14/11 10:26
4050797014	**MW-2S-091211-DUP - FILTERED**	Water	09/12/11 13:25	09/14/11 10:26
4050797015	**MW-3D-091211**	Water	09/12/11 14:55	09/14/11 10:26
4050797016	**MW-3D-091212 - FILTERED**	Water	09/12/11 14:55	09/14/11 10:26

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4050797

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4050797001	**MW-3S-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797002	**MW-3S-091211 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797003	**NPL11-RB-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540D	RRS	1	PASI-G
4050797004	**NPL11-RB-091211 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797005	**MW-1S-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797006	**MW-1S-091211 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797007	**MW-1D-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797008	**MW-1D-091211 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797009	**MW-2D-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797010	**MW-2D-091211 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797011	**MW-2S-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797012	**MW-2S-091211 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797013	**MW-2S-091211-DUP**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4050797

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797014	**MW-2S-091211-DUP - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4050797015	**MW-3D-091211**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	RRS	1	PASI-G
		SM 2540D	RRS	1	PASI-G
4050797016	**MW-3D-091212 - FILTERED**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3S-091211 **Lab ID: 4050797001** Collected: 09/12/11 15:40 Received: 09/14/11 10:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2460**	mg/L	20.0	1		09/19/11 12:41		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**56.4**	mg/L	4.0	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: NPL11-RB-091211 **Lab ID: 4050797003** Collected: 09/12/11 16:00 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	ND	mg/L	1.1	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1S-091211 **Lab ID: 4050797005** Collected: 09/12/11 09:55 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**648**	mg/L	20.0	1		09/19/11 12:41		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**34.8**	mg/L	2.0	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1D-091211 **Lab ID: 4050797007** Collected: 09/12/11 10:50 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**584**	mg/L	20.0	1		09/19/11 12:42		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.1**	mg/L	2.9	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2D-091211 **Lab ID: 4050797009** Collected: 09/12/11 12:05 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**778**	mg/L	20.0	1		09/19/11 12:42		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**41.0**	mg/L	5.0	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211 **Lab ID: 4050797011** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**848**	mg/L	20.0	1		09/19/11 12:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.3**	mg/L	1.3	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211-DUP **Lab ID: 4050797013** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**854**	mg/L	20.0	1		09/19/11 12:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**14.3**	mg/L	1.7	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3D-091211 **Lab ID: 4050797015** Collected: 09/12/11 14:55 Received: 09/14/11 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1090**	mg/L	20.0	1		09/19/11 12:44		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**44.7**	mg/L	6.7	1		09/19/11 10:17		

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: WET/9903 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4050797001, 4050797005, 4050797007, 4050797009, 4050797011, 4050797013, 4050797015

METHOD BLANK: 504878 | Matrix: Water
Associated Lab Samples: 4050797001, 4050797005, 4050797007, 4050797009, 4050797011, 4050797013, 4050797015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	20.0	09/19/11 12:40	

LABORATORY CONTROL SAMPLE: 504879

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1200	1180	99	80-120	

SAMPLE DUPLICATE: 504880

Parameter	Units	4050797009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	778	770	1	10	

SAMPLE DUPLICATE: 504881

Parameter	Units	4050910001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	466	474	2	10	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: WET/9895 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4050797001, 4050797003, 4050797005, 4050797007, 4050797009, 4050797011, 4050797013, 4050797015

METHOD BLANK: 504770 | Matrix: Water
Associated Lab Samples: 4050797001, 4050797003, 4050797005, 4050797007, 4050797009, 4050797011, 4050797013, 4050797015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	1.0	09/19/11 10:17	

LABORATORY CONTROL SAMPLE: 504771

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	96.6	104	108	80-120	

SAMPLE DUPLICATE: 504772

Parameter	Units	4050797015 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	44.7	42.7	5	10	

SAMPLE DUPLICATE: 504773

Parameter	Units	4050906005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	65.0	67.0	3	10	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3S-091211 **Lab ID: 4050797001** Collected: 09/12/11 15:40 Received: 09/14/11 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.552 ± 0.421 (0.214)**	pCi/L	09/23/11 13:41	13982-63-3	
Radium-228	EPA 904.0	**-0.189 ± 0.396 (0.930)**	pCi/L	09/22/11 15:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3S-091211 - FILTERED **Lab ID: 4050797002** Collected: 09/12/11 15:40 Received: 09/14/11 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.130 ± 0.460 (0.917)**	pCi/L	09/23/11 13:41	13982-63-3	
Radium-228	EPA 904.0	**0.433 ± 0.471 (0.983)**	pCi/L	09/22/11 15:09	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: NPL11-RB-091211 **Lab ID: 4050797003** Collected: 09/12/11 16:00 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0974 ± 0.455 (0.816)**	pCi/L	09/23/11 14:42	13982-63-3	
Radium-228	EPA 904.0	**0.494 ± 0.479 (0.985)**	pCi/L	09/22/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: NPL11-RB-091211 - FILTERED **Lab ID: 4050797004** Collected: 09/12/11 16:00 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**2.23 ± 1.04 (0.922)**	pCi/L	09/23/11 14:23	13982-63-3	
Radium-228	EPA 904.0	**-0.0469 ± 0.449 (0.996)**	pCi/L	09/22/11 15:29	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1S-091211 **Lab ID: 4050797005** Collected: 09/12/11 09:55 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.080 ± 0.351 (0.862)**	pCi/L	09/23/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**0.721 ± 0.529 (1.01)**	pCi/L	09/22/11 12:27	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1S-091211 - FILTERED **Lab ID: 4050797006** Collected: 09/12/11 09:55 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.426 ± 0.449 (0.627)**	pCi/L	09/23/11 14:24	13982-63-3	
Radium-228	EPA 904.0	**0.546 ± 0.471 (0.953)**	pCi/L	09/22/11 12:23	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1D-091211 **Lab ID: 4050797007** Collected: 09/12/11 10:50 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.640 ± 0.656 (0.983)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**0.471 ± 0.482 (1.00)**	pCi/L	09/22/11 12:28	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1D-091211 - FILTERED **Lab ID: 4050797008** Collected: 09/12/11 10:50 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.27 ± 0.822 (0.905)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**0.918 ± 0.544 (0.993)**	pCi/L	09/22/11 12:22	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2D-091211 **Lab ID: 4050797009** Collected: 09/12/11 12:05 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.885 ± 0.573 (0.240)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**1.16 ± 0.578 (0.994)**	pCi/L	09/22/11 12:21	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2D-091211 - FILTERED **Lab ID: 4050797010** Collected: 09/12/11 12:05 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.161 ± 0.226 (0.219)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**0.617 ± 0.512 (1.01)**	pCi/L	09/22/11 12:24	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211 **Lab ID: 4050797011** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.354 ± 0.372 (0.548)**	pCi/L	09/29/11 13:29	13982-63-3	
Radium-228	EPA 904.0	**0.744 ± 0.495 (0.908)**	pCi/L	09/27/11 15:10	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211 - FILTERED **Lab ID: 4050797012** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.132 ± 0.411 (0.795)**	pCi/L	09/28/11 13:12	13982-63-3	
Radium-228	EPA 904.0	**0.909 ± 0.533 (0.969)**	pCi/L	09/22/11 12:28	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211-DUP **Lab ID: 4050797013** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.483 ± 0.482 (0.725)**	pCi/L	09/28/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**2.86 ± 1.93 (3.53)**	pCi/L	09/26/11 12:54	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211-DUP - FILTERED **Lab ID: 4050797014** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.311 ± 0.293 (0.381)**	pCi/L	09/28/11 13:43	13982-63-3	
Radium-228	EPA 904.0	**1.04 ± 0.534 (0.938)**	pCi/L	09/27/11 15:21	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3D-091211 **Lab ID: 4050797015** Collected: 09/12/11 14:55 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.389 ± 0.427 (0.667)**	pCi/L	09/28/11 13:43	13982-63-3	
Radium-228	EPA 904.0	**0.451 ± 0.459 (0.899)**	pCi/L	09/27/11 15:50	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3D-091212 - FILTERED **Lab ID: 4050797016** Collected: 09/12/11 14:55 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.168 ± 0.364 (0.671)**	pCi/L	09/28/11 13:43	13982-63-3	
Radium-228	EPA 904.0	**0.894 ± 0.469 (0.818)**	pCi/L	09/27/11 15:07	15262-20-1	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: RADC/9517 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4050797005, 4050797006, 4050797007, 4050797008, 4050797009, 4050797010, 4050797012, 4050797013

METHOD BLANK: 343241 Matrix: Water
Associated Lab Samples: 4050797005, 4050797006, 4050797007, 4050797008, 4050797009, 4050797010, 4050797012, 4050797013

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.337 ± 0.444 (0.955)	pCi/L	09/22/11 12:22	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: RADC/9536 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4050797011, 4050797014, 4050797015, 4050797016

METHOD BLANK: 344091 Matrix: Water
Associated Lab Samples: 4050797011, 4050797014, 4050797015, 4050797016

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.240 ± 0.453 (0.982)	pCi/L	09/27/11 15:36	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: RADC/9516 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4050797001, 4050797002, 4050797003, 4050797004

METHOD BLANK: 343238 Matrix: Water
Associated Lab Samples: 4050797001, 4050797002, 4050797003, 4050797004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	-0.135 ± 0.407 (0.973)	pCi/L	09/22/11 15:22	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: RADC/9514 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4050797001, 4050797002, 4050797003, 4050797004, 4050797005, 4050797006, 4050797007, 4050797008, 4050797009, 4050797010

METHOD BLANK: 343233 Matrix: Water
Associated Lab Samples: 4050797001, 4050797002, 4050797003, 4050797004, 4050797005, 4050797006, 4050797007, 4050797008, 4050797009, 4050797010

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.223 ± 0.328 (0.546)	pCi/L	09/23/11 12:06	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: RADC/9515 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4050797012, 4050797013, 4050797014, 4050797015, 4050797016

METHOD BLANK: 343234 Matrix: Water
Associated Lab Samples: 4050797012, 4050797013, 4050797014, 4050797015, 4050797016

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.0568 ± 0.369 (0.744)	pCi/L	09/28/11 12:48	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4050797

QC Batch: RADC/9533 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4050797011

METHOD BLANK: 344086 | Matrix: Water
Associated Lab Samples: 4050797011

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.053 ± 0.276 (0.639)	pCi/L	09/29/11 13:06	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4050797

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

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February 01, 2012

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory on December 29, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel

laurie.woelfel@pacelabs.com
Project Manager

Enclosures

cc: Tonya Balla, Weston Solutions - IL

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CERTIFICATIONS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Virginia VELAP (Cert # 460198)
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

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SAMPLE SUMMARY

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4055336001	**NPL11-MW1S-122811**	Water	12/28/11 10:20	12/29/11 09:40
4055336002	**NPL11-MW1S-122811 DIS**	Water	12/28/11 10:20	12/29/11 09:40
4055336003	**NPL11-MW1S-122811-DUP**	Water	12/28/11 10:20	12/29/11 09:40
4055336004	**NPL11-MW1S-122811-DUP DIS**	Water	12/28/11 10:20	12/29/11 09:40
4055336005	**NPL11-MW1D-122811**	Water	12/28/11 11:35	12/29/11 09:40
4055336006	**NPL11-MW1D-122811 DIS**	Water	12/28/11 11:35	12/29/11 09:40
4055336007	**NPL11-MW2S-122811**	Water	12/28/11 12:15	12/29/11 09:40
4055336008	**NPL11-MW2S-122811 DIS**	Water	12/28/11 12:15	12/29/11 09:40
4055336009	**NPL11-MW2D-122811**	Water	12/28/11 13:45	12/29/11 09:40
4055336010	**NPL11-MW2D-122811 DIS**	Water	12/28/11 13:45	12/29/11 09:40
4055336011	**NPL11-MW3S-122811**	Water	12/28/11 14:15	12/29/11 09:40
4055336012	**NPL11-MW3S-122811 DIS**	Water	12/28/11 14:15	12/29/11 09:40
4055336013	**NPL11-RB-122811**	Water	12/28/11 15:30	12/29/11 09:40
4055336014	**NPL11-RB-122811 DIS**	Water	12/28/11 15:30	12/29/11 09:40
4055336015	**NPL11-MW3D-122811**	Water	12/28/11 15:35	12/29/11 09:40
4055336016	**NPL11-MW3D-122811 DIS**	Water	12/28/11 15:35	12/29/11 09:40

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SAMPLE ANALYTE COUNT

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4055336001	**NPL11-MW1S-122811**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336002	**NPL11-MW1S-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336003	**NPL11-MW1S-122811-DUP**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336004	**NPL11-MW1S-122811-DUP DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336005	**NPL11-MW1D-122811**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336006	**NPL11-MW1D-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336007	**NPL11-MW2S-122811**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336008	**NPL11-MW2S-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336009	**NPL11-MW2D-122811**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336010	**NPL11-MW2D-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336011	**NPL11-MW3S-122811**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336012	**NPL11-MW3S-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336013	**NPL11-RB-122811**	EPA 903.1	SLA	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336014	**NPL11-RB-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
4055336015	**NPL11-MW3D-122811**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA
		SM 2540C	HMH	1	PASI-G
		SM 2540D	HMH	1	PASI-G
4055336016	**NPL11-MW3D-122811 DIS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	AMK	1	PASI-PA

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811 **Lab ID: 4055336001** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**636**	mg/L	20.0	1		01/04/12 08:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**6.8**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811-DUP **Lab ID: 4055336003** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**634**	mg/L	20.0	1		01/04/12 08:44		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**6.6**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1D-122811 **Lab ID: 4055336005** Collected: 12/28/11 11:35 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**626**	mg/L	20.0	1		01/04/12 08:46		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**14.0**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2S-122811 **Lab ID: 4055336007** Collected: 12/28/11 12:15 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**736**	mg/L	20.0	1		01/04/12 08:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**8.0**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2D-122811 **Lab ID: 4055336009** Collected: 12/28/11 13:45 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**714**	mg/L	20.0	1		01/04/12 08:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**12.0**	mg/L	4.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3S-122811 **Lab ID: 4055336011** Collected: 12/28/11 14:15 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1950**	mg/L	20.0	1		01/04/12 08:48		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**2.8**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-RB-122811 **Lab ID: 4055336013** Collected: 12/28/11 15:30 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**<20.0**	mg/L	20.0	1		01/04/12 08:49		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**<2.0**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3D-122811 **Lab ID: 4055336015** Collected: 12/28/11 15:35 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1110**	mg/L	20.0	1		01/04/12 08:49		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**28.4**	mg/L	4.0	1		01/03/12 12:20		

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QUALITY CONTROL DATA

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

QC Batch: WET/10671 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4055336001, 4055336003, 4055336005, 4055336007, 4055336009, 4055336011, 4055336013, 4055336015

METHOD BLANK: 553327 | Matrix: Water
Associated Lab Samples: 4055336001, 4055336003, 4055336005, 4055336007, 4055336009, 4055336011, 4055336013, 4055336015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<20.0	20.0	01/04/12 08:42	

LABORATORY CONTROL SAMPLE: 553328

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	516	564	109	80-120	

SAMPLE DUPLICATE: 553329

Parameter	Units	4055336003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	634	622	2	10	

SAMPLE DUPLICATE: 553330

Parameter	Units	4055361002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	354	354	0	10	

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QUALITY CONTROL DATA

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

QC Batch: WET/10666 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4055336001, 4055336003, 4055336005, 4055336007, 4055336009, 4055336011, 4055336013, 4055336015

METHOD BLANK: 553131 | Matrix: Water
Associated Lab Samples: 4055336001, 4055336003, 4055336005, 4055336007, 4055336009, 4055336011, 4055336013, 4055336015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<1.0	1.0	01/03/12 12:20	

LABORATORY CONTROL SAMPLE: 553132

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	106	96.0	91	80-120	

SAMPLE DUPLICATE: 553133

Parameter	Units	4055310002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	117	98.0	18	10	R1

SAMPLE DUPLICATE: 553134

Parameter	Units	4055336015 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	28.4	28.4	0	10	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811 **Lab ID: 4055336001** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.243 ± 0.517 (0.872)**	pCi/L	01/25/12 12:01	13982-63-3	
Radium-228	EPA 904.0	**0.367 ± 0.424 (0.889)**	pCi/L	01/23/12 15:05	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811 DIS **Lab ID: 4055336002** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.24 ± 0.834 (0.950)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**0.382 ± 0.450 (0.948)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811-DUP **Lab ID: 4055336003** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.103 ± 0.578 (0.947)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**0.721 ± 0.500 (0.956)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811-DUP DIS **Lab ID: 4055336004** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.426 ± 0.576 (0.918)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**0.344 ± 0.419 (0.884)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1D-122811 **Lab ID: 4055336005** Collected: 12/28/11 11:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.10 ± 0.824 (0.957)**	pCi/L	01/25/12 12:01	13982-63-3	
Radium-228	EPA 904.0	**1.09 ± 0.490 (0.796)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1D-122811 DIS **Lab ID: 4055336006** Collected: 12/28/11 11:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.40 ± 0.837 (0.317)**	pCi/L	01/25/12 11:59	13982-63-3	
Radium-228	EPA 904.0	**1.15 ± 0.508 (0.819)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2S-122811 **Lab ID: 4055336007** Collected: 12/28/11 12:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.256 ± 0.589 (0.901)**	pCi/L	01/25/12 12:11	13982-63-3	
Radium-228	EPA 904.0	**0.872 ± 0.506 (0.926)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2S-122811 DIS **Lab ID: 4055336008** Collected: 12/28/11 12:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.481 ± 0.680 (0.970)**	pCi/L	01/25/12 13:14	13982-63-3	
Radium-228	EPA 904.0	**0.685 ± 0.455 (0.857)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2D-122811 **Lab ID: 4055336009** Collected: 12/28/11 13:45 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.638 ± 0.731 (0.999)**	pCi/L	01/25/12 13:11	13982-63-3	
Radium-228	EPA 904.0	**0.594 ± 0.406 (0.768)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2D-122811 DIS **Lab ID: 4055336010** Collected: 12/28/11 13:45 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.843 ± 0.787 (0.996)**	pCi/L	01/25/12 12:11	13982-63-3	
Radium-228	EPA 904.0	**1.04 ± 0.471 (0.758)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3S-122811 **Lab ID: 4055336011** Collected: 12/28/11 14:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.478 ± 0.668 (0.948)**	pCi/L	01/25/12 13:19	13982-63-3	
Radium-228	EPA 904.0	**0.178 ± 0.446 (0.981)**	pCi/L	01/23/12 15:16	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3S-122811 DIS **Lab ID: 4055336012** Collected: 12/28/11 14:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.067 ± 0.543 (0.947)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**1.04 ± 0.546 (0.960)**	pCi/L	01/23/12 15:16	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-RB-122811 **Lab ID: 4055336013** Collected: 12/28/11 15:30 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.236 ± 0.519 (0.937)**	pCi/L	01/25/12 13:33	13982-63-3	
Radium-228	EPA 904.0	**0.258 ± 0.403 (0.872)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-RB-122811 DIS **Lab ID: 4055336014** Collected: 12/28/11 15:30 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.099 ± 0.556 (0.912)**	pCi/L	01/25/12 13:46	13982-63-3	
Radium-228	EPA 904.0	**0.782 ± 0.432 (0.761)**	pCi/L	01/23/12 15:08	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3D-122811 **Lab ID: 4055336015** Collected: 12/28/11 15:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.584 ± 0.715 (0.963)**	pCi/L	01/25/12 13:45	13982-63-3	
Radium-228	EPA 904.0	**1.07 ± 0.547 (0.947)**	pCi/L	01/23/12 15:08	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3D-122811 DIS **Lab ID: 4055336016** Collected: 12/28/11 15:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.513 ± 0.794 (0.973)**	pCi/L	01/25/12 14:01	13982-63-3	
Radium-228	EPA 904.0	**1.18 ± 0.556 (0.948)**	pCi/L	01/23/12 15:15	15262-20-1	

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QUALITY CONTROL DATA

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

QC Batch: RADC/10664 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4055336001, 4055336002, 4055336003, 4055336004, 4055336005, 4055336006, 4055336007, 4055336008, 4055336009, 4055336010, 4055336011, 4055336012, 4055336013, 4055336014, 4055336015, 4055336016

METHOD BLANK: 386716 Matrix: Water
Associated Lab Samples: 4055336001, 4055336002, 4055336003, 4055336004, 4055336005, 4055336006, 4055336007, 4055336008, 4055336009, 4055336010, 4055336011, 4055336012, 4055336013, 4055336014, 4055336015, 4055336016

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.427 ± 0.357 (0.715)	pCi/L	01/23/12 12:20	

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QUALITY CONTROL DATA

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

QC Batch: RADC/10663 | Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 | Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4055336001, 4055336002, 4055336003, 4055336004, 4055336005, 4055336006, 4055336007, 4055336008, 4055336009, 4055336010, 4055336011, 4055336012, 4055336013, 4055336014, 4055336015, 4055336016

METHOD BLANK: 386715 | Matrix: Water
Associated Lab Samples: 4055336001, 4055336002, 4055336003, 4055336004, 4055336005, 4055336006, 4055336007, 4055336008, 4055336009, 4055336010, 4055336011, 4055336012, 4055336013, 4055336014, 4055336015, 4055336016

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.131 ± 0.285 (0.655)	pCi/L	01/25/12 11:46	

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QUALIFIERS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
4055336001	**NPL11-MW1S-122811**	EPA 903.1	RADC/10663		
4055336002	**NPL11-MW1S-122811 DIS**	EPA 903.1	RADC/10663		
4055336003	**NPL11-MW1S-122811-DUP**	EPA 903.1	RADC/10663		
4055336004	**NPL11-MW1S-122811-DUP DIS**	EPA 903.1	RADC/10663		
4055336005	**NPL11-MW1D-122811**	EPA 903.1	RADC/10663		
4055336006	**NPL11-MW1D-122811 DIS**	EPA 903.1	RADC/10663		
4055336007	**NPL11-MW2S-122811**	EPA 903.1	RADC/10663		
4055336008	**NPL11-MW2S-122811 DIS**	EPA 903.1	RADC/10663		
4055336009	**NPL11-MW2D-122811**	EPA 903.1	RADC/10663		
4055336010	**NPL11-MW2D-122811 DIS**	EPA 903.1	RADC/10663		
4055336011	**NPL11-MW3S-122811**	EPA 903.1	RADC/10663		
4055336012	**NPL11-MW3S-122811 DIS**	EPA 903.1	RADC/10663		
4055336013	**NPL11-RB-122811**	EPA 903.1	RADC/10663		
4055336014	**NPL11-RB-122811 DIS**	EPA 903.1	RADC/10663		
4055336015	**NPL11-MW3D-122811**	EPA 903.1	RADC/10663		
4055336016	**NPL11-MW3D-122811 DIS**	EPA 903.1	RADC/10663		
4055336001	**NPL11-MW1S-122811**	EPA 904.0	RADC/10664		
4055336002	**NPL11-MW1S-122811 DIS**	EPA 904.0	RADC/10664		
4055336003	**NPL11-MW1S-122811-DUP**	EPA 904.0	RADC/10664		
4055336004	**NPL11-MW1S-122811-DUP DIS**	EPA 904.0	RADC/10664		
4055336005	**NPL11-MW1D-122811**	EPA 904.0	RADC/10664		
4055336006	**NPL11-MW1D-122811 DIS**	EPA 904.0	RADC/10664		
4055336007	**NPL11-MW2S-122811**	EPA 904.0	RADC/10664		
4055336008	**NPL11-MW2S-122811 DIS**	EPA 904.0	RADC/10664		
4055336009	**NPL11-MW2D-122811**	EPA 904.0	RADC/10664		
4055336010	**NPL11-MW2D-122811 DIS**	EPA 904.0	RADC/10664		
4055336011	**NPL11-MW3S-122811**	EPA 904.0	RADC/10664		
4055336012	**NPL11-MW3S-122811 DIS**	EPA 904.0	RADC/10664		
4055336013	**NPL11-RB-122811**	EPA 904.0	RADC/10664		
4055336014	**NPL11-RB-122811 DIS**	EPA 904.0	RADC/10664		
4055336015	**NPL11-MW3D-122811**	EPA 904.0	RADC/10664		
4055336016	**NPL11-MW3D-122811 DIS**	EPA 904.0	RADC/10664		
4055336001	**NPL11-MW1S-122811**	SM 2540C	WET/10671		
4055336003	**NPL11-MW1S-122811-DUP**	SM 2540C	WET/10671		
4055336005	**NPL11-MW1D-122811**	SM 2540C	WET/10671		
4055336007	**NPL11-MW2S-122811**	SM 2540C	WET/10671		
4055336009	**NPL11-MW2D-122811**	SM 2540C	WET/10671		
4055336011	**NPL11-MW3S-122811**	SM 2540C	WET/10671		
4055336013	**NPL11-RB-122811**	SM 2540C	WET/10671		
4055336015	**NPL11-MW3D-122811**	SM 2540C	WET/10671		
4055336001	**NPL11-MW1S-122811**	SM 2540D	WET/10666		
4055336003	**NPL11-MW1S-122811-DUP**	SM 2540D	WET/10666		
4055336005	**NPL11-MW1D-122811**	SM 2540D	WET/10666		
4055336007	**NPL11-MW2S-122811**	SM 2540D	WET/10666		
4055336009	**NPL11-MW2D-122811**	SM 2540D	WET/10666		
4055336011	**NPL11-MW3S-122811**	SM 2540D	WET/10666		
4055336013	**NPL11-RB-122811**	SM 2540D	WET/10666		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
4055336015	**NPL11-MW3D-122811**	SM 2540D	WET/10666		

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May 04, 2012

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4058911

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory between April 14, 2012 and April 16, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kang Khang

kang.khang@pacelabs.com
Project Manager

Enclosures

cc: Tonya Balla, Weston Solutions - IL
Rick Mehl, Weston Solutions

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CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4058911

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACLASS DOD-ELAP Accreditation #: ADE-1544
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/TNI Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/TNI Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/TNI Certification #: LA080002
Louisiana/TNI Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188
Utah/TNI Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Virginia VELAP (Cert # 460198)
Washington Certification #: C868
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

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SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4058911

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4058911001	**NPL-11-MW-2D-041312**	Water	04/13/12 11:20	04/14/12 10:15
4058911002	**NPL-11-MW-2S-041312**	Water	04/13/12 12:20	04/14/12 10:15
4058911003	**NPL-11-MW-1S-041312**	Water	04/13/12 14:20	04/14/12 10:15
4058911004	**NPL-11-RB-041312**	Water	04/13/12 15:00	04/14/12 10:15
4058911005	**NPL-11-MW-2D-041312 - DISS**	Water	04/13/12 11:20	04/16/12 10:43
4058911006	**NPL-11-MW-2S-041312 - DISS**	Water	04/13/12 12:20	04/16/12 10:43
4058911007	**NPL-11-MW-1S-041312 - DISS**	Water	04/13/12 14:20	04/16/12 10:43
4058911008	**NPL-11-RB-041312 - DISS**	Water	04/13/12 15:00	04/16/12 10:43

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4058911

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4058911001	**NPL-11-MW-2D-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058911002	**NPL-11-MW-2S-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058911003	**NPL-11-MW-1S-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058911004	**NPL-11-RB-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058911005	**NPL-11-MW-2D-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
4058911006	**NPL-11-MW-2S-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
4058911007	**NPL-11-MW-1S-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
4058911008	**NPL-11-RB-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2D-041312 **Lab ID: 4058911001** Collected: 04/13/12 11:20 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**766**	mg/L	20.0	1		04/20/12 07:54		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**88.0**	mg/L	6.7	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2S-041312 **Lab ID: 4058911002** Collected: 04/13/12 12:20 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**810**	mg/L	20.0	1		04/20/12 07:58		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**6.0**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-1S-041312 **Lab ID: 4058911003** Collected: 04/13/12 14:20 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**734**	mg/L	20.0	1		04/20/12 07:59		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**3.6**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-RB-041312 **Lab ID: 4058911004** Collected: 04/13/12 15:00 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**<20.0**	mg/L	20.0	1		04/20/12 08:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**<1.4**	mg/L	1.4	1		04/18/12 11:10		

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4058911

QC Batch: WET/11422 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

METHOD BLANK: 593880 | Matrix: Water
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<20.0	20.0	04/20/12 07:52	

LABORATORY CONTROL SAMPLE: 593881

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	608	600	99	80-120	

SAMPLE DUPLICATE: 593882

Parameter	Units	4058911001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	766	746	3	10	

SAMPLE DUPLICATE: 593883

Parameter	Units	4059017002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1130	1130	0	10	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4058911

QC Batch: WET/11402 | Analysis Method: SM 2540D
QC Batch Method: SM 2540D | Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

METHOD BLANK: 592857 | Matrix: Water
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<1.0	1.0	04/18/12 11:10	

LABORATORY CONTROL SAMPLE: 592858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	104	104	80-120	

SAMPLE DUPLICATE: 592859

Parameter	Units	4058934002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	23.7	24.7	4	10	

SAMPLE DUPLICATE: 592860

Parameter	Units	4058935001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	16.5	17.0	3	10	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2D-041312 **Lab ID: 4058911001** Collected: 04/13/12 11:20 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.358 ± 0.337 (0.439)**	pCi/L	05/02/12 15:51	13982-63-3	
Radium-228	EPA 904.0	**0.864 ± 0.525 (0.973)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2S-041312 **Lab ID: 4058911002** Collected: 04/13/12 12:20 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.238 ± 0.273 (0.215)**	pCi/L	05/02/12 16:51	13982-63-3	
Radium-228	EPA 904.0	**0.251 ± 0.420 (0.914)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-1S-041312 **Lab ID: 4058911003** Collected: 04/13/12 14:20 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.342 ± 0.478 (0.464)**	pCi/L	05/02/12 16:05	13982-63-3	
Radium-228	EPA 904.0	**0.333 ± 0.414 (0.876)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-RB-041312 **Lab ID: 4058911004** Collected: 04/13/12 15:00 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0678 ± 0.298 (0.630)**	pCi/L	05/02/12 16:31	13982-63-3	
Radium-228	EPA 904.0	**-0.202 ± 0.356 (0.875)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2D-041312 - DISS **Lab ID: 4058911005** Collected: 04/13/12 11:20 Received: 04/16/12 10:43 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.798 ± 0.605 (0.781)**	pCi/L	05/03/12 14:27	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**1.14 ± 0.520 (0.872)**	pCi/L	05/01/12 11:42	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2S-041312 - DISS **Lab ID: 4058911006** Collected: 04/13/12 12:20 Received: 04/16/12 10:43 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.273 ± 0.537 (0.918)**	pCi/L	05/03/12 15:55	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.893 ± 0.488 (0.864)**	pCi/L	05/01/12 11:42	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-1S-041312 - DISS **Lab ID: 4058911007** Collected: 04/13/12 14:20 Received: 04/16/12 10:43 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.000 ± 0.332 (0.743)**	pCi/L	05/03/12 14:52	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**-0.138 ± 0.366 (0.870)**	pCi/L	05/01/12 11:43	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-RB-041312 - DISS **Lab ID: 4058911008** Collected: 04/13/12 15:00 Received: 04/16/12 10:43 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**-0.211 ± 0.242 (0.758)**	pCi/L	05/03/12 14:52	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.142 ± 0.362 (0.809)**	pCi/L	05/01/12 11:48	15262-20-1	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4058911

QC Batch: RADC/11784 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228, Dissolved
Associated Lab Samples: 4058911005, 4058911006, 4058911007, 4058911008

METHOD BLANK: 431287 Matrix: Water
Associated Lab Samples: 4058911005, 4058911006, 4058911007, 4058911008

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228, Dissolved	-0.0700 ± 0.293 (0.697)	pCi/L	05/01/12 11:47	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4058911

QC Batch: RADC/11789 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226, Dissolved
Associated Lab Samples: 4058911005, 4058911006, 4058911007, 4058911008

METHOD BLANK: 431292 Matrix: Water
Associated Lab Samples: 4058911005, 4058911006, 4058911007, 4058911008

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226, Dissolved	0.272 ± 0.424 (0.731)	pCi/L	05/03/12 14:13	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4058911

QC Batch: RADC/11779 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

METHOD BLANK: 431282 Matrix: Water
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.0118 ± 0.392 (0.906)	pCi/L	04/26/12 16:38	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4058911

QC Batch: RADC/11795 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

METHOD BLANK: 431298 Matrix: Water
Associated Lab Samples: 4058911001, 4058911002, 4058911003, 4058911004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.162 ± 0.319 (0.761)	pCi/L	05/02/12 15:10	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4058911

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NPL-11
Pace Project No.: 4058911

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
4058911001	**NPL-11-MW-2D-041312**	EPA 903.1	RADC/11795		
4058911002	**NPL-11-MW-2S-041312**	EPA 903.1	RADC/11795		
4058911003	**NPL-11-MW-1S-041312**	EPA 903.1	RADC/11795		
4058911004	**NPL-11-RB-041312**	EPA 903.1	RADC/11795		
4058911005	**NPL-11-MW-2D-041312 - DISS**	EPA 903.1	RADC/11789		
4058911006	**NPL-11-MW-2S-041312 - DISS**	EPA 903.1	RADC/11789		
4058911007	**NPL-11-MW-1S-041312 - DISS**	EPA 903.1	RADC/11789		
4058911008	**NPL-11-RB-041312 - DISS**	EPA 903.1	RADC/11789		
4058911001	**NPL-11-MW-2D-041312**	EPA 904.0	RADC/11779		
4058911002	**NPL-11-MW-2S-041312**	EPA 904.0	RADC/11779		
4058911003	**NPL-11-MW-1S-041312**	EPA 904.0	RADC/11779		
4058911004	**NPL-11-RB-041312**	EPA 904.0	RADC/11779		
4058911005	**NPL-11-MW-2D-041312 - DISS**	EPA 904.0	RADC/11784		
4058911006	**NPL-11-MW-2S-041312 - DISS**	EPA 904.0	RADC/11784		
4058911007	**NPL-11-MW-1S-041312 - DISS**	EPA 904.0	RADC/11784		
4058911008	**NPL-11-RB-041312 - DISS**	EPA 904.0	RADC/11784		
4058911001	**NPL-11-MW-2D-041312**	SM 2540C	WET/11422		
4058911002	**NPL-11-MW-2S-041312**	SM 2540C	WET/11422		
4058911003	**NPL-11-MW-1S-041312**	SM 2540C	WET/11422		
4058911004	**NPL-11-RB-041312**	SM 2540C	WET/11422		
4058911001	**NPL-11-MW-2D-041312**	SM 2540D	WET/11402		
4058911002	**NPL-11-MW-2S-041312**	SM 2540D	WET/11402		
4058911003	**NPL-11-MW-1S-041312**	SM 2540D	WET/11402		
4058911004	**NPL-11-RB-041312**	SM 2540D	WET/11402		

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May 04, 2012

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: OTTAWA NPL-11
Pace Project No.: 4058912

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory between April 14, 2012 and April 16, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kang Khang

kang.khang@pacelabs.com
Project Manager

Enclosures

cc: Tonya Balla, Weston Solutions - IL
Rick Mehl, Weston Solutions

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CERTIFICATIONS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACLASS DOD-ELAP Accreditation #: ADE-1544
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/TNI Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/TNI Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/TNI Certification #: LA080002
Louisiana/TNI Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188
Utah/TNI Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Virginia VELAP (Cert # 460198)
Washington Certification #: C868
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

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SAMPLE SUMMARY

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4058912001	**NPL11-MW-3S-041312**	Water	04/13/12 10:30	04/14/12 10:15
4058912002	**NPL11-MW-3S-041312D**	Water	04/13/12 10:30	04/14/12 10:15
4058912003	**NPL11-MW-3D-041312**	Water	04/13/12 13:49	04/14/12 10:15
4058912004	**NPL11-MW-1D-041312**	Water	04/13/12 15:48	04/14/12 10:15
4058912005	**NPL11-MW-3S-041312 - DISS**	Water	04/13/12 10:30	04/16/12 13:02
4058912006	**NPL11-MW-3S-041312D - DISS**	Water	04/13/12 10:30	04/16/12 13:02
4058912007	**NPL11-MW-3D-041312 - DISS**	Water	04/13/12 13:49	04/16/12 13:02
4058912008	**NPL11-MW-1D-041312 - DISS**	Water	04/13/12 15:48	04/16/12 13:02

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SAMPLE ANALYTE COUNT

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4058912001	**NPL11-MW-3S-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058912002	**NPL11-MW-3S-041312D**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058912003	**NPL11-MW-3D-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058912004	**NPL11-MW-1D-041312**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
		SM 2540C	HKV	1	PASI-G
		SM 2540D	HKV	1	PASI-G
4058912005	**NPL11-MW-3S-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
4058912006	**NPL11-MW-3S-041312D - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
4058912007	**NPL11-MW-3D-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA
4058912008	**NPL11-MW-1D-041312 - DISS**	EPA 903.1	SLA	1	PASI-PA
		EPA 904.0	WRR	1	PASI-PA

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312 **Lab ID: 4058912001** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1970**	mg/L	20.0	1		04/20/12 08:01		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**16.6**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312D **Lab ID: 4058912002** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1980**	mg/L	20.0	1		04/20/12 08:02		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**7.9**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3D-041312 **Lab ID: 4058912003** Collected: 04/13/12 13:49 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1710**	mg/L	20.0	1		04/20/12 08:02		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**19.6**	mg/L	2.0	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-1D-041312 **Lab ID: 4058912004** Collected: 04/13/12 15:48 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**630**	mg/L	20.0	1		04/20/12 08:03		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**12.0**	mg/L	2.0	1		04/18/12 11:10		

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QUALITY CONTROL DATA

Project: OTTAWA NPL-11
Pace Project No.: 4058912

QC Batch: WET/11422 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

METHOD BLANK: 593880 | Matrix: Water
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<20.0	20.0	04/20/12 07:52	

LABORATORY CONTROL SAMPLE: 593881

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	608	600	99	80-120	

SAMPLE DUPLICATE: 593882

Parameter	Units	4058911001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	766	746	3	10	

SAMPLE DUPLICATE: 593883

Parameter	Units	4059017002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1130	1130	0	10	

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QUALITY CONTROL DATA

Project: OTTAWA NPL-11
Pace Project No.: 4058912

QC Batch: WET/11402 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

METHOD BLANK: 592857 Matrix: Water
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<1.0	1.0	04/18/12 11:10	

LABORATORY CONTROL SAMPLE: 592858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	104	104	80-120	

SAMPLE DUPLICATE: 592859

Parameter	Units	4058934002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	23.7	24.7	4	10	

SAMPLE DUPLICATE: 592860

Parameter	Units	4058935001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	16.5	17.0	3	10	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312 **Lab ID: 4058912001** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.360 ± 0.429 (0.669)**	pCi/L	05/02/12 15:37	13982-63-3	
Radium-228	EPA 904.0	**0.00670 ± 0.367 (0.857)**	pCi/L	04/26/12 16:39	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312D **Lab ID: 4058912002** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0677 ± 0.297 (0.629)**	pCi/L	05/02/12 16:05	13982-63-3	
Radium-228	EPA 904.0	**0.0286 ± 0.427 (0.974)**	pCi/L	04/26/12 16:34	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3D-041312 **Lab ID: 4058912003** Collected: 04/13/12 13:49 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.125 ± 0.247 (0.675)**	pCi/L	05/02/12 16:30	13982-63-3	
Radium-228	EPA 904.0	**0.902 ± 0.535 (0.986)**	pCi/L	04/26/12 16:34	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-1D-041312 **Lab ID: 4058912004** Collected: 04/13/12 15:48 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.901 ± 0.589 (0.721)**	pCi/L	05/02/12 16:20	13982-63-3	
Radium-228	EPA 904.0	**0.597 ± 0.486 (0.965)**	pCi/L	04/26/12 16:39	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312 - DISS **Lab ID: 4058912005** Collected: 04/13/12 10:30 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.144 ± 0.283 (0.529)**	pCi/L	05/03/12 14:13	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**-0.0340 ± 0.393 (0.861)**	pCi/L	05/01/12 11:41	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312D - DISS **Lab ID: 4058912006** Collected: 04/13/12 10:30 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.000 ± 0.269 (0.638)**	pCi/L	05/03/12 14:38	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.292 ± 0.414 (0.870)**	pCi/L	05/01/12 11:41	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3D-041312 - DISS **Lab ID: 4058912007** Collected: 04/13/12 13:49 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.160 ± 0.510 (0.938)**	pCi/L	05/03/12 14:38	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.290 ± 0.411 (0.863)**	pCi/L	05/01/12 11:41	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-1D-041312 - DISS **Lab ID: 4058912008** Collected: 04/13/12 15:48 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**1.62 ± 0.806 (0.810)**	pCi/L	05/03/12 14:27	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**1.24 ± 0.515 (0.818)**	pCi/L	05/01/12 11:42	15262-20-1	

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QUALITY CONTROL DATA

Project: OTTAWA NPL-11
Pace Project No.: 4058912

QC Batch: RADC/11784 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228, Dissolved
Associated Lab Samples: 4058912005, 4058912006, 4058912007, 4058912008

METHOD BLANK: 431287 Matrix: Water
Associated Lab Samples: 4058912005, 4058912006, 4058912007, 4058912008

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228, Dissolved	-0.0700 ± 0.293 (0.697)	pCi/L	05/01/12 11:47	

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QUALITY CONTROL DATA

Project: OTTAWA NPL-11
Pace Project No.: 4058912

QC Batch: RADC/11789 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226, Dissolved
Associated Lab Samples: 4058912005, 4058912006, 4058912007, 4058912008

METHOD BLANK: 431292 Matrix: Water
Associated Lab Samples: 4058912005, 4058912006, 4058912007, 4058912008

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226, Dissolved	0.272 ± 0.424 (0.731)	pCi/L	05/03/12 14:13	

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QUALITY CONTROL DATA

Project: OTTAWA NPL-11
Pace Project No.: 4058912

QC Batch: RADC/11779 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

METHOD BLANK: 431282 Matrix: Water
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-228	0.0118 ± 0.392 (0.906)	pCi/L	04/26/12 16:38	

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QUALITY CONTROL DATA

Project: OTTAWA NPL-11
Pace Project No.: 4058912

QC Batch: RADC/11795 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

METHOD BLANK: 431298 Matrix: Water
Associated Lab Samples: 4058912001, 4058912002, 4058912003, 4058912004

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	-0.162 ± 0.319 (0.761)	pCi/L	05/02/12 15:10	

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QUALIFIERS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
4058912001	**NPL11-MW-3S-041312**	EPA 903.1	RADC/11795		
4058912002	**NPL11-MW-3S-041312D**	EPA 903.1	RADC/11795		
4058912003	**NPL11-MW-3D-041312**	EPA 903.1	RADC/11795		
4058912004	**NPL11-MW-1D-041312**	EPA 903.1	RADC/11795		
4058912005	**NPL11-MW-3S-041312 - DISS**	EPA 903.1	RADC/11789		
4058912006	**NPL11-MW-3S-041312D - DISS**	EPA 903.1	RADC/11789		
4058912007	**NPL11-MW-3D-041312 - DISS**	EPA 903.1	RADC/11789		
4058912008	**NPL11-MW-1D-041312 - DISS**	EPA 903.1	RADC/11789		
4058912001	**NPL11-MW-3S-041312**	EPA 904.0	RADC/11779		
4058912002	**NPL11-MW-3S-041312D**	EPA 904.0	RADC/11779		
4058912003	**NPL11-MW-3D-041312**	EPA 904.0	RADC/11779		
4058912004	**NPL11-MW-1D-041312**	EPA 904.0	RADC/11779		
4058912005	**NPL11-MW-3S-041312 - DISS**	EPA 904.0	RADC/11784		
4058912006	**NPL11-MW-3S-041312D - DISS**	EPA 904.0	RADC/11784		
4058912007	**NPL11-MW-3D-041312 - DISS**	EPA 904.0	RADC/11784		
4058912008	**NPL11-MW-1D-041312 - DISS**	EPA 904.0	RADC/11784		
4058912001	**NPL11-MW-3S-041312**	SM 2540C	WET/11422		
4058912002	**NPL11-MW-3S-041312D**	SM 2540C	WET/11422		
4058912003	**NPL11-MW-3D-041312**	SM 2540C	WET/11422		
4058912004	**NPL11-MW-1D-041312**	SM 2540C	WET/11422		
4058912001	**NPL11-MW-3S-041312**	SM 2540D	WET/11402		
4058912002	**NPL11-MW-3S-041312D**	SM 2540D	WET/11402		
4058912003	**NPL11-MW-3D-041312**	SM 2540D	WET/11402		
4058912004	**NPL11-MW-1D-041312**	SM 2540D	WET/11402		

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OTTAWA OU2 NPL-11 SITE
OTTAWA, ILLINOIS
DATA VALIDATION REPORT

Date: July 20, 2011
Laboratory: Pace Analytical (Pace), Green Bay, Wisconsin
Laboratory Project #: 4047261, 4047263, and 4047264
Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)
Weston Analytical TDD/Work Order #: S05-0008-1101-006/20405.016.008.1347.00

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for eight water samples (includes the same eight water samples filtered for a total of 16 samples analyzed) collected for the Ottawa OU2 NPL-11 Site that were analyzed for the following parameters and methods:

- Radium 226 (total and dissolved) by United States Environmental Protection Agency (U.S. EPA)Method 903.1
- Radium 228 (total and dissolved) by U.S. EPA Method 904.0
- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D

A level II data package was requested from Pace. The data validation was conducted in general accordance with the U.S. EPA "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" dated January 2010 and the U.S. Department of Energy "Evaluation of Radiochemical Data Usability" dated April 1997. The Attachment contains the results summary sheets.

Data Validation Report
Ottawa OU2 NP-11Site
Pace Analytical
Laboratory Project #: 4047261, 4047263, and 4047264

RADIUM 226 AND RADIUM 228 BY U.S. EPA METHODS 903.1 AND 904.0

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-MW2S-061711	4047261001	Water	6/17/2011	7/5/2011 – 7/6/2011
NPL11-MW2D-061711	4047261002	Water	6/17/2011	7/5/2011 – 7/6/2011
NPL11-MW2S-061711-FILT	4047261003	Water	6/17/2011	7/5/2011 – 7/6/2011
NPL11-MW2D-061711-FILT	4047261004	Water	6/17/2011	7/5/2011 – 7/6/2011
NPL11-MW1S-061611	4047263001	Water	6/16/2011	6/27/2011 – 7/6/2011
NPL11-MW1S-061611D	4047263002	Water	6/16/2011	6/27/2011 – 7/6/2011
NPL11-MW3S-061611	4047263003	Water	6/16/2011	6/27/2011 – 7/6/2011
NPL11-MW1S-061611-FILT	4047263004	Water	6/16/2011	6/27/2011 – 7/6/2011
NPL11-MW1S-061611D-FILT	4047263005	Water	6/16/2011	6/30/2011 – 7/6/2011
NPL11-MW3S-061611-FILT	4047263006	Water	6/16/2011	6/27/2011 – 7/6/2011
NPL11-MW3D-061711	4047264001	Water	6/17/2011	6/30/2011 – 7/6/2011
NPL11-RB-061711	4047264002	Water	6/17/2011	6/30/2011 – 7/6/2011
NPL11-MW1D-061711	4047264003	Water	6/17/2011	6/30/2011 – 7/6/2011
NPL11-MW3D-061711-FILT	4047264004	Water	6/17/2011	6/27/2011 – 7/6/2011
NPL11-RB-061711-FILT	4047264005	Water	6/17/2011	6/30/2011 – 7/6/2011
NPL11-MW1D-061711-FILT	4047264006	Water	6/17/2011	6/30/2011 – 7/6/2011

2. Holding Times

The samples were analyzed within the required holding time limit of 180 days from sample collection to analysis.

3. Blank Results

A method blank was analyzed with the samples and was method blank result is less than its minimum detectable concentration (MDC) as required.

4. Field Duplicate Results

Sample NPL11-MW1S-061611D is a field duplicate of sample NPL11-MW1S-061611 and sample NPL11-MW1S-061611D-FILT is a field duplicate of sample NPL11-MW1S-061611-FILT. There is no set QC limit for field duplicates; however, a standard QC limit of 50 relative percent difference (RPD) or less is typically used. The RPDs were calculated and ranged from 37 to 58 percent. These RPDs are a little high indicating some sample heterogeneity.

5. Overall Assessment

The Radium 226 and Radium 228 data are acceptable for use based on the information received.

TDS BY SM 2540C AND TSS BY SM 2540D

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-MW2S-061711	4047261001	Water	6/17/2011	6/21/2011
NPL11-MW2D-061711	4047261002	Water	6/17/2011	6/21/2011
NPL11-MW1S-061611	4047263001	Water	6/16/2011	6/21/2011
NPL11-MW1S-061611D	4047263002	Water	6/16/2011	6/21/2011
NPL11-MW3S-061611	4047263003	Water	6/16/2011	6/21/2011
NPL11-MW3D-061711	4047264001	Water	6/17/2011	6/21/2011
NPL11-RB-061711	4047264002	Water	6/17/2011	6/21/2011
NPL11-MW1D-061711	4047264003	Water	6/17/2011	6/21/2011

2. Holding Times

The samples were analyzed within the required holding time limit of 7 days from sample collection to analysis.

3. Blank Results

Method blanks were analyzed with the samples and were free of target analytes above the reporting limit.

4. Laboratory Control Sample (LCS) Results

The LCS recoveries were within the laboratory-established quality control (QC) limits for target analytes.

5. Laboratory Duplicate Results

The laboratory duplicates were within the laboratory QC limit for relative percent difference.

6. Field Duplicate Results

Sample NPL11-MW1S-061611D is a field duplicate of sample NPL11-MW1S-061611. There is no set QC limit for field duplicates; however, a standard QC limit of 50 RPD or less is typically used. The RPDs were calculated and were 0 and 2 percent for TSS and TDS, respectively. These RPDs indicate excellent correlation between the two samples.

7. Overall Assessment

The TDS and TSS data are acceptable for use based on the information received.

ATTACHMENT

PACE ANALYTICAL
RESULTS SUMMARY

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2S-061711 **Lab ID: 4047261001** Collected: 06/17/11 08:30 Received: 06/20/11 13:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**708**	mg/L	20.0	1		06/21/11 15:26		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**3.6**	mg/L	1.4	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2D-061711 **Lab ID: 4047261002** Collected: 06/17/11 09:50 Received: 06/20/11 13:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**694**	mg/L	20.0	1		06/21/11 15:27		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**10.4**	mg/L	2.0	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2S-061711 **Lab ID: 4047261001** Collected: 06/17/11 08:30 Received: 06/20/11 13:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.135 ± 0.326 (0.629)**	pCi/L	07/06/11 13:55	13982-63-3	
Radium-228	EPA 904.0	**1.25 ± 0.510 (0.806)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2D-061711 **Lab ID: 4047261002** Collected: 06/17/11 09:50 Received: 06/20/11 13:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.828 ± 0.680 (0.374)**	pCi/L	07/06/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**1.36 ± 0.552 (0.784)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2S-061711-FILT **Lab ID: 4047261003** Collected: 06/17/11 08:30 Received: 06/21/11 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.063 ± 0.213 (0.581)**	pCi/L	07/06/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**1.20 ± 0.505 (0.811)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047261

Sample: NPL11-MW2D-061711-FILT **Lab ID: 4047261004** Collected: 06/17/11 09:50 Received: 06/21/11 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.524 ± 0.418 (0.482)**	pCi/L	07/06/11 14:26	13982-63-3	
Radium-228	EPA 904.0	**0.755 ± 0.441 (0.795)**	pCi/L	07/05/11 12:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611 **Lab ID: 4047263001** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**802**	mg/L	20.0	1		06/21/11 15:21		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.0**	mg/L	1.7	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-D **Lab ID: 4047263002** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**786**	mg/L	20.0	1		06/21/11 15:22		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.0**	mg/L	1.4	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW3S-061611 **Lab ID: 4047263003** Collected: 06/16/11 18:00 Received: 06/20/11 13:56 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1870**	mg/L	20.0	1		06/21/11 15:25		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**118**	mg/L	5.0	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611 **Lab ID: 4047263001** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.142 ± 0.394 (0.764)**	pCi/L	07/06/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**0.418 ± 0.427 (0.892)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-D **Lab ID: 4047263002** Collected: 06/16/11 14:45 Received: 06/20/11 13:56 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.235 ± 0.462 (0.636)**	pCi/L	07/06/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**0.736 ± 0.572 (1.13)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW3S-061611 **Lab ID: 4047263003** Collected: 06/16/11 18:00 Received: 06/20/11 13:56 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.355 ± 0.438 (0.710)**	pCi/L	07/06/11 13:42	13982-63-3	
Radium-228	EPA 904.0	**0.858 ± 0.501 (0.882)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-FILT **Lab ID: 4047263004** Collected: 06/16/11 14:45 Received: 06/20/11 15:12 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0746 ± 0.254 (0.549)**	pCi/L	07/06/11 13:42	13982-63-3	
Radium-228	EPA 904.0	**0.829 ± 0.526 (0.982)**	pCi/L	06/27/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW1S-061611-D-FILT **Lab ID: 4047263005** Collected: 06/16/11 14:45 Received: 06/20/11 15:12 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.135 ± 0.324 (0.625)**	pCi/L	07/06/11 13:55	13982-63-3	
Radium-228	EPA 904.0	**0.568 ± 0.470 (0.913)**	pCi/L	06/30/11 16:01	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047263

Sample: NPL11-MW3S-061611-FILT **Lab ID: 4047263006** Collected: 06/16/11 18:00 Received: 06/20/11 15:12 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.512 ± 0.485 (0.679)**	pCi/L	07/06/11 13:55	13982-63-3	
Radium-228	EPA 904.0	**0.553 ± 0.442 (0.882)**	pCi/L	06/27/11 15:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW3D-061711 **Lab ID: 4047264001** Collected: 06/17/11 12:20 Received: 06/20/11 13:58 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1490**	mg/L	20.0	1		06/21/11 15:29		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**60.3**	mg/L	3.3	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-RB-061711 **Lab ID: 4047264002** Collected: 06/17/11 12:45 Received: 06/20/11 13:58 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	ND	mg/L	20.0	1		06/21/11 15:29		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	ND	mg/L	1.2	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW1D-061711 **Lab ID: 4047264003** Collected: 06/16/11 13:05 Received: 06/20/11 13:58 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**686**	mg/L	20.0	1		06/21/11 15:26		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**30.4**	mg/L	2.0	1		06/21/11 13:55		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW3D-061711 **Lab ID: 4047264001** Collected: 06/17/11 12:20 Received: 06/20/11 13:58 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.572 ± 0.542 (0.759)**	pCi/L	07/06/11 12:54	13982-63-3	
Radium-228	EPA 904.0	**0.991 ± 0.529 (0.950)**	pCi/L	06/30/11 15:57	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-RB-061711 **Lab ID: 4047264002** Collected: 06/17/11 12:45 Received: 06/20/11 13:58 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0731 ± 0.379 (0.787)**	pCi/L	07/06/11 12:54	13982-63-3	
Radium-228	EPA 904.0	**0.846 ± 0.509 (0.943)**	pCi/L	06/30/11 15:59	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW1D-061711 **Lab ID: 4047264003** Collected: 06/16/11 13:05 Received: 06/20/11 13:58 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.339 ± 0.445 (0.730)**	pCi/L	07/06/11 13:07	13982-63-3	
Radium-228	EPA 904.0	**1.35 ± 0.560 (0.902)**	pCi/L	06/30/11 15:58	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW3D-061711-FILT **Lab ID: 4047264004** Collected: 06/17/11 12:20 Received: 06/20/11 15:18 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.215 ± 0.316 (0.527)**	pCi/L	07/06/11 13:07	13982-63-3	
Radium-228	EPA 904.0	**0.787 ± 0.509 (0.957)**	pCi/L	06/27/11 15:10	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-RB-061711-FILT **Lab ID: 4047264005** Collected: 06/17/11 12:45 Received: 06/20/11 15:18 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0759 ± 0.258 (0.559)**	pCi/L	07/06/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**0.726 ± 0.421 (0.756)**	pCi/L	06/30/11 15:58	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047264

Sample: NPL11-MW1D-061711-FILT **Lab ID: 4047264006** Collected: 06/17/11 12:05 Received: 06/20/11 15:18 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.611 ± 0.462 (0.567)**	pCi/L	07/06/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**1.42 ± 0.556 (0.874)**	pCi/L	06/30/11 15:59	15262-20-1	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4047264

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

SAMPLE QUALIFIERS

Sample: 4047264004

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047264005

[1] Sample was filtered by the laboratory prior to analysis.

Sample: 4047264006

[1] Sample was filtered by the laboratory prior to analysis.

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OTTAWA OU2 NPL-11 SITE
OTTAWA, ILLINOIS
DATA VALIDATION REPORT

Date: January 12, 2012
Laboratory: Pace Analytical (Pace), Green Bay, Wisconsin
Laboratory Project #: 4050797
Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)
Weston Analytical TDD/Work Order #: S05-0008-1101-006/20405.016.008.1347.00

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for eight water samples collected for the Ottawa OU2 NPL-11 Site that were analyzed for the following parameters and methods:

- Radium 226 (total and dissolved) by United States Environmental Protection Agency (U.S. EPA)Method 903.1
- Radium 228 (total and dissolved) by U.S. EPA Method 904.0
- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D

A level II data package was requested from Pace. The data validation was conducted in general accordance with the U.S. EPA "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" dated January 2010 and the U.S. Department of Energy "Evaluation of Radiochemical Data Usability" dated April 1997. The Attachment contains the results summary sheets.

Data Validation Report
Ottawa OU2 NP-11Site
Pace Analytical
Laboratory Project #: 4050797

RADIUM 226 AND RADIUM 228 BY U.S. EPA METHODS 903.1 AND 904.0

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
MW-3S-091211	4050797001	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-3S-091211-FILTERED	4050797002	Water	9/12/2011	9/22/2011 – 9/23/2011
NPL11-RB-091211	4050797003	Water	9/12/2011	9/22/2011 – 9/23/2011
NPL11-RB-091211-FILTERED	4050797004	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-1S-091211	4050797005	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-1S-091211-FILTERED	4050797006	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-1D-091211	4050797007	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-1D-091211-FILTERED	4050797008	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-2D-091211	4050797009	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-2D-091211-FILTERED	4050797010	Water	9/12/2011	9/22/2011 – 9/23/2011
MW-2S-091211	4050797011	Water	9/12/2011	9/27/2011 – 9/29/2011
MW-2S-091211-FILTERED	4050797012	Water	9/12/2011	9/22/2011 – 9/28/2011
MW-2S-091211-DUP	4050797013	Water	9/12/2011	9/26/2011 – 9/28/2011
MW-2S-091211-DUP-FILTERED	4050797014	Water	9/12/2011	9/27/2011 – 9/28/2011
MW-3D-091211	4050797015	Water	9/12/2011	9/27/2011 – 9/28/2011
MW-3D-091211-FILTERED	4050797016	Water	9/12/2011	9/27/2011 – 9/28/2011

2. Holding Times

The samples were analyzed within the required holding time limit of 180 days from sample collection to analysis.

3. Blank Results

Method blanks were analyzed with the samples and the method blank results were less than their minimum detectable concentrations (MDC) as required.

4. Field Duplicate Results

Sample MW-2S-091211-DUP is a field duplicate of sample MW-2S-091211 and sample MW-2S-091211-DUP-FILTERED is a field duplicate of sample MW-2S-091211-FILTERED. There is no set QC limit for field duplicates; however, a standard QC limit of 50 relative percent difference (RPD) or less is typically used. The table below summarizes the RPD results. Two of the RPD results are somewhat high indicating some sample heterogeneity associated with the radium analyses of these water samples.

Analyte	MW-2S-091211	MW-2S-091211-DUP	RPD	MW-2S-091211-FILTERED	2S-091211-DUP-FILTERED	RPD
Radium 226 (pCi/L)	0.354	0.483	31	0.132	0.311	81
Radium 228 (pCi/L)	0.744	2.86	117	0.909	1.04	13

Notes: pCi/L – Picocurie per liter

5. Overall Assessment

The Radium 226 and Radium 228 data are acceptable for use based on the information received.

Data Validation Report
Ottawa OU2 NP-11Site
Pace Analytical
Laboratory Project #: 4050797

TDS BY SM 2540C AND TSS BY SM 2540D

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
MW-3S-091211	4050797001	Water	9/12/2011	9/19/2011
NPL11-RB-091211	4050797003	Water	9/12/2011	9/19/2011
MW-1S-091211	4050797005	Water	9/12/2011	9/19/2011
MW-1D-091211	4050797007	Water	9/12/2011	9/19/2011
MW-2D-091211	4050797009	Water	9/12/2011	9/19/2011
MW-2S-091211	4050797011	Water	9/12/2011	9/19/2011
MW-2S-091211-DUP	4050797013	Water	9/12/2011	9/19/2011
MW-3D-091211	4050797015	Water	9/12/2011	9/19/2011

2. Holding Times

The samples were analyzed within the required holding time limit of 7 days from sample collection to analysis.

3. Blank Results

Method blanks were analyzed with the samples and were free of target analytes above the reporting limit.

4. Laboratory Control Sample (LCS) Results

The LCS recoveries were within the laboratory-established quality control (QC) limits for target analytes.

5. Laboratory Duplicate Results

The laboratory duplicates were within the laboratory QC limit for relative percent difference.

6. Field Duplicate Results

Sample MW-2S-091211-DUP is a field duplicate of sample MW-2S-091211. There is no set QC limit for field duplicates; however, a standard QC limit of 50 RPD or less is typically used. The

RPDs were calculated and were 23 and 1 percent for TSS and TDS, respectively. These RPDs indicate good correlation between the two samples.

7. Overall Assessment

The TDS and TSS data are acceptable for use based on the information received.

ATTACHMENT

PACE ANALYTICAL
RESULTS SUMMARY

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3S-091211 **Lab ID: 4050797001** Collected: 09/12/11 15:40 Received: 09/14/11 10:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2460**	mg/L	20.0	1		09/19/11 12:41		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**56.4**	mg/L	4.0	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: NPL11-RB-091211 **Lab ID: 4050797003** Collected: 09/12/11 16:00 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	ND	mg/L	1.1	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1S-091211 **Lab ID: 4050797005** Collected: 09/12/11 09:55 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**648**	mg/L	20.0	1		09/19/11 12:41		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**34.8**	mg/L	2.0	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1D-091211 **Lab ID: 4050797007** Collected: 09/12/11 10:50 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**584**	mg/L	20.0	1		09/19/11 12:42		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.1**	mg/L	2.9	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2D-091211 **Lab ID: 4050797009** Collected: 09/12/11 12:05 Received: 09/14/11 13:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**778**	mg/L	20.0	1		09/19/11 12:42		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**41.0**	mg/L	5.0	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211 **Lab ID: 4050797011** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**848**	mg/L	20.0	1		09/19/11 12:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**11.3**	mg/L	1.3	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211-DUP **Lab ID: 4050797013** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**854**	mg/L	20.0	1		09/19/11 12:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**14.3**	mg/L	1.7	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3D-091211 **Lab ID: 4050797015** Collected: 09/12/11 14:55 Received: 09/14/11 10:26 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1090**	mg/L	20.0	1		09/19/11 12:44		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**44.7**	mg/L	6.7	1		09/19/11 10:17		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3S-091211 **Lab ID: 4050797001** Collected: 09/12/11 15:40 Received: 09/14/11 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.552 ± 0.421 (0.214)**	pCi/L	09/23/11 13:41	13982-63-3	
Radium-228	EPA 904.0	**-0.189 ± 0.396 (0.930)**	pCi/L	09/22/11 15:12	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3S-091211 - FILTERED **Lab ID: 4050797002** Collected: 09/12/11 15:40 Received: 09/14/11 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.130 ± 0.460 (0.917)**	pCi/L	09/23/11 13:41	13982-63-3	
Radium-228	EPA 904.0	**0.433 ± 0.471 (0.983)**	pCi/L	09/22/11 15:09	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: NPL11-RB-091211 **Lab ID: 4050797003** Collected: 09/12/11 16:00 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0974 ± 0.455 (0.816)**	pCi/L	09/23/11 14:42	13982-63-3	
Radium-228	EPA 904.0	**0.494 ± 0.479 (0.985)**	pCi/L	09/22/11 15:11	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: NPL11-RB-091211 - FILTERED **Lab ID: 4050797004** Collected: 09/12/11 16:00 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**2.23 ± 1.04 (0.922)**	pCi/L	09/23/11 14:23	13982-63-3	
Radium-228	EPA 904.0	**-0.0469 ± 0.449 (0.996)**	pCi/L	09/22/11 15:29	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1S-091211 **Lab ID: 4050797005** Collected: 09/12/11 09:55 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.080 ± 0.351 (0.862)**	pCi/L	09/23/11 14:06	13982-63-3	
Radium-228	EPA 904.0	**0.721 ± 0.529 (1.01)**	pCi/L	09/22/11 12:27	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1S-091211 - FILTERED **Lab ID: 4050797006** Collected: 09/12/11 09:55 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.426 ± 0.449 (0.627)**	pCi/L	09/23/11 14:24	13982-63-3	
Radium-228	EPA 904.0	**0.546 ± 0.471 (0.953)**	pCi/L	09/22/11 12:23	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1D-091211 **Lab ID: 4050797007** Collected: 09/12/11 10:50 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.640 ± 0.656 (0.983)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**0.471 ± 0.482 (1.00)**	pCi/L	09/22/11 12:28	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-1D-091211 - FILTERED **Lab ID: 4050797008** Collected: 09/12/11 10:50 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.27 ± 0.822 (0.905)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**0.918 ± 0.544 (0.993)**	pCi/L	09/22/11 12:22	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2D-091211 **Lab ID: 4050797009** Collected: 09/12/11 12:05 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.885 ± 0.573 (0.240)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**1.16 ± 0.578 (0.994)**	pCi/L	09/22/11 12:21	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2D-091211 - FILTERED **Lab ID: 4050797010** Collected: 09/12/11 12:05 Received: 09/14/11 13:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.161 ± 0.226 (0.219)**	pCi/L	09/23/11 14:36	13982-63-3	
Radium-228	EPA 904.0	**0.617 ± 0.512 (1.01)**	pCi/L	09/22/11 12:24	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211 **Lab ID: 4050797011** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.354 ± 0.372 (0.548)**	pCi/L	09/29/11 13:29	13982-63-3	
Radium-228	EPA 904.0	**0.744 ± 0.495 (0.908)**	pCi/L	09/27/11 15:10	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211 - FILTERED **Lab ID: 4050797012** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.132 ± 0.411 (0.795)**	pCi/L	09/28/11 13:12	13982-63-3	
Radium-228	EPA 904.0	**0.909 ± 0.533 (0.969)**	pCi/L	09/22/11 12:28	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211-DUP **Lab ID: 4050797013** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.483 ± 0.482 (0.725)**	pCi/L	09/28/11 13:30	13982-63-3	
Radium-228	EPA 904.0	**2.86 ± 1.93 (3.53)**	pCi/L	09/26/11 12:54	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-2S-091211-DUP - FILTERED **Lab ID: 4050797014** Collected: 09/12/11 13:25 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.311 ± 0.293 (0.381)**	pCi/L	09/28/11 13:43	13982-63-3	
Radium-228	EPA 904.0	**1.04 ± 0.534 (0.938)**	pCi/L	09/27/11 15:21	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3D-091211 **Lab ID: 4050797015** Collected: 09/12/11 14:55 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.389 ± 0.427 (0.667)**	pCi/L	09/28/11 13:43	13982-63-3	
Radium-228	EPA 904.0	**0.451 ± 0.459 (0.899)**	pCi/L	09/27/11 15:50	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4050797

Sample: MW-3D-091212 - FILTERED **Lab ID: 4050797016** Collected: 09/12/11 14:55 Received: 09/14/11 10:26 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.168 ± 0.364 (0.671)**	pCi/L	09/28/11 13:43	13982-63-3	
Radium-228	EPA 904.0	**0.894 ± 0.469 (0.818)**	pCi/L	09/27/11 15:07	15262-20-1	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4050797

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

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OTTAWA OU2 NPL-11 SITE
OTTAWA, ILLINOIS
DATA VALIDATION REPORT

Date: January 12, 2012
Laboratory: Pace Analytical (Pace), Green Bay, Wisconsin
Laboratory Project #: 4055336
Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)
Weston Analytical TDD/Work Order #: S05-0008-1101-006/20405.016.008.1347.00

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for eight water samples collected for the Ottawa OU2 NPL-11 Site that were analyzed for the following parameters and methods:

- Radium 226 (total and dissolved) by United States Environmental Protection Agency (U.S. EPA)Method 903.1
- Radium 228 (total and dissolved) by U.S. EPA Method 904.0
- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D

A level II data package was requested from Pace. The data validation was conducted in general accordance with the U.S. EPA "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" dated January 2010 and the U.S. Department of Energy "Evaluation of Radiochemical Data Usability" dated April 1997. The Attachment contains the results summary sheets.

Data Validation Report
Ottawa OU2 NP-11Site
Pace Analytical
Laboratory Project #: 4055336

RADIUM 226 AND RADIUM 228 BY U.S. EPA METHODS 903.1 AND 904.0

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-MW1S-122811	4055336001	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW1S-122811 DIS	4055336002	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW1S-122811-DUP	4055336003	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW1S-122811-DUP DIS	4055336004	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW1D-122811	4055336005	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW1D-122811 DIS	4055336006	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW2S-122811	4055336007	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW2S-122811 DIS	4055336008	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW2D-122811	4055336009	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW2D-122811 DIS	4055336010	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW3S-122811	4055336011	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW3S-122811 DIS	4055336012	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-RB-122811	4055336013	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-RB-122811 DIS	4055336014	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW3D-122811	4055336015	Water	12/28/2011	1/23/2012 – 1/25/2012
NPL11-MW3D-122811 DIS	4055336016	Water	12/28/2011	1/23/2012 – 1/25/2012

2. Holding Times

The samples were analyzed within the required holding time limit of 180 days from sample collection to analysis.

3. Blank Results

Method blanks were analyzed with the samples and the method blank results were less than their minimum detectable concentrations (MDC) as required. In addition, the rinsate blank results were below the MDCs.

4. Field Duplicate Results

Sample NPL11-MW1S-122811-DUP is a field duplicate of sample NPL11-MW1S-122811 and sample NPL11-MW1S-122811-DUP DIS is a field duplicate of sample NPL11-MW1S-122811 DIS.

All radium results except one were less than the MDC indicating good correlation between the duplicate and parent sample. The exception was Radium-226 in sample NPL11-MW1S-122811 DIS which was detected just slightly above the MDC whereas the duplicate Radium-226 result was below the MDC. This indicates some minor heterogeneity associated with Radiujm-226 in this sample. No qualifications were applied.

5. Overall Assessment

The Radium 226 and Radium 228 data are acceptable for use based on the information received.

TDS BY SM 2540C AND TSS BY SM 2540D

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-MW1S-122811	4055336001	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-MW1S-122811-DUP	4055336003	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-MW1D-122811	4055336005	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-MW2S-122811	4055336007	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-MW2D-122811	4055336009	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-MW3S-122811	4055336011	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-RB-122811	4055336013	Water	12/28/2011	1/3/2012 – 1/4/2012
NPL11-MW3D-122811	4055336015	Water	12/28/2011	1/3/2012 – 1/4/2012

2. Holding Times

The samples were analyzed within the required holding time limit of 7 days from sample collection to analysis.

3. Blank Results

Method blanks and a rinsate blank were analyzed with the samples and were free of target analytes above the reporting limit.

4. Laboratory Control Sample (LCS) Results

The LCS recoveries were within the laboratory-established quality control (QC) limits for target analytes.

5. Laboratory Duplicate Results

Two laboratory duplicates were analyzed with the analyses. For TSS, one of the duplicates was outside QC limits while the other duplicate had a 0 RPD. No qualifications were applied for the one laboratory duplicate QC exceedance.

6. Field Duplicate Results

Sample NPL11-MW1S-122811-DUP is a field duplicate of sample NPL11-MW1S-122811. There is no set QC limit for field duplicates; however, a standard QC limit of 50 RPD or less is typically used. The RPDs were calculated and were 3 and .3 percent for TSS and TDS, respectively. These RPDs indicate good correlation between the two samples.

7. Overall Assessment

The TDS and TSS data are acceptable for use based on the information received.

ATTACHMENT

PACE ANALYTICAL
RESULTS SUMMARY

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811 **Lab ID: 4055336001** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**636**	mg/L	20.0	1		01/04/12 08:43		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**6.8**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811-DUP **Lab ID: 4055336003** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**634**	mg/L	20.0	1		01/04/12 08:44		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**6.6**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1D-122811 **Lab ID: 4055336005** Collected: 12/28/11 11:35 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**626**	mg/L	20.0	1		01/04/12 08:46		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**14.0**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2S-122811 **Lab ID: 4055336007** Collected: 12/28/11 12:15 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**736**	mg/L	20.0	1		01/04/12 08:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**8.0**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2D-122811 **Lab ID: 4055336009** Collected: 12/28/11 13:45 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**714**	mg/L	20.0	1		01/04/12 08:47		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**12.0**	mg/L	4.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3S-122811 **Lab ID: 4055336011** Collected: 12/28/11 14:15 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1950**	mg/L	20.0	1		01/04/12 08:48		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**2.8**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-RB-122811 **Lab ID: 4055336013** Collected: 12/28/11 15:30 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**<20.0**	mg/L	20.0	1		01/04/12 08:49		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**<2.0**	mg/L	2.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3D-122811 **Lab ID: 4055336015** Collected: 12/28/11 15:35 Received: 12/29/11 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1110**	mg/L	20.0	1		01/04/12 08:49		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**28.4**	mg/L	4.0	1		01/03/12 12:20		

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811 **Lab ID: 4055336001** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.243 ± 0.517 (0.872)**	pCi/L	01/25/12 12:01	13982-63-3	
Radium-228	EPA 904.0	**0.367 ± 0.424 (0.889)**	pCi/L	01/23/12 15:05	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811 DIS **Lab ID: 4055336002** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.24 ± 0.834 (0.950)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**0.382 ± 0.450 (0.948)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811-DUP **Lab ID: 4055336003** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.103 ± 0.578 (0.947)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**0.721 ± 0.500 (0.956)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1S-122811-DUP DIS **Lab ID: 4055336004** Collected: 12/28/11 10:20 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.426 ± 0.576 (0.918)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**0.344 ± 0.419 (0.884)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1D-122811 **Lab ID: 4055336005** Collected: 12/28/11 11:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.10 ± 0.824 (0.957)**	pCi/L	01/25/12 12:01	13982-63-3	
Radium-228	EPA 904.0	**1.09 ± 0.490 (0.796)**	pCi/L	01/23/12 15:06	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW1D-122811 DIS **Lab ID: 4055336006** Collected: 12/28/11 11:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.40 ± 0.837 (0.317)**	pCi/L	01/25/12 11:59	13982-63-3	
Radium-228	EPA 904.0	**1.15 ± 0.508 (0.819)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2S-122811 **Lab ID: 4055336007** Collected: 12/28/11 12:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.256 ± 0.589 (0.901)**	pCi/L	01/25/12 12:11	13982-63-3	
Radium-228	EPA 904.0	**0.872 ± 0.506 (0.926)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2S-122811 DIS **Lab ID: 4055336008** Collected: 12/28/11 12:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.481 ± 0.680 (0.970)**	pCi/L	01/25/12 13:14	13982-63-3	
Radium-228	EPA 904.0	**0.685 ± 0.455 (0.857)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2D-122811 **Lab ID: 4055336009** Collected: 12/28/11 13:45 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.638 ± 0.731 (0.999)**	pCi/L	01/25/12 13:11	13982-63-3	
Radium-228	EPA 904.0	**0.594 ± 0.406 (0.768)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW2D-122811 DIS **Lab ID: 4055336010** Collected: 12/28/11 13:45 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.843 ± 0.787 (0.996)**	pCi/L	01/25/12 12:11	13982-63-3	
Radium-228	EPA 904.0	**1.04 ± 0.471 (0.758)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3S-122811 **Lab ID: 4055336011** Collected: 12/28/11 14:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.478 ± 0.668 (0.948)**	pCi/L	01/25/12 13:19	13982-63-3	
Radium-228	EPA 904.0	**0.178 ± 0.446 (0.981)**	pCi/L	01/23/12 15:16	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3S-122811 DIS **Lab ID: 4055336012** Collected: 12/28/11 14:15 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.067 ± 0.543 (0.947)**	pCi/L	01/25/12 12:56	13982-63-3	
Radium-228	EPA 904.0	**1.04 ± 0.546 (0.960)**	pCi/L	01/23/12 15:16	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-RB-122811 **Lab ID: 4055336013** Collected: 12/28/11 15:30 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.236 ± 0.519 (0.937)**	pCi/L	01/25/12 13:33	13982-63-3	
Radium-228	EPA 904.0	**0.258 ± 0.403 (0.872)**	pCi/L	01/23/12 15:07	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-RB-122811 DIS **Lab ID: 4055336014** Collected: 12/28/11 15:30 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.099 ± 0.556 (0.912)**	pCi/L	01/25/12 13:46	13982-63-3	
Radium-228	EPA 904.0	**0.782 ± 0.432 (0.761)**	pCi/L	01/23/12 15:08	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3D-122811 **Lab ID: 4055336015** Collected: 12/28/11 15:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.584 ± 0.715 (0.963)**	pCi/L	01/25/12 13:45	13982-63-3	
Radium-228	EPA 904.0	**1.07 ± 0.547 (0.947)**	pCi/L	01/23/12 15:08	15262-20-1	

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ANALYTICAL RESULTS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

Sample: NPL11-MW3D-122811 DIS **Lab ID: 4055336016** Collected: 12/28/11 15:35 Received: 12/29/11 09:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.513 ± 0.794 (0.973)**	pCi/L	01/25/12 14:01	13982-63-3	
Radium-228	EPA 904.0	**1.18 ± 0.556 (0.948)**	pCi/L	01/23/12 15:15	15262-20-1	

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QUALIFIERS

Project: 20405.012.008.0385.00
Pace Project No.: 4055336

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

R1	RPD value was outside control limits.

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OTTAWA OU2 NPL-11 SITE
OTTAWA, ILLINOIS
DATA VALIDATION REPORT

Date: May 9, 2012
Laboratory: Pace Analytical (Pace), Green Bay, Wisconsin
Laboratory Project #: 4058911 and 4058912
Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)
Weston Analytical TDD/Work Order #: S05-0008-1101-006/20405.016.008.1347.00

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for eight water samples collected for the Ottawa OU2 NPL-11 Site that were analyzed for the following parameters and methods:

- Radium 226 (total and dissolved) by United States Environmental Protection Agency (U.S. EPA)Method 903.1
- Radium 228 (total and dissolved) by U.S. EPA Method 904.0
- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D

A level II data package was requested from Pace. The data validation was conducted in general accordance with the U.S. EPA "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" dated January 2010 and the U.S. Department of Energy "Evaluation of Radiochemical Data Usability" dated April 1997. The Attachment contains the results summary sheets.

Data Validation Report
Ottawa OU2 NP-11Site
Pace Analytical
Laboratory Project #: 4058911 and 4058912

RADIUM 226 AND RADIUM 228 BY U.S. EPA METHODS 903.1 AND 904.0

1. Samples

The following table summarizes the samples for which this data validation is being conducted. Radium 226 and Radium 228 were analyzed as both total and dissolved fractions. The laboratory performed the filtering for the dissolved sample portions and gave them separate identification numbers.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL-11-MW-2D-041312	4058911001	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL-11-MW-2S-041312	4058911002	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL-11-MW-1S-041312	4058911003	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL-11-RB-041312	4058911004	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL-11-MW-2D-041312-DISS	4058911005	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL-11-MW-2S-041312-DISS	4058911006	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL-11-MW-1S-041312-DISS	4058911007	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL-11-RB-041312-DISS	4058911008	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL11-MW-3S-041312	4058912001	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL11-MW-3S-041312D	4058912002	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL11-MW-3D-041312	4058912003	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL11-MW-1D-041312	4058912004	Water	4/13/2012	4/26/2012 – 5/2/2012
NPL11-MW-3S-041312-DISS	4058912005	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL11-MW-3S-041312D-DISS	4058912006	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL11-MW-3D-041312-DISS	4058912007	Water	4/13/2012	5/1/2012 – 5/3/2012
NPL11-MW-1D-041312-DISS	4058912008	Water	4/13/2012	5/1/2012 – 5/3/2012

2. Holding Times

The samples were analyzed within the required holding time limit of 180 days from sample collection to analysis.

3. Blank Results

Method blanks were analyzed with the samples and the method blank results were less than their minimum detectable concentrations (MDC) as required. In addition, the rinsate blank results were below the MDCs.

4. Field Duplicate Results

Sample NPL11-MW-3S-041312D is a field duplicate of sample NPL11-MW-3S-041312 and sample NPL11-MW-3S-041312D-DISS is a field duplicate of sample NPL11-MW-3S-041312-DISS.

All radium results were less than the MDC indicating good correlation between the duplicate and parent sample.

5. Overall Assessment

The Radium 226 and Radium 228 data are acceptable for use based on the information received.

TDS BY SM 2540C AND TSS BY SM 2540D

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL-11-MW-2D-041312	4058911001	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL-11-MW-2S-041312	4058911002	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL-11-MW-1S-041312	4058911003	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL-11-RB-041312	4058911004	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL11-MW-3S-041312	4058912001	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL11-MW-3S-041312D	4058912002	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL11-MW-3D-041312	4058912003	Water	4/13/2012	4/18/2012 – 4/20/2012
NPL11-MW-1D-041312	4058912004	Water	4/13/2012	4/18/2012 – 4/20/2012

2. Holding Times

The samples were analyzed within the required holding time limit of 7 days from sample collection to analysis.

3. Blank Results

Method blanks and a rinsate blank were analyzed with the samples and were free of target analytes above the reporting limit.

4. Laboratory Control Sample (LCS) Results

The LCS recoveries were within the laboratory-established quality control (QC) limits for target analytes.

5. Laboratory Duplicate Results

Two laboratory duplicates were analyzed with the analyses. The RPDs were within QC limits.

6. Field Duplicate Results

Sample NPL11-MW-3S-041312D is a field duplicate of sample NPL11-MW-3S-041312. There is no set QC limit for field duplicates; however, a standard QC limit of 50 RPD or less is typically used. The RPDs were calculated and were 71 and .5 percent for TSS and TDS, respectively. The RPD of 71 indicates sample heterogeneity associated with TSS in these samples.

7. Overall Assessment

The TDS and TSS data are acceptable for use based on the information received.

ATTACHMENT

PACE ANALYTICAL
RESULTS SUMMARY

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2D-041312 **Lab ID: 4058911001** Collected: 04/13/12 11:20 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**766**	mg/L	20.0	1		04/20/12 07:54		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**88.0**	mg/L	6.7	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2S-041312 **Lab ID: 4058911002** Collected: 04/13/12 12:20 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**810**	mg/L	20.0	1		04/20/12 07:58		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**6.0**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-1S-041312 **Lab ID: 4058911003** Collected: 04/13/12 14:20 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**734**	mg/L	20.0	1		04/20/12 07:59		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**3.6**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-RB-041312 **Lab ID: 4058911004** Collected: 04/13/12 15:00 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**<20.0**	mg/L	20.0	1		04/20/12 08:00		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**<1.4**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2D-041312 **Lab ID: 4058911001** Collected: 04/13/12 11:20 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.358 ± 0.337 (0.439)**	pCi/L	05/02/12 15:51	13982-63-3	
Radium-228	EPA 904.0	**0.864 ± 0.525 (0.973)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2S-041312 **Lab ID: 4058911002** Collected: 04/13/12 12:20 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.238 ± 0.273 (0.215)**	pCi/L	05/02/12 16:51	13982-63-3	
Radium-228	EPA 904.0	**0.251 ± 0.420 (0.914)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-1S-041312 **Lab ID: 4058911003** Collected: 04/13/12 14:20 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.342 ± 0.478 (0.464)**	pCi/L	05/02/12 16:05	13982-63-3	
Radium-228	EPA 904.0	**0.333 ± 0.414 (0.876)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-RB-041312 **Lab ID: 4058911004** Collected: 04/13/12 15:00 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0678 ± 0.298 (0.630)**	pCi/L	05/02/12 16:31	13982-63-3	
Radium-228	EPA 904.0	**-0.202 ± 0.356 (0.875)**	pCi/L	04/26/12 16:40	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2D-041312 - DISS **Lab ID: 4058911005** Collected: 04/13/12 11:20 Received: 04/16/12 10:43 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.798 ± 0.605 (0.781)**	pCi/L	05/03/12 14:27	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**1.14 ± 0.520 (0.872)**	pCi/L	05/01/12 11:42	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-2S-041312 - DISS **Lab ID: 4058911006** Collected: 04/13/12 12:20 Received: 04/16/12 10:43 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.273 ± 0.537 (0.918)**	pCi/L	05/03/12 15:55	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.893 ± 0.488 (0.864)**	pCi/L	05/01/12 11:42	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-MW-1S-041312 - DISS **Lab ID: 4058911007** Collected: 04/13/12 14:20 Received: 04/16/12 10:43 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.000 ± 0.332 (0.743)**	pCi/L	05/03/12 14:52	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**-0.138 ± 0.366 (0.870)**	pCi/L	05/01/12 11:43	15262-20-1	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4058911

Sample: NPL-11-RB-041312 - DISS **Lab ID: 4058911008** Collected: 04/13/12 15:00 Received: 04/16/12 10:43 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**-0.211 ± 0.242 (0.758)**	pCi/L	05/03/12 14:52	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.142 ± 0.362 (0.809)**	pCi/L	05/01/12 11:48	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312 **Lab ID: 4058912001** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1970**	mg/L	20.0	1		04/20/12 08:01		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**16.6**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312D **Lab ID: 4058912002** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1980**	mg/L	20.0	1		04/20/12 08:02		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**7.9**	mg/L	1.4	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3D-041312 **Lab ID: 4058912003** Collected: 04/13/12 13:49 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1710**	mg/L	20.0	1		04/20/12 08:02		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**19.6**	mg/L	2.0	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-1D-041312 **Lab ID: 4058912004** Collected: 04/13/12 15:48 Received: 04/14/12 10:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**630**	mg/L	20.0	1		04/20/12 08:03		
2540D Total Suspended Solids	Analytical Method: SM 2540D							
Total Suspended Solids	**12.0**	mg/L	2.0	1		04/18/12 11:10		

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312 **Lab ID: 4058912001** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.360 ± 0.429 (0.669)**	pCi/L	05/02/12 15:37	13982-63-3	
Radium-228	EPA 904.0	**0.00670 ± 0.367 (0.857)**	pCi/L	04/26/12 16:39	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312D **Lab ID: 4058912002** Collected: 04/13/12 10:30 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0677 ± 0.297 (0.629)**	pCi/L	05/02/12 16:05	13982-63-3	
Radium-228	EPA 904.0	**0.0286 ± 0.427 (0.974)**	pCi/L	04/26/12 16:34	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3D-041312 **Lab ID: 4058912003** Collected: 04/13/12 13:49 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.125 ± 0.247 (0.675)**	pCi/L	05/02/12 16:30	13982-63-3	
Radium-228	EPA 904.0	**0.902 ± 0.535 (0.986)**	pCi/L	04/26/12 16:34	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-1D-041312 **Lab ID: 4058912004** Collected: 04/13/12 15:48 Received: 04/14/12 10:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.901 ± 0.589 (0.721)**	pCi/L	05/02/12 16:20	13982-63-3	
Radium-228	EPA 904.0	**0.597 ± 0.486 (0.965)**	pCi/L	04/26/12 16:39	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312 - DISS **Lab ID: 4058912005** Collected: 04/13/12 10:30 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.144 ± 0.283 (0.529)**	pCi/L	05/03/12 14:13	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**-0.0340 ± 0.393 (0.861)**	pCi/L	05/01/12 11:41	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3S-041312D - DISS **Lab ID: 4058912006** Collected: 04/13/12 10:30 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.000 ± 0.269 (0.638)**	pCi/L	05/03/12 14:38	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.292 ± 0.414 (0.870)**	pCi/L	05/01/12 11:41	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-3D-041312 - DISS **Lab ID: 4058912007** Collected: 04/13/12 13:49 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**0.160 ± 0.510 (0.938)**	pCi/L	05/03/12 14:38	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**0.290 ± 0.411 (0.863)**	pCi/L	05/01/12 11:41	15262-20-1	

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ANALYTICAL RESULTS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

Sample: NPL11-MW-1D-041312 - DISS **Lab ID: 4058912008** Collected: 04/13/12 15:48 Received: 04/16/12 13:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226, Dissolved	EPA 903.1	**1.62 ± 0.806 (0.810)**	pCi/L	05/03/12 14:27	13982-63-3	
Radium-228, Dissolved	EPA 904.0	**1.24 ± 0.515 (0.818)**	pCi/L	05/01/12 11:42	15262-20-1	

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QUALIFIERS

Project: OTTAWA NPL-11
Pace Project No.: 4058912

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

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APPENDIX D
RESIDENTIAL RADON SAMPLE
LABORATORY ANALYTICAL REPORTS

Radtrak® Radon Gas Detector

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

TEST/REPORT ADDRESS:
LAUREN PESCE
20 N. WACKER DRIVE
SUITE 1210
CHICAGO, IL
60606

YOUR STATE AGENCY:
IL DEPT OF PUBLIC HEALTH
(800) 325-1245

RADON MONITORING REPORT

Detector Number	Detector Type	Starting Date	Ending Date	Days	Location	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	Note
4829599	INDOOR AIR	06/13/11	10/20/11	129			1.3 ±0.08	Crawl Space
4829621	INDOOR AIR	06/13/11	10/20/11	129			1.1 ±0.07	Kitchen
1	2	3	4	5	6	7	8	9

RESULTS RELATED ONLY TO MONITORS AS RECEIVED BY LANDAUER.

	Process No.	Date Rec'd.	Report Date	Acct. No.
LMR	A22315	10/25/11	11/01/11	0400000

KEEP THIS DOCUMENT WITH YOUR IMPORTANT PAPERS
– SEE OTHER SIDE FOR IMPORTANT INFORMATION –

Radon Monitoring Report

WESTON SOLUTIONS, INC.
ATTN: RICK MEHL
750 N. BUNKER CT.
SUITE 500
VERNON HILLS, IL 60061

LICENSES: 101146AL,100584RT,RNL99201

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586
Telephone: (800) 528-8327 Facsimile: (708) 755-7048

Acct. No. 0410038

PROGRAM NAME: 355 BELLEVUE

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4923612	DRN	12-DEC-13	09-APR-14	FLOOR: FIRST FLOOR KITCHEN	251.2 ±13.8	2.1 ±0.12	
4923640	DRN	12-DEC-13	09-APR-14	FLOOR: BASEMENT CRAWL SPACE	282.3 ±14.8	2.4 ±0.13	
①	②	③	④	⑤	⑥	⑦	⑧

RESULTS RELATED ONLY TO MONITORS
AS RECEIVED BY LANDAUER.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A22925	24-APR-14	11-APR-14

APPENDIX E
INVESTIGATION DERIVED WASTE SAMPLE LABORATORY ANALYTICAL AND DATA VALIDATION REPORTS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

July 19, 2011

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL-11
Pace Project No.: 4047262

Dear Lisa Graczck/Dynamac:

Enclosed are the analytical results for sample(s) received by the laboratory on June 20, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kang Khang for
Laurie Woelfel
laurie.woelfel@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: NPL-11
Pace Project No.: 4047262

Pennsylvania Certification IDs
1638 Roseytown Road Suites 2,3&4, Greensburg, PA 15601
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/NELAC Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/NELAC Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/NELAC Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/NELAC Certification #: LA080002
Louisiana/NELAC Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/NELAC Certification #: 2976
New Jersey/NELAC Certification #: PA 051
New Mexico Certification
New York/NELAC Certification #: 10888
North Carolina Certification #: 42706
Oregon/NELAC Certification #: PA200002
Pennsylvania/NELAC Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/NELAC Certification #: T104704188-09 TX
Utah/NELAC Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Washington Certification #: C1941
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Carolina Certification #: 503
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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(920)469-2436

SAMPLE SUMMARY

Project: NPL-11
Pace Project No.: 4047262

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4047262001	**NPL11-DISPOSAL-061711**	Solid	06/17/11 14:15	06/20/11 13:51

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SAMPLE ANALYTE COUNT

Project: NPL-11
Pace Project No.: 4047262

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4047262001	**NPL11-DISPOSAL-061711**	EPA 6010	DLB	22	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7470	CMS	1	PASI-G
		EPA 7471	CMS	1	PASI-G
		EPA 8270	RJN	70	PASI-G
		EPA 8260	JJB	38	PASI-G
		ASTM D2974-87	AKC	1	PASI-G
		EPA 901.1m	AEH	1	PASI-PA
		EPA 9034	KPZ	1	PASI-K
		EPA 9045	HMH	1	PASI-G
		EPA 9012	DAW	1	PASI-G

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050							
Aluminum	**13600**	mg/kg	54.0	1	06/24/11 09:20	06/28/11 14:48	7429-90-5	
Antimony	ND	mg/kg	2.2	1	06/24/11 09:20	06/28/11 14:48	7440-36-0	
Arsenic	**5.2**	mg/kg	2.2	1	06/24/11 09:20	06/28/11 14:48	7440-38-2	
Barium	**62.0**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-39-3	
Beryllium	**0.82**	mg/kg	0.43	1	06/24/11 09:20	06/28/11 14:48	7440-41-7	
Cadmium	**0.61**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-43-9	
Calcium	**6370**	mg/kg	21.6	1	06/24/11 09:20	06/28/11 14:48	7440-70-2	
Chromium	**20.8**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-47-3	
Cobalt	**9.3**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-48-4	
Copper	**15.2**	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7440-50-8	
Iron	**16800**	mg/kg	10.8	1	06/24/11 09:20	06/28/11 14:48	7439-89-6	
Lead	**16.2**	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7439-92-1	
Magnesium	**4580**	mg/kg	21.6	1	06/24/11 09:20	06/28/11 14:48	7439-95-4	
Manganese	**414**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7439-96-5	
Nickel	**26.5**	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7440-02-0	
Potassium	**2600**	mg/kg	21.6	1	06/24/11 09:20	06/28/11 14:48	7440-09-7	
Selenium	ND	mg/kg	2.2	1	06/24/11 09:20	06/28/11 14:48	7782-49-2	
Silver	ND	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7440-22-4	
Sodium	ND	mg/kg	108	1	06/24/11 09:20	06/28/11 14:48	7440-23-5	
Thallium	ND	mg/kg	4.3	1	06/24/11 09:20	06/28/11 14:48	7440-28-0	
Vanadium	**30.7**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-62-2	
Zinc	**56.1**	mg/kg	4.3	1	06/24/11 09:20	06/28/11 14:48	7440-66-6	
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 06/22/11 00:00							
Arsenic	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7440-38-2	
Barium	ND	mg/L	0.50	1	06/28/11 10:55	06/28/11 22:59	7440-39-3	
Cadmium	ND	mg/L	0.0050	1	06/28/11 10:55	06/28/11 22:59	7440-43-9	
Chromium	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7440-47-3	
Lead	ND	mg/L	0.0075	1	06/28/11 10:55	06/28/11 22:59	7439-92-1	
Selenium	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7782-49-2	
Silver	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 06/22/11 00:00							
Mercury	ND	ug/L	0.20	1	06/30/11 14:50	07/01/11 12:52	7439-97-6	
7471 Mercury	Analytical Method: EPA 7471 Preparation Method: EPA 7471							
Mercury	**0.019**	mg/kg	0.011	1	07/01/11 08:57	07/01/11 14:28	7439-97-6	
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546							
Acenaphthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	83-32-9	
Acenaphthylene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	208-96-8	
Anthracene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	120-12-7	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546							
Benzo(a)anthracene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	56-55-3	
Benzo(a)pyrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	205-99-2	
Benzo(g,h,i)perylene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	191-24-2	
Benzo(k)fluoranthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	207-08-9	
4-Bromophenylphenyl ether	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	101-55-3	
Butylbenzylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	85-68-7	
Carbazole	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	86-74-8	
4-Chloro-3-methylphenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	59-50-7	
4-Chloroaniline	ND	ug/kg	391	1	06/24/11 10:17	06/24/11 17:41	106-47-8	
bis(2-Chloroethoxy)methane	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	111-91-1	
bis(2-Chloroethyl) ether	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	111-44-4	
2-Chloronaphthalene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-58-7	
2-Chlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-57-8	
4-Chlorophenylphenyl ether	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	7005-72-3	
Chrysene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	53-70-3	
Dibenzofuran	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	132-64-9	
1,2-Dichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	106-46-7	
3,3'-Dichlorobenzidine	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-94-1	
2,4-Dichlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	120-83-2	
Diethylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	84-66-2	
2,4-Dimethylphenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	105-67-9	
Dimethylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	131-11-3	
Di-n-butylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	84-74-2	
4,6-Dinitro-2-methylphenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	534-52-1	
2,4-Dinitrophenol	ND	ug/kg	782	1	06/24/11 10:17	06/24/11 17:41	51-28-5	
2,4-Dinitrotoluene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	121-14-2	
2,6-Dinitrotoluene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	606-20-2	
Di-n-octylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	117-84-0	
bis(2-Ethylhexyl)phthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	117-81-7	
Fluoranthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	206-44-0	
Fluorene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	86-73-7	
Hexachloro-1,3-butadiene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	87-68-3	
Hexachlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	118-74-1	
Hexachlorocyclopentadiene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	77-47-4	
Hexachloroethane	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	67-72-1	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	193-39-5	
Isophorone	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	78-59-1	
2-Methylnaphthalene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-57-6	
2-Methylphenol(o-Cresol)	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-48-7	
3&4-Methylphenol(m&p Cresol)	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41		
Naphthalene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-20-3	

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Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546							
2-Nitroaniline	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	88-74-4	
3-Nitroaniline	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	99-09-2	
4-Nitroaniline	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	100-01-6	
Nitrobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	98-95-3	
2-Nitrophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	88-75-5	
4-Nitrophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	100-02-7	
N-Nitroso-di-n-propylamine	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	621-64-7	
N-Nitrosodiphenylamine	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	86-30-6	
2,2'-Oxybis(1-chloropropane)	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	108-60-1	
Pentachlorophenol	ND	ug/kg	387	1	06/24/11 10:17	06/24/11 17:41	87-86-5	
Phenanthrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	85-01-8	
Phenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	108-95-2	
Pyrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	129-00-0	
1,2,4-Trichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	120-82-1	
2,4,5-Trichlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-95-4	
2,4,6-Trichlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	88-06-2	
Nitrobenzene-d5 (S)	64	%.	21-130	1	06/24/11 10:17	06/24/11 17:41	4165-60-0	
2-Fluorobiphenyl (S)	75	%.	40-130	1	06/24/11 10:17	06/24/11 17:41	321-60-8	
Terphenyl-d14 (S)	96	%.	10-164	1	06/24/11 10:17	06/24/11 17:41	1718-51-0	
Phenol-d6 (S)	65	%.	31-130	1	06/24/11 10:17	06/24/11 17:41	13127-88-3	
2-Fluorophenol (S)	61	%.	26-130	1	06/24/11 10:17	06/24/11 17:41	367-12-4	
2,4,6-Tribromophenol (S)	85	%.	10-130	1	06/24/11 10:17	06/24/11 17:41	118-79-6	
8260 MSV 5035 Low Level	Analytical Method: EPA 8260 Preparation Method: EPA 8260							
Acetone	ND	ug/kg	23.4	1	06/22/11 12:00	06/22/11 13:25	67-64-1	L3,M0
Benzene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	71-43-2	
Bromodichloromethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-27-4	
Bromoform	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-25-2	
Bromomethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	74-83-9	
2-Butanone (MEK)	ND	ug/kg	23.4	1	06/22/11 12:00	06/22/11 13:25	78-93-3	
Carbon disulfide	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-15-0	
Carbon tetrachloride	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	56-23-5	
Chlorobenzene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	108-90-7	
Chloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-00-3	
Chloroform	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	67-66-3	
Chloromethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	74-87-3	
Dibromochloromethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	124-48-1	
1,1-Dichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-34-3	
1,2-Dichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	107-06-2	
1,1-Dichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	156-60-5	
1,2-Dichloropropane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	10061-02-6	

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035 Low Level	Analytical Method: EPA 8260 Preparation Method: EPA 8260							
Ethylbenzene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	100-41-4	
2-Hexanone	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	591-78-6	
Methylene Chloride	**15.6**	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-09-2	Z3
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	1634-04-4	
Styrene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	79-34-5	
Tetrachloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	127-18-4	
Toluene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	108-88-3	
1,1,1-Trichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	79-00-5	
Trichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	79-01-6	
Vinyl chloride	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-01-4	
Xylene (Total)	ND	ug/kg	17.6	1	06/22/11 12:00	06/22/11 13:25	1330-20-7	
Dibromofluoromethane (S)	95	%.	70-130	1	06/22/11 12:00	06/22/11 13:25	1868-53-7	
Toluene-d8 (S)	122	%.	62-153	1	06/22/11 12:00	06/22/11 13:25	2037-26-5	
4-Bromofluorobenzene (S)	76	%.	51-130	1	06/22/11 12:00	06/22/11 13:25	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**14.7**	%	0.10	1		06/22/11 07:51		
9034 Sulfide	Analytical Method: EPA 9034							
Sulfide	ND	mg/kg	58.6	1	06/30/11 10:00	06/30/11 10:00	18496-25-8	H3
9045 pH Soil	Analytical Method: EPA 9045							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		06/23/11 13:20		H3
9012 Cyanide, Total	Analytical Method: EPA 9012 Preparation Method: EPA 9012A							
Cyanide	ND	mg/kg	0.47	1	06/28/11 08:19	06/28/11 16:05	57-12-5	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: MPRP/5644 | Analysis Method: EPA 6010
QC Batch Method: EPA 3050 | Analysis Description: 6010 MET
Associated Lab Samples: 4047262001

METHOD BLANK: 468176 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	ND	50.0	06/28/11 13:44	
Antimony	mg/kg	ND	2.0	06/28/11 13:44	
Arsenic	mg/kg	ND	2.0	06/28/11 13:44	
Barium	mg/kg	ND	0.50	06/28/11 13:44	
Beryllium	mg/kg	ND	0.40	06/28/11 13:44	
Cadmium	mg/kg	ND	0.50	06/28/11 13:44	
Calcium	mg/kg	ND	20.0	06/28/11 13:44	
Chromium	mg/kg	ND	0.50	06/28/11 13:44	
Cobalt	mg/kg	ND	0.50	06/28/11 13:44	
Copper	mg/kg	ND	1.0	06/28/11 13:44	
Iron	mg/kg	ND	10.0	06/28/11 13:44	
Lead	mg/kg	ND	1.0	06/28/11 13:44	
Magnesium	mg/kg	ND	20.0	06/28/11 13:44	
Manganese	mg/kg	ND	0.50	06/28/11 13:44	
Nickel	mg/kg	ND	1.0	06/28/11 13:44	
Potassium	mg/kg	ND	20.0	06/28/11 13:44	
Selenium	mg/kg	ND	2.0	06/28/11 13:44	
Silver	mg/kg	ND	1.0	06/28/11 13:44	
Sodium	mg/kg	ND	100	06/28/11 13:44	
Thallium	mg/kg	ND	4.0	06/28/11 13:44	
Vanadium	mg/kg	ND	0.50	06/28/11 13:44	
Zinc	mg/kg	ND	4.0	06/28/11 13:44	

LABORATORY CONTROL SAMPLE: 468177

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	500	489	98	80-120	
Antimony	mg/kg	50	46.3	93	80-120	
Arsenic	mg/kg	50	47.4	95	80-120	
Barium	mg/kg	50	48.3	97	80-120	
Beryllium	mg/kg	50	49.5	99	80-120	
Cadmium	mg/kg	50	47.7	95	80-120	
Calcium	mg/kg	500	503	101	80-120	
Chromium	mg/kg	50	49.5	99	80-120	
Cobalt	mg/kg	50	48.7	97	80-120	
Copper	mg/kg	50	47.6	95	80-120	
Iron	mg/kg	500	509	102	80-120	
Lead	mg/kg	50	48.2	96	80-120	
Magnesium	mg/kg	500	501	100	80-120	
Manganese	mg/kg	50	48.9	98	80-120	
Nickel	mg/kg	50	49.0	98	80-120	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

LABORATORY CONTROL SAMPLE: 468177

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Potassium	mg/kg	500	510	102	80-120	
Selenium	mg/kg	50	46.8	94	80-120	
Silver	mg/kg	25	24.4	97	80-120	
Sodium	mg/kg	500	512	102	80-120	
Thallium	mg/kg	50	47.2	94	80-120	
Vanadium	mg/kg	50	47.9	96	80-120	
Zinc	mg/kg	50	49.4	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 468178 468179

Parameter	Units	4047417001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/kg	8910	609	613	14100	13700	846	788	75-125	2	20	P6
Antimony	mg/kg	8.2	60.9	61.3	40.2	91.1	53	135	75-125	78	20	M0,R1
Arsenic	mg/kg	11.1	60.9	61.3	65.8	64.5	90	87	75-125	2	20	
Barium	mg/kg	131	60.9	61.3	223	217	150	140	75-125	3	20	M0
Beryllium	mg/kg	0.59	60.9	61.3	55.6	55.2	90	89	75-125	.7	20	
Cadmium	mg/kg	1.3	60.9	61.3	56.0	55.6	90	89	75-125	.7	20	
Calcium	mg/kg	38100	609	613	32200	31500	-958	-1080	75-125	2	20	P6
Chromium	mg/kg	19.1	60.9	61.3	83.8	82.0	106	103	75-125	2	20	
Cobalt	mg/kg	7.2	60.9	61.3	60.8	62.0	88	89	75-125	2	20	
Copper	mg/kg	103	60.9	61.3	187	162	138	96	75-125	14	20	M0
Iron	mg/kg	19900	609	613	20100	19500	24	-68	75-125	3	20	P6
Lead	mg/kg	423	60.9	61.3	543	1000	196	942	75-125	59	20	P6,R1
Magnesium	mg/kg	14200	609	613	10600	12200	-602	-338	75-125	14	20	P6
Manganese	mg/kg	1650	60.9	61.3	2020	2170	615	859	75-125	7	20	P6
Nickel	mg/kg	26.5	60.9	61.3	85.8	85.8	97	97	75-125	.000	20	
Potassium	mg/kg	1850	609	613	2930	2800	177	154	75-125	5	20	M0
Selenium	mg/kg	12.3 U	60.9	61.3	55.3	55.8	91	91	75-125	.9	20	
Silver	mg/kg	6.1 U	30.5	30.7	29.5	29.5	95	95	75-125	.2	20	
Sodium	mg/kg	564	609	613	1180	1160	102	97	75-125	2	20	
Thallium	mg/kg	1.6J	60.9	61.3	57.5	58.4	92	93	75-125	2	20	
Vanadium	mg/kg	47.7	60.9	61.3	122	118	122	114	75-125	4	20	
Zinc	mg/kg	234	60.9	61.3	343	230	180	-5	75-125	39	20	M0,R1

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: MPRP/5655 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET TCLP
Associated Lab Samples: 4047262001

METHOD BLANK: 469892 | Matrix: Water
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.050	06/28/11 22:52	
Barium	mg/L	ND	0.50	06/28/11 22:52	
Cadmium	mg/L	ND	0.0050	06/28/11 22:52	
Chromium	mg/L	ND	0.050	06/28/11 22:52	
Lead	mg/L	ND	0.0075	06/28/11 22:52	
Selenium	mg/L	ND	0.050	06/28/11 22:52	
Silver	mg/L	ND	0.050	06/28/11 22:52	

LABORATORY CONTROL SAMPLE: 469893

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.5	0.52	104	80-120	
Barium	mg/L	.5	0.54	107	80-120	
Cadmium	mg/L	.5	0.52	103	80-120	
Chromium	mg/L	.5	0.57	114	80-120	
Lead	mg/L	.5	0.55	110	80-120	
Selenium	mg/L	.5	0.51	102	80-120	
Silver	mg/L	.25	0.27	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 469894 469895

Parameter	Units	4047262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	.5	.5	0.57	0.55	112	108	75-125	3	20	
Barium	mg/L	ND	.5	.5	0.75	0.76	104	105	75-125	1	20	
Cadmium	mg/L	ND	.5	.5	0.56	0.54	111	107	75-125	4	20	
Chromium	mg/L	ND	.5	.5	0.58	0.58	114	113	75-125	.3	20	
Lead	mg/L	ND	.5	.5	0.56	0.54	111	106	75-125	4	20	
Selenium	mg/L	ND	.5	.5	0.58	0.56	115	111	75-125	3	20	
Silver	mg/L	ND	.25	.25	0.29	0.29	115	115	75-125	.5	20	

MATRIX SPIKE SAMPLE: 469896

Parameter	Units	4047302002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	<0.25	2.5	2.7	108	75-125	
Barium	mg/L	<2.5	2.5	3.2	106	75-125	
Cadmium	mg/L	<0.025	2.5	2.7	108	75-125	
Chromium	mg/L	1.2	2.5	4.0	114	75-125	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

MATRIX SPIKE SAMPLE: 469896

Parameter	Units	4047302002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Lead	mg/L	<0.038	2.5	2.7	109	75-125	
Selenium	mg/L	<0.25	2.5	2.7	107	75-125	
Silver	mg/L	<0.25	1.2	1.4	112	75-125	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: MERP/2604 | Analysis Method: EPA 7470
QC Batch Method: EPA 7470 | Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 4047262001

METHOD BLANK: 471774 | Matrix: Water
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	07/01/11 12:49	

LABORATORY CONTROL SAMPLE: 471775

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.5	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 471776 471777

Parameter	Units	4047262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.5	5.5	109	110	85-115	.5	20	

MATRIX SPIKE SAMPLE: 471788

Parameter	Units	4047302001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.20	5	0.25	5	85-115	M0

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: MERP/2602 | Analysis Method: EPA 7471
QC Batch Method: EPA 7471 | Analysis Description: 7471 Mercury
Associated Lab Samples: 4047262001

METHOD BLANK: 471731 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.010	07/01/11 14:12	

LABORATORY CONTROL SAMPLE: 471732

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.25	0.25	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 471733 471734

Parameter	Units	4047240010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.0030J	.31	.31	0.33	0.32	105	103	85-115	2	20	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: OEXT/11513 | Analysis Method: EPA 8270
QC Batch Method: EPA 3546 | Analysis Description: 8270 Solid MSSV Microwave
Associated Lab Samples: 4047262001

METHOD BLANK: 468159 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	ND	167	06/24/11 11:44	
1,2-Dichlorobenzene	ug/kg	ND	167	06/24/11 11:44	
1,3-Dichlorobenzene	ug/kg	ND	167	06/24/11 11:44	
1,4-Dichlorobenzene	ug/kg	ND	167	06/24/11 11:44	
2,2'-Oxybis(1-chloropropane)	ug/kg	ND	167	06/24/11 11:44	
2,4,5-Trichlorophenol	ug/kg	ND	167	06/24/11 11:44	
2,4,6-Trichlorophenol	ug/kg	ND	167	06/24/11 11:44	
2,4-Dichlorophenol	ug/kg	ND	167	06/24/11 11:44	
2,4-Dimethylphenol	ug/kg	ND	167	06/24/11 11:44	
2,4-Dinitrophenol	ug/kg	ND	667	06/24/11 11:44	
2,4-Dinitrotoluene	ug/kg	ND	167	06/24/11 11:44	
2,6-Dinitrotoluene	ug/kg	ND	167	06/24/11 11:44	
2-Chloronaphthalene	ug/kg	ND	167	06/24/11 11:44	
2-Chlorophenol	ug/kg	ND	167	06/24/11 11:44	
2-Methylnaphthalene	ug/kg	ND	167	06/24/11 11:44	
2-Methylphenol(o-Cresol)	ug/kg	ND	167	06/24/11 11:44	
2-Nitroaniline	ug/kg	ND	167	06/24/11 11:44	
2-Nitrophenol	ug/kg	ND	167	06/24/11 11:44	
3&4-Methylphenol(m&p Cresol)	ug/kg	ND	167	06/24/11 11:44	
3,3'-Dichlorobenzidine	ug/kg	ND	167	06/24/11 11:44	
3-Nitroaniline	ug/kg	ND	167	06/24/11 11:44	
4,6-Dinitro-2-methylphenol	ug/kg	ND	167	06/24/11 11:44	
4-Bromophenylphenyl ether	ug/kg	ND	167	06/24/11 11:44	
4-Chloro-3-methylphenol	ug/kg	ND	167	06/24/11 11:44	
4-Chloroaniline	ug/kg	ND	333	06/24/11 11:44	
4-Chlorophenylphenyl ether	ug/kg	ND	167	06/24/11 11:44	
4-Nitroaniline	ug/kg	ND	167	06/24/11 11:44	
4-Nitrophenol	ug/kg	ND	167	06/24/11 11:44	
Acenaphthene	ug/kg	ND	167	06/24/11 11:44	
Acenaphthylene	ug/kg	ND	167	06/24/11 11:44	
Anthracene	ug/kg	ND	167	06/24/11 11:44	
Benzo(a)anthracene	ug/kg	ND	167	06/24/11 11:44	
Benzo(a)pyrene	ug/kg	ND	167	06/24/11 11:44	
Benzo(b)fluoranthene	ug/kg	ND	167	06/24/11 11:44	
Benzo(g,h,i)perylene	ug/kg	ND	167	06/24/11 11:44	
Benzo(k)fluoranthene	ug/kg	ND	167	06/24/11 11:44	
bis(2-Chloroethoxy)methane	ug/kg	ND	167	06/24/11 11:44	
bis(2-Chloroethyl) ether	ug/kg	ND	167	06/24/11 11:44	
bis(2-Ethylhexyl)phthalate	ug/kg	ND	167	06/24/11 11:44	
Butylbenzylphthalate	ug/kg	ND	167	06/24/11 11:44	
Carbazole	ug/kg	ND	167	06/24/11 11:44	
Chrysene	ug/kg	ND	167	06/24/11 11:44	
Di-n-butylphthalate	ug/kg	ND	167	06/24/11 11:44	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

METHOD BLANK: 468159 Matrix: Solid

Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Di-n-octylphthalate	ug/kg	ND	167	06/24/11 11:44	
Dibenz(a,h)anthracene	ug/kg	ND	167	06/24/11 11:44	
Dibenzofuran	ug/kg	ND	167	06/24/11 11:44	
Diethylphthalate	ug/kg	ND	167	06/24/11 11:44	
Dimethylphthalate	ug/kg	ND	167	06/24/11 11:44	
Fluoranthene	ug/kg	ND	167	06/24/11 11:44	
Fluorene	ug/kg	ND	167	06/24/11 11:44	
Hexachloro-1,3-butadiene	ug/kg	ND	167	06/24/11 11:44	
Hexachlorobenzene	ug/kg	ND	167	06/24/11 11:44	
Hexachlorocyclopentadiene	ug/kg	ND	167	06/24/11 11:44	
Hexachloroethane	ug/kg	ND	167	06/24/11 11:44	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	167	06/24/11 11:44	
Isophorone	ug/kg	ND	167	06/24/11 11:44	
N-Nitroso-di-n-propylamine	ug/kg	ND	167	06/24/11 11:44	
N-Nitrosodiphenylamine	ug/kg	ND	167	06/24/11 11:44	
Naphthalene	ug/kg	ND	167	06/24/11 11:44	
Nitrobenzene	ug/kg	ND	167	06/24/11 11:44	
Pentachlorophenol	ug/kg	ND	330	06/24/11 11:44	
Phenanthrene	ug/kg	ND	167	06/24/11 11:44	
Phenol	ug/kg	ND	167	06/24/11 11:44	
Pyrene	ug/kg	ND	167	06/24/11 11:44	
2,4,6-Tribromophenol (S)	%.	79	10-130	06/24/11 11:44	
2-Fluorobiphenyl (S)	%.	94	40-130	06/24/11 11:44	
2-Fluorophenol (S)	%.	84	26-130	06/24/11 11:44	
Nitrobenzene-d5 (S)	%.	83	21-130	06/24/11 11:44	
Phenol-d6 (S)	%.	81	31-130	06/24/11 11:44	
Terphenyl-d14 (S)	%.	106	10-164	06/24/11 11:44	

LABORATORY CONTROL SAMPLE: 468160

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	1670	1280	77	59-130	
1,2-Dichlorobenzene	ug/kg	1670	1230	74	54-130	
1,3-Dichlorobenzene	ug/kg	1670	1190	72	51-130	
1,4-Dichlorobenzene	ug/kg	1670	1220	73	51-130	
2,2'-Oxybis(1-chloropropane)	ug/kg	1670	1150	69	34-130	
2,4,5-Trichlorophenol	ug/kg	1670	1550	93	67-130	
2,4,6-Trichlorophenol	ug/kg	1670	1460	88	68-130	
2,4-Dichlorophenol	ug/kg	1670	1380	83	61-130	
2,4-Dimethylphenol	ug/kg	1670	1410	85	50-130	
2,4-Dinitrophenol	ug/kg	1670	1350	81	29-130	
2,4-Dinitrotoluene	ug/kg	1670	1880	113	70-130	
2,6-Dinitrotoluene	ug/kg	1670	1750	105	70-130	
2-Chloronaphthalene	ug/kg	1670	1450	87	68-130	
2-Chlorophenol	ug/kg	1670	1240	74	53-130	

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(920)469-2436

QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

LABORATORY CONTROL SAMPLE: 468160

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/kg	1670	1470	88	66-130	
2-Methylphenol(o-Cresol)	ug/kg	1670	1310	79	51-130	
2-Nitroaniline	ug/kg	1670	1550	93	55-130	
2-Nitrophenol	ug/kg	1670	1320	79	57-130	
3&4-Methylphenol(m&p Cresol)	ug/kg	1670	1260	76	53-130	
3,3'-Dichlorobenzidine	ug/kg	1670	1280	77	52-139	
3-Nitroaniline	ug/kg	1670	1650	99	65-130	
4,6-Dinitro-2-methylphenol	ug/kg	1670	1680	101	54-130	
4-Bromophenylphenyl ether	ug/kg	1670	1670	100	65-130	
4-Chloro-3-methylphenol	ug/kg	1670	1490	90	63-130	
4-Chloroaniline	ug/kg	1670	1250	75	49-130	
4-Chlorophenylphenyl ether	ug/kg	1670	1680	101	70-130	
4-Nitroaniline	ug/kg	1670	1560	94	55-140	
4-Nitrophenol	ug/kg	1670	1470	88	46-130	
Acenaphthene	ug/kg	1670	1560	94	70-130	
Acenaphthylene	ug/kg	1670	1490	90	69-130	
Anthracene	ug/kg	1670	1620	97	70-130	
Benzo(a)anthracene	ug/kg	1670	1660	100	70-130	
Benzo(a)pyrene	ug/kg	1670	1490	90	70-130	
Benzo(b)fluoranthene	ug/kg	1670	1600	96	66-130	
Benzo(g,h,i)perylene	ug/kg	1670	1450	87	43-149	
Benzo(k)fluoranthene	ug/kg	1670	1940	116	66-130	
bis(2-Chloroethoxy)methane	ug/kg	1670	1340	81	59-130	
bis(2-Chloroethyl) ether	ug/kg	1670	1190	71	40-130	
bis(2-Ethylhexyl)phthalate	ug/kg	1670	2000	120	64-133	
Butylbenzylphthalate	ug/kg	1670	1930	116	60-136	
Carbazole	ug/kg	1670	1640	98	67-130	
Chrysene	ug/kg	1670	1600	96	70-130	
Di-n-butylphthalate	ug/kg	1670	1850	111	70-130	
Di-n-octylphthalate	ug/kg	1670	1830	110	60-133	
Dibenz(a,h)anthracene	ug/kg	1670	1420	85	45-139	
Dibenzofuran	ug/kg	1670	1650	99	70-130	
Diethylphthalate	ug/kg	1670	1740	104	70-130	
Dimethylphthalate	ug/kg	1670	1660	99	70-130	
Fluoranthene	ug/kg	1670	1620	97	59-130	
Fluorene	ug/kg	1670	1670	100	70-130	
Hexachloro-1,3-butadiene	ug/kg	1670	1260	76	55-130	
Hexachlorobenzene	ug/kg	1670	1690	101	68-130	
Hexachlorocyclopentadiene	ug/kg	1670	778	47	13-130	
Hexachloroethane	ug/kg	1670	1170	70	47-130	
Indeno(1,2,3-cd)pyrene	ug/kg	1670	1300	78	37-150	
Isophorone	ug/kg	1670	914	55	17-130	
N-Nitroso-di-n-propylamine	ug/kg	1670	1320	79	48-130	
N-Nitrosodiphenylamine	ug/kg	1670	1850	111	70-135	
Naphthalene	ug/kg	1670	1330	80	60-130	
Nitrobenzene	ug/kg	1670	1250	75	48-130	
Pentachlorophenol	ug/kg	1670	1510	91	47-130	
Phenanthrene	ug/kg	1670	1630	98	70-130	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

LABORATORY CONTROL SAMPLE: 468160

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phenol	ug/kg	1670	1320	79	46-130	
Pyrene	ug/kg	1670	1890	113	41-146	
2,4,6-Tribromophenol (S)	%.			98	10-130	
2-Fluorobiphenyl (S)	%.			87	40-130	
2-Fluorophenol (S)	%.			71	26-130	
Nitrobenzene-d5 (S)	%.			72	21-130	
Phenol-d6 (S)	%.			77	31-130	
Terphenyl-d14 (S)	%.			103	10-164	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 468161 468162

Parameter	Units	4047241004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trichlorobenzene	ug/kg	<0.010 mg/kg	1850	1850	1370	1420	74	77	48-130	4	24	
1,2-Dichlorobenzene	ug/kg	<0.021 mg/kg	1850	1850	1410	1400	76	76	47-130	.3	20	
1,3-Dichlorobenzene	ug/kg	<0.022 mg/kg	1850	1850	1360	1380	74	75	40-130	1	21	
1,4-Dichlorobenzene	ug/kg	<0.024 mg/kg	1850	1850	1410	1380	76	75	45-130	2	21	
2,2'-Oxybis(1-chloropropane)	ug/kg	<0.024 mg/kg	1850	1850	1330	1350	72	73	31-130	2	25	
2,4,5-Trichlorophenol	ug/kg	<0.012 mg/kg	1850	1850	1590	1710	86	93	36-130	7	24	
2,4,6-Trichlorophenol	ug/kg	<0.020 mg/kg	1850	1850	1530	1560	83	85	36-130	2	29	
2,4-Dichlorophenol	ug/kg	<0.016 mg/kg	1850	1850	1380	1480	75	80	46-130	7	28	
2,4-Dimethylphenol	ug/kg	<0.092 mg/kg	1850	1850	1330	1280	72	70	30-130	4	32	
2,4-Dinitrophenol	ug/kg	<0.14 mg/kg	1850	1850	382J	451J	21	25	10-130		40	
2,4-Dinitrotoluene	ug/kg	<0.014 mg/kg	1850	1850	1970	1960	107	106	32-130	.6	30	
2,6-Dinitrotoluene	ug/kg	<0.021 mg/kg	1850	1850	1800	1830	98	99	48-130	2	26	
2-Chloronaphthalene	ug/kg	<0.019 mg/kg	1850	1850	1520	1600	83	87	53-130	5	20	
2-Chlorophenol	ug/kg	<0.092 mg/kg	1850	1850	1380	1370	75	74	45-130	.8	24	
2-Methylnaphthalene	ug/kg	<0.020 mg/kg	1850	1850	1560	1650	85	90	52-130	6	20	
2-Methylphenol(o-Cresol)	ug/kg	<0.092 mg/kg	1850	1850	1370	1400	75	76	45-130	2	26	
2-Nitroaniline	ug/kg	<0.013 mg/kg	1850	1850	1610	1640	87	89	31-130	2	20	
2-Nitrophenol	ug/kg	<0.022 mg/kg	1850	1850	1450	1510	79	82	30-130	4	28	
3&4-Methylphenol(m&p Cresol)	ug/kg	<0.019 mg/kg	1850	1850	1310	1360	71	74	43-130	4	25	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 468161 468162

Parameter	Units	4047241004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
3,3'-Dichlorobenzidine	ug/kg	<0.013 mg/kg	1850	1850	1390	1230	76	67	10-169	12	50	
3-Nitroaniline	ug/kg	<0.015 mg/kg	1850	1850	1700	1730	92	94	15-137	2	36	
4,6-Dinitro-2-methylphenol	ug/kg	<0.092 mg/kg	1850	1850	1200	1400	65	76	10-130	15	50	
4-Bromophenylphenyl ether	ug/kg	<0.020 mg/kg	1850	1850	1650	1690	90	92	36-130	2	25	
4-Chloro-3-methylphenol	ug/kg	<0.019 mg/kg	1850	1850	1520	1590	82	86	43-130	4	27	
4-Chloroaniline	ug/kg	<0.092 mg/kg	1850	1850	1360	1390	74	75	18-130	2	28	
4-Chlorophenylphenyl ether	ug/kg	<0.092 mg/kg	1850	1850	1710	1730	93	94	51-130	1	20	
4-Nitroaniline	ug/kg	<0.092 mg/kg	1850	1850	1610	1650	87	89	10-142	2	50	
4-Nitrophenol	ug/kg	<0.036 mg/kg	1850	1850	1090	1330	59	72	10-130	20	50	
Acenaphthene	ug/kg	<0.092 mg/kg	1850	1850	1640	1680	89	91	52-130	2	21	
Acenaphthylene	ug/kg	<0.020 mg/kg	1850	1850	1570	1620	85	88	50-130	3	20	
Anthracene	ug/kg	<0.092 mg/kg	1850	1850	1610	1610	87	88	45-130	.4	25	
Benzo(a)anthracene	ug/kg	<0.021 mg/kg	1850	1850	1660	1640	89	88	43-130	2	41	
Benzo(a)pyrene	ug/kg	<0.022 mg/kg	1850	1850	1500	1480	81	80	34-130	1	38	
Benzo(b)fluoranthene	ug/kg	<0.022 mg/kg	1850	1850	1710	1740	93	94	32-130	1	36	
Benzo(g,h,i)perylene	ug/kg	<0.092 mg/kg	1850	1850	1310	1380	71	75	16-148	5	50	
Benzo(k)fluoranthene	ug/kg	<0.029 mg/kg	1850	1850	2020	1870	109	101	45-130	8	41	
bis(2-Chloroethoxy)methane	ug/kg	<0.022 mg/kg	1850	1850	1450	1560	79	85	54-130	8	21	
bis(2-Chloroethyl) ether	ug/kg	<0.092 mg/kg	1850	1850	1360	1420	74	77	42-130	4	26	
bis(2-Ethylhexyl)phthalate	ug/kg	<0.038 mg/kg	1850	1850	2080	2030	111	109	35-155	3	23	
Butylbenzylphthalate	ug/kg	<0.041 mg/kg	1850	1850	2000	1940	108	105	31-154	3	27	
Carbazole	ug/kg	<0.019 mg/kg	1850	1850	1720	1720	94	93	29-135	.5	34	
Chrysene	ug/kg	<0.027 mg/kg	1850	1850	1600	1720	86	92	46-130	7	30	
Di-n-butylphthalate	ug/kg	<0.031 mg/kg	1850	1850	1870	1830	101	99	43-130	2	29	
Di-n-octylphthalate	ug/kg	<0.020 mg/kg	1850	1850	1860	1830	101	99	44-136	2	29	
Dibenz(a,h)anthracene	ug/kg	<0.034 mg/kg	1850	1850	1230	1350	67	73	21-132	9	50	
Dibenzofuran	ug/kg	<0.092 mg/kg	1850	1850	1730	1750	94	95	53-130	1	20	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 468161 468162

Parameter	Units	4047241004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Diethylphthalate	ug/kg	<0.092 mg/kg	1850	1850	1870	1900	101	103	51-130	2	22	
Dimethylphthalate	ug/kg	<0.019 mg/kg	1850	1850	1730	1760	94	96	63-130	2	25	
Fluoranthene	ug/kg	0.069J mg/kg	1850	1850	1650	1610	86	84	22-132	2	38	
Fluorene	ug/kg	<0.0093 mg/kg	1850	1850	1730	1720	94	94	50-130	.3	20	
Hexachloro-1,3-butadiene	ug/kg	<0.024 mg/kg	1850	1850	1380	1410	75	76	49-130	2	23	
Hexachlorobenzene	ug/kg	<0.011 mg/kg	1850	1850	1680	1670	91	91	44-130	.8	20	
Hexachlorocyclopentadiene	ug/kg	<0.092 mg/kg	1850	1850	829	896	45	49	10-130	8	50	
Hexachloroethane	ug/kg	<0.023 mg/kg	1850	1850	1350	1340	73	73	31-130	.8	23	
Indeno(1,2,3-cd)pyrene	ug/kg	<0.025 mg/kg	1850	1850	1010	1170	55	63	16-142	14	50	
Isophorone	ug/kg	<0.092 mg/kg	1850	1850	987	1030	54	56	19-130	5	20	
N-Nitroso-di-n-propylamine	ug/kg	<0.022 mg/kg	1850	1850	1430	1490	77	81	42-130	4	23	
N-Nitrosodiphenylamine	ug/kg	<0.025 mg/kg	1850	1850	1870	1890	102	103	42-151	.7	36	
Naphthalene	ug/kg	<0.022 mg/kg	1850	1850	1450	1500	79	82	51-130	4	21	
Nitrobenzene	ug/kg	<0.021 mg/kg	1850	1850	1370	1410	74	76	46-130	2	24	
Pentachlorophenol	ug/kg	<0.092 mg/kg	1850	1850	1330	1430	72	78	10-130	7	38	
Phenanthrene	ug/kg	<0.092 mg/kg	1850	1850	1660	1690	88	90	44-130	2	27	
Phenol	ug/kg	<0.022 mg/kg	1850	1850	1460	1490	79	81	41-130	2	28	
Pyrene	ug/kg	0.059J mg/kg	1850	1850	1950	1980	103	104	21-156	1	42	
2,4,6-Tribromophenol (S)	%.						94	94	10-130			
2-Fluorobiphenyl (S)	%.						84	87	40-130			
2-Fluorophenol (S)	%.						71	71	26-130			
Nitrobenzene-d5 (S)	%.						69	75	21-130			
Phenol-d6 (S)	%.						74	75	31-130			
Terphenyl-d14 (S)	%.						100	100	10-164			

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: MSV/11733 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV Low
Associated Lab Samples: 4047262001

METHOD BLANK: 467341 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/kg	ND	5.0	06/22/11 11:29	
1,1,2,2-Tetrachloroethane	ug/kg	ND	5.0	06/22/11 11:29	
1,1,2-Trichloroethane	ug/kg	ND	5.0	06/22/11 11:29	
1,1-Dichloroethane	ug/kg	ND	5.0	06/22/11 11:29	
1,1-Dichloroethene	ug/kg	ND	5.0	06/22/11 11:29	
1,2-Dichloroethane	ug/kg	ND	5.0	06/22/11 11:29	
1,2-Dichloropropane	ug/kg	ND	5.0	06/22/11 11:29	
2-Butanone (MEK)	ug/kg	ND	20.0	06/22/11 11:29	
2-Hexanone	ug/kg	ND	5.0	06/22/11 11:29	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	5.0	06/22/11 11:29	
Acetone	ug/kg	ND	20.0	06/22/11 11:29	
Benzene	ug/kg	ND	5.0	06/22/11 11:29	
Bromodichloromethane	ug/kg	ND	5.0	06/22/11 11:29	
Bromoform	ug/kg	ND	5.0	06/22/11 11:29	
Bromomethane	ug/kg	ND	5.0	06/22/11 11:29	
Carbon disulfide	ug/kg	ND	5.0	06/22/11 11:29	
Carbon tetrachloride	ug/kg	ND	5.0	06/22/11 11:29	
Chlorobenzene	ug/kg	ND	5.0	06/22/11 11:29	
Chloroethane	ug/kg	ND	5.0	06/22/11 11:29	
Chloroform	ug/kg	ND	5.0	06/22/11 11:29	
Chloromethane	ug/kg	ND	5.0	06/22/11 11:29	
cis-1,2-Dichloroethene	ug/kg	ND	5.0	06/22/11 11:29	
cis-1,3-Dichloropropene	ug/kg	ND	5.0	06/22/11 11:29	
Dibromochloromethane	ug/kg	ND	5.0	06/22/11 11:29	
Ethylbenzene	ug/kg	ND	5.0	06/22/11 11:29	
Methyl-tert-butyl ether	ug/kg	ND	5.0	06/22/11 11:29	
Methylene Chloride	ug/kg	ND	5.0	06/22/11 11:29	
Styrene	ug/kg	ND	5.0	06/22/11 11:29	
Tetrachloroethene	ug/kg	ND	5.0	06/22/11 11:29	
Toluene	ug/kg	ND	5.0	06/22/11 11:29	
trans-1,2-Dichloroethene	ug/kg	ND	5.0	06/22/11 11:29	
trans-1,3-Dichloropropene	ug/kg	ND	5.0	06/22/11 11:29	
Trichloroethene	ug/kg	ND	5.0	06/22/11 11:29	
Vinyl chloride	ug/kg	ND	5.0	06/22/11 11:29	
Xylene (Total)	ug/kg	ND	15.0	06/22/11 11:29	
4-Bromofluorobenzene (S)	%.	91	51-130	06/22/11 11:29	
Dibromofluoromethane (S)	%.	90	70-130	06/22/11 11:29	
Toluene-d8 (S)	%.	96	62-153	06/22/11 11:29	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

LABORATORY CONTROL SAMPLE & LCSD: 467342 467343

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/kg	50	45.7	43.6	91	87	70-130	5	20	
1,1,2,2-Tetrachloroethane	ug/kg	50	43.8	42.6	88	85	61-130	3	20	
1,1,2-Trichloroethane	ug/kg	50	54.3	52.8	109	106	70-130	3	20	
1,1-Dichloroethane	ug/kg	50	47.2	45.5	94	91	70-130	4	20	
1,1-Dichloroethene	ug/kg	50	60.6	57.2	121	114	70-130	6	20	
1,2-Dichloroethane	ug/kg	50	45.1	43.0	90	86	70-130	5	20	
1,2-Dichloropropane	ug/kg	50	48.6	46.1	97	92	70-130	5	20	
2-Butanone (MEK)	ug/kg	50	59.8	54.4	120	109	50-150	9	21	
2-Hexanone	ug/kg	50	44.4	44.8	89	90	70-130	1	20	
4-Methyl-2-pentanone (MIBK)	ug/kg	50	42.7	45.5	85	91	50-150	6	20	
Acetone	ug/kg	50	110	94.4	220	189	13-130	15	35	L0
Benzene	ug/kg	50	49.3	47.8	99	96	70-130	3	20	
Bromodichloromethane	ug/kg	50	48.3	44.8	97	90	70-130	8	20	
Bromoform	ug/kg	50	56.5	54.2	113	108	70-130	4	20	
Bromomethane	ug/kg	50	63.5	59.9	127	120	67-132	6	20	
Carbon disulfide	ug/kg	50	56.3	55.3	113	111	66-130	2	20	
Carbon tetrachloride	ug/kg	50	51.9	50.4	104	101	70-130	3	20	
Chlorobenzene	ug/kg	50	56.2	54.0	112	108	70-130	4	20	
Chloroethane	ug/kg	50	54.3	49.6	109	99	67-130	9	20	
Chloroform	ug/kg	50	46.4	46.0	93	92	70-130	.8	20	
Chloromethane	ug/kg	50	39.5	38.3	79	77	43-130	3	20	
cis-1,2-Dichloroethene	ug/kg	50	50.8	48.4	102	97	70-130	5	20	
cis-1,3-Dichloropropene	ug/kg	50	45.9	44.3	92	89	70-130	4	20	
Dibromochloromethane	ug/kg	50	53.7	53.3	107	107	70-130	.6	20	
Ethylbenzene	ug/kg	50	51.3	50.2	103	100	70-130	2	20	
Methylene Chloride	ug/kg	50	54.2	50.4	108	101	70-130	7	20	
Styrene	ug/kg	50	53.5	50.9	107	102	70-130	5	20	
Tetrachloroethene	ug/kg	50	61.6	60.1	123	120	70-130	2	20	
Toluene	ug/kg	50	51.5	49.8	103	100	70-130	3	20	
trans-1,2-Dichloroethene	ug/kg	50	51.6	48.5	103	97	70-130	6	20	
trans-1,3-Dichloropropene	ug/kg	50	44.9	44.1	90	88	70-130	2	20	
Trichloroethene	ug/kg	50	56.4	53.6	113	107	70-130	5	20	
Vinyl chloride	ug/kg	50	47.7	45.9	95	92	46-131	4	20	
Xylene (Total)	ug/kg	150	163	160	108	106	70-130	2	20	
4-Bromofluorobenzene (S)	%.				99	100	51-130			
Dibromofluoromethane (S)	%.				89	91	70-130			
Toluene-d8 (S)	%.				98	99	62-153			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 467345 467346

Parameter	Units	4047262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/kg	ND	58.3	58.3	56.9	57.2	98	98	46-143	.5	50	
1,1,2,2-Tetrachloroethane	ug/kg	ND	58.3	58.3	74.9	74.6	129	128	10-200	.5	50	
1,1,2-Trichloroethane	ug/kg	ND	58.3	58.3	59.1	53.3	101	91	36-155	10	30	
1,1-Dichloroethane	ug/kg	ND	58.3	58.3	54.3	54.5	93	93	48-142	.3	21	
1,1-Dichloroethene	ug/kg	ND	58.3	58.3	70.3	74.3	121	128	55-143	6	28	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 467345 467346

Parameter	Units	4047262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2-Dichloroethane	ug/kg	ND	58.3	58.3	44.8	41.4	77	71	45-132	8	50	
1,2-Dichloropropane	ug/kg	ND	58.3	58.3	47.7	45.4	82	78	48-131	5	26	
2-Butanone (MEK)	ug/kg	ND	58.3	58.3	52.7	70.2	90	120	10-189	28	50	
2-Hexanone	ug/kg	ND	58.3	58.3	33.8	35.4	58	61	21-166	4	20	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	58.3	58.3	54.1	47.0	93	81	21-164	14	50	
Acetone	ug/kg	ND	58.3	58.3	90.8	126	156	216	10-200	32	50	M0
Benzene	ug/kg	ND	58.3	58.3	51.5	49.2	88	84	51-131	5	25	
Bromodichloromethane	ug/kg	ND	58.3	58.3	44.5	40.1	76	69	41-133	11	50	
Bromoform	ug/kg	ND	58.3	58.3	47.6	37.3	82	64	10-158	24	50	
Bromomethane	ug/kg	ND	58.3	58.3	83.9	81.4	144	140	53-145	3	32	
Carbon disulfide	ug/kg	ND	58.3	58.3	66.1	66.7	112	113	52-130	.9	20	
Carbon tetrachloride	ug/kg	ND	58.3	58.3	63.2	63.9	108	110	42-147	1	50	
Chlorobenzene	ug/kg	ND	58.3	58.3	45.5	37.5	78	64	18-144	19	50	
Chloroethane	ug/kg	ND	58.3	58.3	68.1	71.6	117	123	55-138	5	21	
Chloroform	ug/kg	ND	58.3	58.3	49.9	49.0	86	84	51-132	2	20	
Chloromethane	ug/kg	ND	58.3	58.3	55.5	55.7	95	96	29-138	.4	50	
cis-1,2-Dichloroethene	ug/kg	ND	58.3	58.3	52.4	50.5	90	87	49-132	4	50	
cis-1,3-Dichloropropene	ug/kg	ND	58.3	58.3	32.7	25.8	56	44	29-135	24	50	
Dibromochloromethane	ug/kg	ND	58.3	58.3	51.7	46.3	89	79	25-150	11	22	
Ethylbenzene	ug/kg	ND	58.3	58.3	48.2	43.2	83	74	22-152	11	30	
Methylene Chloride	ug/kg	15.6	58.3	58.3	75.8	81.4	103	113	52-135	7	20	
Styrene	ug/kg	ND	58.3	58.3	34.6	26.1	59	45	10-138	28	50	
Tetrachloroethene	ug/kg	ND	58.3	58.3	69.6	69.6	119	119	15-175	.06	50	
Toluene	ug/kg	ND	58.3	58.3	58.4	54.0	99	91	35-151	8	36	
trans-1,2-Dichloroethene	ug/kg	ND	58.3	58.3	57.6	56.7	99	97	48-135	1	50	
trans-1,3-Dichloropropene	ug/kg	ND	58.3	58.3	35.4	28.4	61	49	20-137	22	50	
Trichloroethene	ug/kg	ND	58.3	58.3	51.4	49.3	88	85	30-155	4	50	
Vinyl chloride	ug/kg	ND	58.3	58.3	64.7	67.5	111	116	42-152	4	28	
Xylene (Total)	ug/kg	ND	175	175	154	136	88	78	18-131	13	20	
4-Bromofluorobenzene (S)	%.						77	75	51-130			
Dibromofluoromethane (S)	%.						99	94	70-130			
Toluene-d8 (S)	%.						118	120	62-153			

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: PMST/5672
QC Batch Method: ASTM D2974-87
Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 4047262001

SAMPLE DUPLICATE: 466706

Parameter	Units	4047275002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.8	8.7	.4	10	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: WET/29825 | Analysis Method: EPA 9034
QC Batch Method: EPA 9034 | Analysis Description: 9034 Sulfide Solid
Associated Lab Samples: 4047262001

METHOD BLANK: 838435 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/kg	ND	50.0	06/30/11 10:00	

LABORATORY CONTROL SAMPLE: 838436

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/kg	400	391	98	39-150	

MATRIX SPIKE SAMPLE: 838437

Parameter	Units	4047260001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/kg	50.0 U	1330	1360	102	15-150	

SAMPLE DUPLICATE: 838438

Parameter	Units	4047262001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide	mg/kg	ND	ND		24	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: WET/9207
QC Batch Method: EPA 9045
Analysis Method: EPA 9045
Analysis Description: 9045 pH
Associated Lab Samples: 4047262001

SAMPLE DUPLICATE: 468053

Parameter	Units	4047000001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.8	8.8	.2	5	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: WETA/9239 | Analysis Method: EPA 9012
QC Batch Method: EPA 9012A | Analysis Description: 9012 Cyanide
Associated Lab Samples: 4047262001

METHOD BLANK: 469720 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cyanide	mg/kg	ND	0.60	06/28/11 15:52	

LABORATORY CONTROL SAMPLE: 469721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/kg	3	2.9	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 469722 469723

Parameter	Units	4047437001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cyanide	mg/kg	<0.19	1.7	1.7	1.0	0.90	60	52	80-120	14	20	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 469724 469725

Parameter	Units	4047417008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cyanide	mg/kg	0.49 U	2.4	2.4	0.88	2.4	32	95	80-120	93	20	M1,R1

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ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.57 ± 0.236 (0.119)**	pCi/g	07/18/11 11:06	13982-63-3	

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QUALITY CONTROL DATA

Project: NPL-11
Pace Project No.: 4047262

QC Batch: RADC/8733 | Analysis Method: EPA 901.1m
QC Batch Method: EPA 901.1m | Analysis Description: 901.1 Gamma Spec
Associated Lab Samples: 4047262001

METHOD BLANK: 312825 | Matrix: Solid
Associated Lab Samples: 4047262001

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.0210 ± 0.0380 (0.0720)	pCi/g	07/18/11 14:07	

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QUALIFIERS

Project: NPL-11
Pace Project No.: 4047262

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

H3	Sample was received outside EPA method holding time.
H3	Sample was received outside the recognized method holding time.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.
Z3	Methylene chloride is a common laboratory contaminant. Results for this analyte should be considered estimated unless the amount found in the sample is 3 to 5 times higher than that found in the method blank.

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January 17, 2014

Lisa Graczck/Dynamac
Weston Solutions, Inc.
20 North Wacker Drive
Suite 1210
Chicago, IL 60606

RE: Project: NPL4
Pace Project No.: 4090021

Dear Lisa Graczck/Dynamac:
Enclosed are the analytical results for sample(s) received by the laboratory on December 14, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kang Khang

kang.khang@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: NPL4
Pace Project No.: 4090021

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACLASS DOD-ELAP Accreditation #: ADE-1544
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/TNI Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/TNI Certification #: LA080002
Louisiana/TNI Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188
Utah/TNI Certification #: ANTE
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 11888
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
US Dept of Agriculture #: S-76505
Wisconsin Certification #: 405132750

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SAMPLE SUMMARY

Project: NPL4
Pace Project No.: 4090021

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4090021001	**NPL11-121213**	Solid	12/12/13 11:05	12/14/13 11:40
4090021002	**NPL1-LPI-121213**	Solid	12/12/13 11:15	12/14/13 11:40

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SAMPLE ANALYTE COUNT

Project: NPL4
Pace Project No.: 4090021

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
4090021001	**NPL11-121213**	EPA 8081	DMH	8	PASI-G
		EPA 8082	BDS	10	PASI-G
		ASTM D2974-87	JGH	1	PASI-G
4090021002	**NPL1-LPI-121213**	EPA 8081	DMH	8	PASI-G
		EPA 8082	BDS	10	PASI-G
		EPA 6010	MMZ	7	PASI-G
		EPA 7470	LMS	1	PASI-G
		EPA 8270	RJN	16	PASI-G
		EPA 8260	LAP	13	PASI-G
		ASTM D2974-87	JGH	1	PASI-G
		EPA 901.1m	MAH	1	PASI-PA
		EPA 9045	DEY	1	PASI-G

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ANALYTICAL RESULTS

Project: NPL4
Pace Project No.: 4090021

Sample: NPL11-121213 **Lab ID: 4090021001** Collected: 12/12/13 11:05 Received: 12/14/13 11:40 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8081 GCS Pesticides, TCLP	Analytical Method: EPA 8081 Preparation Method: EPA 3510							
	Leachate Method/Date: EPA 1311; 12/23/13 00:00							
gamma-BHC (Lindane)	**<0.50**	ug/L	0.50	1	12/27/13 12:00	12/28/13 17:59	58-89-9	
Chlordane (Technical)	**<10.0**	ug/L	10.0	1	12/27/13 12:00	12/28/13 17:59	57-74-9	
Endrin	**<1.0**	ug/L	1.0	1	12/27/13 12:00	12/28/13 17:59	72-20-8	
Heptachlor epoxide	**<0.50**	ug/L	0.50	1	12/27/13 12:00	12/28/13 17:59	1024-57-3	
Methoxychlor	**<5.0**	ug/L	5.0	1	12/27/13 12:00	12/28/13 17:59	72-43-5	
Toxaphene	**<30.0**	ug/L	30.0	1	12/27/13 12:00	12/28/13 17:59	8001-35-2	
Surrogates								
Decachlorobiphenyl (S)	89	%	25-130	1	12/27/13 12:00	12/28/13 17:59	2051-24-3	
Tetrachloro-m-xylene (S)	75	%	38-130	1	12/27/13 12:00	12/28/13 17:59	877-09-8	
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3541							
PCB-1016 (Aroclor 1016)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	12674-11-2	
PCB-1221 (Aroclor 1221)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	11104-28-2	
PCB-1232 (Aroclor 1232)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	11141-16-5	
PCB-1242 (Aroclor 1242)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	53469-21-9	
PCB-1248 (Aroclor 1248)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	12672-29-6	
PCB-1254 (Aroclor 1254)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	11097-69-1	
PCB-1260 (Aroclor 1260)	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	11096-82-5	
PCB, Total	**<70.3**	ug/kg	70.3	1	12/17/13 09:14	12/18/13 10:24	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	78	%	40-130	1	12/17/13 09:14	12/18/13 10:24	877-09-8	
Decachlorobiphenyl (S)	73	%	48-130	1	12/17/13 09:14	12/18/13 10:24	2051-24-3	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**28.8**	%	0.10	1		12/16/13 16:05		

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ANALYTICAL RESULTS

Project: NPL4
Pace Project No.: 4090021

Sample: NPL1-LPI-121213 **Lab ID: 4090021002** Collected: 12/12/13 11:15 Received: 12/14/13 11:40 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8081 GCS Pesticides, TCLP	Analytical Method: EPA 8081 Preparation Method: EPA 3510							
	Leachate Method/Date: EPA 1311; 12/23/13 00:00							
gamma-BHC (Lindane)	**<0.50**	ug/L	0.50	1	12/27/13 12:00	12/28/13 18:25	58-89-9	
Chlordane (Technical)	**<10.0**	ug/L	10.0	1	12/27/13 12:00	12/28/13 18:25	57-74-9	
Endrin	**<1.0**	ug/L	1.0	1	12/27/13 12:00	12/28/13 18:25	72-20-8	
Heptachlor epoxide	**<0.50**	ug/L	0.50	1	12/27/13 12:00	12/28/13 18:25	1024-57-3	
Methoxychlor	**<5.0**	ug/L	5.0	1	12/27/13 12:00	12/28/13 18:25	72-43-5	
Toxaphene	**<30.0**	ug/L	30.0	1	12/27/13 12:00	12/28/13 18:25	8001-35-2	
Surrogates								
Decachlorobiphenyl (S)	91	%	25-130	1	12/27/13 12:00	12/28/13 18:25	2051-24-3	
Tetrachloro-m-xylene (S)	80	%	38-130	1	12/27/13 12:00	12/28/13 18:25	877-09-8	
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3541							
PCB-1016 (Aroclor 1016)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	12674-11-2	
PCB-1221 (Aroclor 1221)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	11104-28-2	
PCB-1232 (Aroclor 1232)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	11141-16-5	
PCB-1242 (Aroclor 1242)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	53469-21-9	
PCB-1248 (Aroclor 1248)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	12672-29-6	
PCB-1254 (Aroclor 1254)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	11097-69-1	
PCB-1260 (Aroclor 1260)	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	11096-82-5	
PCB, Total	**<59.1**	ug/kg	59.1	1	12/17/13 09:14	12/18/13 10:41	1336-36-3	
Surrogates								
Tetrachloro-m-xylene (S)	75	%	40-130	1	12/17/13 09:14	12/18/13 10:41	877-09-8	
Decachlorobiphenyl (S)	91	%	48-130	1	12/17/13 09:14	12/18/13 10:41	2051-24-3	
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 12/23/13 00:00							
Arsenic	**<0.050**	mg/L	0.050	1	12/24/13 08:55	12/24/13 15:02	7440-38-2	
Barium	**<0.50**	mg/L	0.50	1	12/24/13 08:55	12/24/13 15:02	7440-39-3	
Cadmium	**0.29**	mg/L	0.0050	1	12/24/13 08:55	12/24/13 15:02	7440-43-9	
Chromium	**<0.050**	mg/L	0.050	1	12/24/13 08:55	12/24/13 15:02	7440-47-3	
Lead	**0.31**	mg/L	0.0075	1	12/24/13 08:55	12/24/13 15:02	7439-92-1	
Selenium	**<0.050**	mg/L	0.050	1	12/24/13 08:55	12/24/13 15:02	7782-49-2	
Silver	**<0.050**	mg/L	0.050	1	12/24/13 08:55	12/24/13 15:02	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 12/23/13 00:00							
Mercury	**<0.20**	ug/L	0.20	1	12/24/13 08:41	12/24/13 13:55	7439-97-6	
8270 MSSV TCLP Sep Funnel	Analytical Method: EPA 8270 Preparation Method: EPA 3510							
	Leachate Method/Date: EPA 1311; 12/23/13 00:00							
1,4-Dichlorobenzene	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	106-46-7	
2,4-Dinitrotoluene	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	121-14-2	
Hexachloro-1,3-butadiene	**<100**	ug/L	100	1	12/30/13 12:00	12/31/13 14:15	87-68-3	
Hexachlorobenzene	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	118-74-1	

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ANALYTICAL RESULTS

Project: NPL4
Pace Project No.: 4090021

Sample: NPL1-LPI-121213 **Lab ID: 4090021002** Collected: 12/12/13 11:15 Received: 12/14/13 11:40 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV TCLP Sep Funnel	Analytical Method: EPA 8270 Preparation Method: EPA 3510							
	Leachate Method/Date: EPA 1311; 12/23/13 00:00							
Hexachloroethane	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	67-72-1	
2-Methylphenol(o-Cresol)	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15		
Nitrobenzene	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	98-95-3	
Pentachlorophenol	**<100**	ug/L	100	1	12/30/13 12:00	12/31/13 14:15	87-86-5	
Pyridine	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	110-86-1	
2,4,5-Trichlorophenol	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	95-95-4	
2,4,6-Trichlorophenol	**<50.0**	ug/L	50.0	1	12/30/13 12:00	12/31/13 14:15	88-06-2	
Surrogates								
Nitrobenzene-d5 (S)	102	%	59-130	1	12/30/13 12:00	12/31/13 14:15	4165-60-0	
2-Fluorobiphenyl (S)	94	%	60-130	1	12/30/13 12:00	12/31/13 14:15	321-60-8	
Phenol-d6 (S)	33	%	19-130	1	12/30/13 12:00	12/31/13 14:15	13127-88-3	
2,4,6-Tribromophenol (S)	76	%	34-143	1	12/30/13 12:00	12/31/13 14:15	118-79-6	
8260 MSV TCLP	Analytical Method: EPA 8260 Preparation Method: EPA 1311							
Benzene	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	71-43-2	
2-Butanone (MEK)	**<200**	ug/L	200	10	12/23/13 00:00	12/26/13 11:23	78-93-3	
Carbon tetrachloride	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	56-23-5	
Chlorobenzene	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	108-90-7	
Chloroform	**<50.0**	ug/L	50.0	10	12/23/13 00:00	12/26/13 11:23	67-66-3	
1,2-Dichloroethane	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	107-06-2	
1,1-Dichloroethene	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	75-35-4	
Tetrachloroethene	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	127-18-4	
Trichloroethene	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	79-01-6	
Vinyl chloride	**<10.0**	ug/L	10.0	10	12/23/13 00:00	12/26/13 11:23	75-01-4	
Surrogates								
Toluene-d8 (S)	104	%	55-137	10	12/23/13 00:00	12/26/13 11:23	2037-26-5	
4-Bromofluorobenzene (S)	97	%	43-137	10	12/23/13 00:00	12/26/13 11:23	460-00-4	
Dibromofluoromethane (S)	100	%	70-130	10	12/23/13 00:00	12/26/13 11:23	1868-53-7	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**15.3**	%	0.10	1		12/16/13 16:05		
9045 pH Soil	Analytical Method: EPA 9045							
pH at 25 Degrees C	**7.4**	Std. Units	0.10	1		12/18/13 14:55		H6

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: MERP/4041
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 4090021002

METHOD BLANK: 916605
Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.20	0.20	12/24/13 13:34	

METHOD BLANK: 916243
Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.20	0.20	12/24/13 13:59	

LABORATORY CONTROL SAMPLE: 916606

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 916607 916608

Parameter	Units	4089211001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.10	5	5	4.6	4.9	92	98	85-115	6	20	

MATRIX SPIKE SAMPLE: 916609

Parameter	Units	4090190001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.10	5	5.5	111	85-115	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: MPRP/9677 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET TCLP
Associated Lab Samples: 4090021002

METHOD BLANK: 916617 | Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.050	0.050	12/24/13 14:38	
Barium	mg/L	<0.50	0.50	12/24/13 14:38	
Cadmium	mg/L	<0.0050	0.0050	12/24/13 14:38	
Chromium	mg/L	<0.050	0.050	12/24/13 14:38	
Lead	mg/L	<0.0075	0.0075	12/24/13 14:38	
Selenium	mg/L	<0.050	0.050	12/24/13 14:38	
Silver	mg/L	<0.050	0.050	12/24/13 14:38	

METHOD BLANK: 916241 | Matrix: Solid
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.25	0.25	12/24/13 15:00	
Barium	mg/L	<2.5	2.5	12/24/13 15:00	
Cadmium	mg/L	<0.025	0.025	12/24/13 15:00	
Chromium	mg/L	<0.25	0.25	12/24/13 15:00	
Lead	mg/L	<0.038	0.038	12/24/13 15:00	
Selenium	mg/L	<0.25	0.25	12/24/13 15:00	
Silver	mg/L	<0.25	0.25	12/24/13 15:00	

METHOD BLANK: 916242 | Matrix: Solid
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.050	0.050	12/24/13 15:05	
Barium	mg/L	<0.50	0.50	12/24/13 15:05	
Cadmium	mg/L	<0.0050	0.0050	12/24/13 15:05	
Chromium	mg/L	<0.050	0.050	12/24/13 15:05	
Lead	mg/L	<0.0075	0.0075	12/24/13 15:05	
Selenium	mg/L	<0.050	0.050	12/24/13 15:05	
Silver	mg/L	<0.050	0.050	12/24/13 15:05	

LABORATORY CONTROL SAMPLE: 916618

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.5	0.46	92	80-120	
Barium	mg/L	.5	<0.50	92	80-120	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

LABORATORY CONTROL SAMPLE: 916618

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium	mg/L	.5	0.47	94	80-120	
Chromium	mg/L	.5	0.48	95	80-120	
Lead	mg/L	.5	0.47	94	80-120	
Selenium	mg/L	.5	0.47	94	80-120	
Silver	mg/L	.25	0.23	94	80-120	

MATRIX SPIKE SAMPLE: 916619

Parameter	Units	4090190001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	<0.12	2.5	2.3	93	75-125	
Barium	mg/L	<1.2	2.5	2.6	91	75-125	
Cadmium	mg/L	<0.012	2.5	2.4	95	75-125	
Chromium	mg/L	<0.12	2.5	2.4	94	75-125	
Lead	mg/L	<0.015	2.5	2.4	94	75-125	
Selenium	mg/L	<0.12	2.5	2.4	94	75-125	
Silver	mg/L	<0.12	1.2	1.2	95	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 916620 916621

Parameter	Units	4090209001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	<0.12	2.5	2.5	2.3	2.4	92	94	75-125	2	20	
Barium	mg/L	<1.2	2.5	2.5	2.7	2.7	90	90	75-125	0	20	
Cadmium	mg/L	<0.012	2.5	2.5	2.3	2.4	94	95	75-125	2	20	
Chromium	mg/L	<0.12	2.5	2.5	2.3	2.4	93	94	75-125	1	20	
Lead	mg/L	<0.015	2.5	2.5	2.3	2.4	92	94	75-125	2	20	
Selenium	mg/L	<0.12	2.5	2.5	2.3	2.4	91	93	75-125	2	20	
Silver	mg/L	<0.12	1.2	1.2	1.2	1.2	93	94	75-125	2	20	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: MSV/22863 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV TCLP
Associated Lab Samples: 4090021002

METHOD BLANK: 916648 | Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethene	ug/L	<1.0	1.0	12/26/13 07:01	
1,2-Dichloroethane	ug/L	<1.0	1.0	12/26/13 07:01	
2-Butanone (MEK)	ug/L	<20.0	20.0	12/26/13 07:01	
Benzene	ug/L	<1.0	1.0	12/26/13 07:01	
Carbon tetrachloride	ug/L	<1.0	1.0	12/26/13 07:01	
Chlorobenzene	ug/L	<1.0	1.0	12/26/13 07:01	
Chloroform	ug/L	<5.0	5.0	12/26/13 07:01	
Tetrachloroethene	ug/L	<1.0	1.0	12/26/13 07:01	
Trichloroethene	ug/L	<1.0	1.0	12/26/13 07:01	
Vinyl chloride	ug/L	<1.0	1.0	12/26/13 07:01	
4-Bromofluorobenzene (S)	%	98	43-137	12/26/13 07:01	
Dibromofluoromethane (S)	%	98	70-130	12/26/13 07:01	
Toluene-d8 (S)	%	102	55-137	12/26/13 07:01	

METHOD BLANK: 916246 | Matrix: Solid
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethene	ug/L	<10.0	10.0	12/26/13 11:45	
1,2-Dichloroethane	ug/L	<10.0	10.0	12/26/13 11:45	
2-Butanone (MEK)	ug/L	<200	200	12/26/13 11:45	
Benzene	ug/L	<10.0	10.0	12/26/13 11:45	
Carbon tetrachloride	ug/L	<10.0	10.0	12/26/13 11:45	
Chlorobenzene	ug/L	<10.0	10.0	12/26/13 11:45	
Chloroform	ug/L	<50.0	50.0	12/26/13 11:45	
Tetrachloroethene	ug/L	<10.0	10.0	12/26/13 11:45	
Trichloroethene	ug/L	<10.0	10.0	12/26/13 11:45	
Vinyl chloride	ug/L	<10.0	10.0	12/26/13 11:45	
4-Bromofluorobenzene (S)	%	97	43-137	12/26/13 11:45	
Dibromofluoromethane (S)	%	101	70-130	12/26/13 11:45	
Toluene-d8 (S)	%	104	55-137	12/26/13 11:45	

LABORATORY CONTROL SAMPLE & LCSD: 916649 916650

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1-Dichloroethene	ug/L	50	62.9	64.7	126	129	70-130	3	20	
1,2-Dichloroethane	ug/L	50	54.7	56.2	109	112	70-144	3	20	
Benzene	ug/L	50	55.4	57.2	111	114	70-137	3	20	
Carbon tetrachloride	ug/L	50	47.0	50.4	94	101	70-154	7	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

LABORATORY CONTROL SAMPLE & LCSD: 916649 916650

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Chlorobenzene	ug/L	50	52.2	54.2	104	108	70-130	4	20	
Chloroform	ug/L	50	54.6	56.1	109	112	70-130	3	20	
Tetrachloroethene	ug/L	50	46.0	48.0	92	96	70-130	4	20	
Trichloroethene	ug/L	50	53.0	55.5	106	111	70-130	5	20	
Vinyl chloride	ug/L	50	59.2	60.5	118	121	61-143	2	20	
4-Bromofluorobenzene (S)	%				101	100	43-137			
Dibromofluoromethane (S)	%				105	105	70-130			
Toluene-d8 (S)	%				102	102	55-137			

MATRIX SPIKE SAMPLE: 916651

Parameter	Units	4090190001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethene	ug/L	<4.3	500	631	126	70-130	
1,2-Dichloroethane	ug/L	<4.8	500	542	108	70-146	
2-Butanone (MEK)	ug/L	<27.0		<200			
Benzene	ug/L	<5.0	500	557	111	70-137	
Carbon tetrachloride	ug/L	<3.7	500	509	102	70-154	
Chlorobenzene	ug/L	<3.6	500	521	104	70-130	
Chloroform	ug/L	<6.9	500	548	110	70-130	
Tetrachloroethene	ug/L	<4.7	500	459	92	70-130	
Trichloroethene	ug/L	<4.3	500	526	105	70-130	
Vinyl chloride	ug/L	<1.8	500	573	114	59-144	
4-Bromofluorobenzene (S)	%				101	43-137	
Dibromofluoromethane (S)	%				105	70-130	
Toluene-d8 (S)	%				102	55-137	

MATRIX SPIKE SAMPLE: 916652

Parameter	Units	4090021002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethene	ug/L	<10.0	500	626	125	70-130	
1,2-Dichloroethane	ug/L	<10.0	500	533	107	70-146	
2-Butanone (MEK)	ug/L	<200		<200			
Benzene	ug/L	<10.0	500	551	110	70-137	
Carbon tetrachloride	ug/L	<10.0	500	513	103	70-154	
Chlorobenzene	ug/L	<10.0	500	524	105	70-130	
Chloroform	ug/L	<50.0	500	545	109	70-130	
Tetrachloroethene	ug/L	<10.0	500	458	92	70-130	
Trichloroethene	ug/L	<10.0	500	529	106	70-130	
Vinyl chloride	ug/L	<10.0	500	565	113	59-144	
4-Bromofluorobenzene (S)	%				101	43-137	
Dibromofluoromethane (S)	%				105	70-130	
Toluene-d8 (S)	%				102	55-137	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: OEXT/21081 | Analysis Method: EPA 8081
QC Batch Method: EPA 3510 | Analysis Description: 8081 GCS TCLP Pesticides
Associated Lab Samples: 4090021001, 4090021002

METHOD BLANK: 917266 | Matrix: Water
Associated Lab Samples: 4090021001, 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chlordane (Technical)	ug/L	<2.0	2.0	12/28/13 16:41	
Endrin	ug/L	<0.20	0.20	12/28/13 16:41	
gamma-BHC (Lindane)	ug/L	<0.10	0.10	12/28/13 16:41	
Heptachlor epoxide	ug/L	<0.10	0.10	12/28/13 16:41	
Methoxychlor	ug/L	<1.0	1.0	12/28/13 16:41	
Toxaphene	ug/L	<6.0	6.0	12/28/13 16:41	
Decachlorobiphenyl (S)	%	91	25-130	12/28/13 16:41	
Tetrachloro-m-xylene (S)	%	83	38-130	12/28/13 16:41	

METHOD BLANK: 916244 | Matrix: Water
Associated Lab Samples: 4090021001, 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chlordane (Technical)	ug/L	<10.0	10.0	12/28/13 16:15	
Endrin	ug/L	<1.0	1.0	12/28/13 16:15	
gamma-BHC (Lindane)	ug/L	<0.50	0.50	12/28/13 16:15	
Heptachlor epoxide	ug/L	<0.50	0.50	12/28/13 16:15	
Methoxychlor	ug/L	<5.0	5.0	12/28/13 16:15	
Toxaphene	ug/L	<30.0	30.0	12/28/13 16:15	
Decachlorobiphenyl (S)	%	86	25-130	12/28/13 16:15	
Tetrachloro-m-xylene (S)	%	73	38-130	12/28/13 16:15	

LABORATORY CONTROL SAMPLE: 917267

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chlordane (Technical)	ug/L		<2.0			
Endrin	ug/L	.8	0.83	104	64-130	
gamma-BHC (Lindane)	ug/L	.4	0.42	106	63-130	
Heptachlor epoxide	ug/L	.4	0.42	105	64-130	
Methoxychlor	ug/L	4	3.6	91	58-130	
Toxaphene	ug/L		<6.0			
Decachlorobiphenyl (S)	%			94	25-130	
Tetrachloro-m-xylene (S)	%			90	38-130	

MATRIX SPIKE SAMPLE: 917268

Parameter	Units	4090021001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chlordane (Technical)	ug/L	<10.0		<10.0			

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

MATRIX SPIKE SAMPLE: 917268

Parameter	Units	4090021001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Endrin	ug/L	<1.0	4	4.1	101	64-131	
gamma-BHC (Lindane)	ug/L	<0.50	2	2.0	102	45-133	
Heptachlor epoxide	ug/L	<0.50	2	2.0	101	60-130	
Methoxychlor	ug/L	<5.0	20	17.8	89	56-130	
Toxaphene	ug/L	<30.0		<30.0			
Decachlorobiphenyl (S)	%				91	25-130	
Tetrachloro-m-xylene (S)	%				80	38-130	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: OEXT/20993 | Analysis Method: EPA 8082
QC Batch Method: EPA 3541 | Analysis Description: 8082 GCS PCB
Associated Lab Samples: 4090021001, 4090021002

METHOD BLANK: 912757 | Matrix: Solid
Associated Lab Samples: 4090021001, 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	<50.0	50.0	12/17/13 17:49	
PCB-1221 (Aroclor 1221)	ug/kg	<50.0	50.0	12/17/13 17:49	
PCB-1232 (Aroclor 1232)	ug/kg	<50.0	50.0	12/17/13 17:49	
PCB-1242 (Aroclor 1242)	ug/kg	<50.0	50.0	12/17/13 17:49	
PCB-1248 (Aroclor 1248)	ug/kg	<50.0	50.0	12/17/13 17:49	
PCB-1254 (Aroclor 1254)	ug/kg	<50.0	50.0	12/17/13 17:49	
PCB-1260 (Aroclor 1260)	ug/kg	<50.0	50.0	12/17/13 17:49	
Decachlorobiphenyl (S)	%	97	48-130	12/17/13 17:49	
Tetrachloro-m-xylene (S)	%	84	40-130	12/17/13 17:49	

LABORATORY CONTROL SAMPLE: 912758

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg		<50.0			
PCB-1221 (Aroclor 1221)	ug/kg		<50.0			
PCB-1232 (Aroclor 1232)	ug/kg		<50.0			
PCB-1242 (Aroclor 1242)	ug/kg		<50.0			
PCB-1248 (Aroclor 1248)	ug/kg		<50.0			
PCB-1254 (Aroclor 1254)	ug/kg		<50.0			
PCB-1260 (Aroclor 1260)	ug/kg	500	443	89	70-130	
Decachlorobiphenyl (S)	%			98	48-130	
Tetrachloro-m-xylene (S)	%			83	40-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 912759 912760

Parameter	Units	4090020001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
PCB-1016 (Aroclor 1016)	ug/kg	<25.6			<51.1	<51.1					31	
PCB-1221 (Aroclor 1221)	ug/kg	<25.6			<51.1	<51.1					31	
PCB-1232 (Aroclor 1232)	ug/kg	<25.6			<51.1	<51.1					31	
PCB-1242 (Aroclor 1242)	ug/kg	<25.6			<51.1	<51.1					31	
PCB-1248 (Aroclor 1248)	ug/kg	<25.6			<51.1	<51.1					31	
PCB-1254 (Aroclor 1254)	ug/kg	<25.6			<51.1	<51.1					31	
PCB-1260 (Aroclor 1260)	ug/kg	<25.6	511	511	430	418	84	82	40-149	3	31	
Decachlorobiphenyl (S)	%						93	92	48-130			
Tetrachloro-m-xylene (S)	%						81	84	40-130			

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: OEXT/21087 | Analysis Method: EPA 8270
QC Batch Method: EPA 3510 | Analysis Description: 8270 TCLP MSSV
Associated Lab Samples: 4090021002

METHOD BLANK: 917692 | Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,4-Dichlorobenzene	ug/L	<10.0	10.0	12/31/13 10:27	
2,4,5-Trichlorophenol	ug/L	<10.0	10.0	12/31/13 10:27	
2,4,6-Trichlorophenol	ug/L	<10.0	10.0	12/31/13 10:27	
2,4-Dinitrotoluene	ug/L	<10.0	10.0	12/31/13 10:27	
2-Methylphenol(o-Cresol)	ug/L	<10.0	10.0	12/31/13 10:27	
3&4-Methylphenol(m&p Cresol)	ug/L	<10.0	10.0	12/31/13 10:27	
Hexachloro-1,3-butadiene	ug/L	<20.0	20.0	12/31/13 10:27	
Hexachlorobenzene	ug/L	<10.0	10.0	12/31/13 10:27	
Hexachloroethane	ug/L	<10.0	10.0	12/31/13 10:27	
Nitrobenzene	ug/L	<10.0	10.0	12/31/13 10:27	
Pentachlorophenol	ug/L	<20.0	20.0	12/31/13 10:27	
Pyridine	ug/L	<10.0	10.0	12/31/13 10:27	
2,4,6-Tribromophenol (S)	%	78	34-143	12/31/13 10:27	
2-Fluorobiphenyl (S)	%	97	60-130	12/31/13 10:27	
Nitrobenzene-d5 (S)	%	91	59-130	12/31/13 10:27	
Phenol-d6 (S)	%	30	19-130	12/31/13 10:27	

METHOD BLANK: 916245 | Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,4-Dichlorobenzene	ug/L	<50.0	50.0	01/02/14 11:09	
2,4,5-Trichlorophenol	ug/L	<50.0	50.0	01/02/14 11:09	
2,4,6-Trichlorophenol	ug/L	<50.0	50.0	01/02/14 11:09	
2,4-Dinitrotoluene	ug/L	<50.0	50.0	01/02/14 11:09	
2-Methylphenol(o-Cresol)	ug/L	<50.0	50.0	01/02/14 11:09	
3&4-Methylphenol(m&p Cresol)	ug/L	<50.0	50.0	01/02/14 11:09	
Hexachloro-1,3-butadiene	ug/L	<100	100	01/02/14 11:09	
Hexachlorobenzene	ug/L	<50.0	50.0	01/02/14 11:09	
Hexachloroethane	ug/L	<50.0	50.0	01/02/14 11:09	
Nitrobenzene	ug/L	<50.0	50.0	01/02/14 11:09	
Pentachlorophenol	ug/L	<100	100	01/02/14 11:09	
Pyridine	ug/L	<50.0	50.0	01/02/14 11:09	
2,4,6-Tribromophenol (S)	%	73	34-143	01/02/14 11:09	
2-Fluorobiphenyl (S)	%	96	60-130	01/02/14 11:09	
Nitrobenzene-d5 (S)	%	93	59-130	01/02/14 11:09	
Phenol-d6 (S)	%	34	19-130	01/02/14 11:09	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

METHOD BLANK: 917109 Matrix: Water
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,4-Dichlorobenzene	ug/L	<50.0	50.0	01/02/14 19:19	
2,4,5-Trichlorophenol	ug/L	<50.0	50.0	01/02/14 19:19	
2,4,6-Trichlorophenol	ug/L	<50.0	50.0	01/02/14 19:19	
2,4-Dinitrotoluene	ug/L	<50.0	50.0	01/02/14 19:19	
2-Methylphenol(o-Cresol)	ug/L	<50.0	50.0	01/02/14 19:19	
3&4-Methylphenol(m&p Cresol)	ug/L	<50.0	50.0	01/02/14 19:19	
Hexachloro-1,3-butadiene	ug/L	<100	100	01/02/14 19:19	
Hexachlorobenzene	ug/L	<50.0	50.0	01/02/14 19:19	
Hexachloroethane	ug/L	<50.0	50.0	01/02/14 19:19	
Nitrobenzene	ug/L	<50.0	50.0	01/02/14 19:19	
Pentachlorophenol	ug/L	<100	100	01/02/14 19:19	
Pyridine	ug/L	<50.0	50.0	01/02/14 19:19	
2,4,6-Tribromophenol (S)	%	76	34-143	01/02/14 19:19	
2-Fluorobiphenyl (S)	%	103	60-130	01/02/14 19:19	
Nitrobenzene-d5 (S)	%	105	59-130	01/02/14 19:19	
Phenol-d6 (S)	%	36	19-130	01/02/14 19:19	

LABORATORY CONTROL SAMPLE: 917693

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	50	31.0	62	53-130	
2,4,5-Trichlorophenol	ug/L	50	43.6	87	70-130	
2,4,6-Trichlorophenol	ug/L	50	44.8	90	70-130	
2,4-Dinitrotoluene	ug/L	50	51.7	103	69-134	
2-Methylphenol(o-Cresol)	ug/L	50	36.8	74	48-130	
3&4-Methylphenol(m&p Cresol)	ug/L	50	32.5	65	43-130	
Hexachloro-1,3-butadiene	ug/L	50	35.0	70	53-130	
Hexachlorobenzene	ug/L	50	46.1	92	59-130	
Hexachloroethane	ug/L	50	28.3	57	47-130	
Nitrobenzene	ug/L	50	53.3	107	66-130	
Pentachlorophenol	ug/L	50	42.7	85	54-130	
Pyridine	ug/L	50	17.8	36	10-130	
2,4,6-Tribromophenol (S)	%			77	34-143	
2-Fluorobiphenyl (S)	%			89	60-130	
Nitrobenzene-d5 (S)	%			87	59-130	
Phenol-d6 (S)	%			35	19-130	

MATRIX SPIKE SAMPLE: 917694

Parameter	Units	4090021002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	<50.0	250	194	78	50-130	
2,4,5-Trichlorophenol	ug/L	<50.0	250	262	105	65-130	
2,4,6-Trichlorophenol	ug/L	<50.0	250	255	102	64-130	
2,4-Dinitrotoluene	ug/L	<50.0	250	307	123	49-136	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

MATRIX SPIKE SAMPLE: 917694

Parameter	Units	4090021002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
2-Methylphenol(o-Cresol)	ug/L	<50.0	250	211	84	33-130	
3&4-Methylphenol(m&p Cresol)	ug/L	<50.0	250	190	76	35-130	
Hexachloro-1,3-butadiene	ug/L	<100	250	210	84	48-130	
Hexachlorobenzene	ug/L	<50.0	250	263	105	57-130	
Hexachloroethane	ug/L	<50.0	250	178	71	45-130	
Nitrobenzene	ug/L	<50.0	250	300	120	62-130	
Pentachlorophenol	ug/L	<100	250	257	103	10-149	
Pyridine	ug/L	<50.0	250	140	56	10-130	
2,4,6-Tribromophenol (S)	%				91	34-143	
2-Fluorobiphenyl (S)	%				98	60-130	
Nitrobenzene-d5 (S)	%				100	59-130	
Phenol-d6 (S)	%				41	19-130	

MATRIX SPIKE SAMPLE: 917695

Parameter	Units	4090190001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	<8.6	250	176	71	50-130	
2,4,5-Trichlorophenol	ug/L	<10	250	243	97	65-130	
2,4,6-Trichlorophenol	ug/L	<10.7	250	237	95	64-130	
2,4-Dinitrotoluene	ug/L	<8.0	250	283	113	49-136	
2-Methylphenol(o-Cresol)	ug/L	<9.7	250	185	74	33-130	
3&4-Methylphenol(m&p Cresol)	ug/L	52.7	250	211	63	35-130	
Hexachloro-1,3-butadiene	ug/L	<6.6	250	190	76	48-130	
Hexachlorobenzene	ug/L	<11.1	250	244	98	57-130	
Hexachloroethane	ug/L	<5.8	250	170	68	45-130	
Nitrobenzene	ug/L	<13.7	250	285	114	62-130	
Pentachlorophenol	ug/L	<10.8	250	238	95	10-149	
Pyridine	ug/L	<14.3	250	157	63	10-130	
2,4,6-Tribromophenol (S)	%				84	34-143	
2-Fluorobiphenyl (S)	%				88	60-130	
Nitrobenzene-d5 (S)	%				85	59-130	
Phenol-d6 (S)	%				35	19-130	

MATRIX SPIKE SAMPLE: 917696

Parameter	Units	4090496001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	<8.6	250	155	62	50-130	
2,4,5-Trichlorophenol	ug/L	<10	250	234	94	65-130	
2,4,6-Trichlorophenol	ug/L	<10.7	250	233	93	64-130	
2,4-Dinitrotoluene	ug/L	<8.0	250	297	119	49-136	
2-Methylphenol(o-Cresol)	ug/L	<9.7	250	207	83	33-130	
3&4-Methylphenol(m&p Cresol)	ug/L	<7.7	250	184	74	35-130	
Hexachloro-1,3-butadiene	ug/L	<6.6	250	181	73	48-130	
Hexachlorobenzene	ug/L	<11.1	250	266	107	57-130	
Hexachloroethane	ug/L	<5.8	250	145	58	45-130	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

MATRIX SPIKE SAMPLE: 917696

Parameter	Units	4090496001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrobenzene	ug/L	<13.7	250	266	106	62-130	
Pentachlorophenol	ug/L	<10.8	250	205	82	10-149	
Pyridine	ug/L	<14.3	250	116	46	10-130	
2,4,6-Tribromophenol (S)	%				84	34-143	
2-Fluorobiphenyl (S)	%				89	60-130	
Nitrobenzene-d5 (S)	%				89	59-130	
Phenol-d6 (S)	%				39	19-130	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: PMST/9313
QC Batch Method: ASTM D2974-87
Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 4090021001, 4090021002

SAMPLE DUPLICATE: 912563

Parameter	Units	4090013009 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.6	11.7	1	10	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: TCLP/3237
QC Batch Method: EPA 1311
Analysis Method: EPA 8260
Analysis Description: 8260 MSV TCLP
Associated Lab Samples: 4090021002

METHOD BLANK: 916246
Matrix: Solid
Associated Lab Samples: 4090021002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethene	ug/L	<10.0	10.0	12/26/13 11:45	
1,2-Dichloroethane	ug/L	<10.0	10.0	12/26/13 11:45	
2-Butanone (MEK)	ug/L	<200	200	12/26/13 11:45	
Benzene	ug/L	<10.0	10.0	12/26/13 11:45	
Carbon tetrachloride	ug/L	<10.0	10.0	12/26/13 11:45	
Chlorobenzene	ug/L	<10.0	10.0	12/26/13 11:45	
Chloroform	ug/L	<50.0	50.0	12/26/13 11:45	
Tetrachloroethene	ug/L	<10.0	10.0	12/26/13 11:45	
Trichloroethene	ug/L	<10.0	10.0	12/26/13 11:45	
Vinyl chloride	ug/L	<10.0	10.0	12/26/13 11:45	
4-Bromofluorobenzene (S)	%	97	43-137	12/26/13 11:45	
Dibromofluoromethane (S)	%	101	70-130	12/26/13 11:45	
Toluene-d8 (S)	%	104	55-137	12/26/13 11:45	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: WET/17324
QC Batch Method: EPA 9045
Analysis Method: EPA 9045
Analysis Description: 9045 pH
Associated Lab Samples: 4090021002

SAMPLE DUPLICATE: 914541

Parameter	Units	4090021002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.4	7.4	0	5	

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ANALYTICAL RESULTS

Project: NPL4
Pace Project No.: 4090021

Sample: NPL1-LPI-121213 **Lab ID: 4090021002** Collected: 12/12/13 11:15 Received: 12/14/13 11:40 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.471 ± 0.337 (0.272)**	pCi/g	01/14/14 14:01	13982-63-3	

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QUALITY CONTROL DATA

Project: NPL4
Pace Project No.: 4090021

QC Batch: RADC/18073
QC Batch Method: EPA 901.1m
Analysis Method: EPA 901.1m
Analysis Description: 901.1 Gamma Spec Ingrowth
Associated Lab Samples: 4090021002

METHOD BLANK: 670463
Matrix: Solid
Associated Lab Samples:

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.047 ± 0.070 (0.231)	pCi/g	12/17/13 12:23	

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Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: NPL4
Pace Project No.: 4090021

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

H6	Analysis initiated outside of the 15 minute EPA recommended holding time.

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Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NPL4
Pace Project No.: 4090021

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
4090021001	**NPL11-121213**	EPA 3510	OEXT/21081	EPA 8081	GCSV/10744
4090021002	**NPL1-LPI-121213**	EPA 3510	OEXT/21081	EPA 8081	GCSV/10744
4090021001	**NPL11-121213**	EPA 3541	OEXT/20993	EPA 8082	GCSV/10707
4090021002	**NPL1-LPI-121213**	EPA 3541	OEXT/20993	EPA 8082	GCSV/10707
4090021002	**NPL1-LPI-121213**	EPA 3010	MPRP/9677	EPA 6010	ICP/8521
4090021002	**NPL1-LPI-121213**	EPA 7470	MERP/4041	EPA 7470	MERC/5212
4090021002	**NPL1-LPI-121213**	EPA 3510	OEXT/21087	EPA 8270	MSSV/6391
4090021002	**NPL1-LPI-121213**	EPA 1311	TCLP/3237	EPA 8260	MSV/22863
4090021001	**NPL11-121213**	ASTM D2974-87	PMST/9313		
4090021002	**NPL1-LPI-121213**	ASTM D2974-87	PMST/9313		
4090021002	**NPL1-LPI-121213**	EPA 901.1m	RADC/18142	EPA 901.1m	RADC/18073
4090021002	**NPL1-LPI-121213**	EPA 9045	WET/17324		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

4090021

Page: 1 of 1

Section A Required Client Information:

Company:	Weston Solutions Inc
Address:	750 E. Bunker Ct. Ste 500
	Vernon Hills, IL 60061
Email To:	
Phone:	847-918-4000
Fax:	847-918-4055
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Rick Mehl
Copy To:	
Purchase Order No.:	
Project Name:	NPL4
Project Number:	

Section C Invoice Information:

Attention:	Same
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_____

SITE LOCATION: ☐ GA ☐ IL ☒ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER____

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	TCLP VOCs	TCLP SVOCs	TCLP Pest/Herb	Total PCBs	TCLP RCRA metals	pH	Radium-226	Residual Chlorine (Y/N)	Pace Project No. Lab I.D.
001 1	NPL11-121213	SL	C	12-12-13	1105				4								X			X	X					4-4oz ag A
002 2	NPL1-LPI-121213	SL	C	12-12-13	1115				6								X	X	X	X	X	X	X	X		6-4oz ag A
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Timothy A. Walls 12-12-13

Filtered (Y/N)

Requested Analysis:

Additional Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Timothy A. Walls / Weston	12-13-13	1145			
Fed Ex	12-14-13	1140	[illegible] Pace GB	12-14-13	1140

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
3.5	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Timothy A. Walls

SIGNATURE of SAMPLER: Timothy A. Walls

DATE Signed (MM / DD / YY): 12-12-13

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Project **WO# : 4090021**

4090021

Client Name: Weston Solutions

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other: _____

Tracking #: 8739 5475 4001

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☐ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used SR-52 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 3 /Corr: 3.5°C **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 12-14-13
Initials: BK

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☐Yes ☑No ☐N/A	
-Pace IR Containers Used:	☐Yes ☑No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: S		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: * custody seal only on hinge of cooler. 12-14-13 BK

Project Manager Review: _____ **Date:** 12/16/13

F-GB-C-031-Rev.02 (28Oct2013) SCUR Form

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

January 06, 2014

Kang Khang
PASI Green Bay
1241 Bellevue Street
Suite 9
Green Bay, WI 54302

RE: Project 20163473
Project ID: 4090021/Weston Solutions-IL

Dear Kang Khang:

Enclosed are the analytical results for sample(s) received by the laboratory on December 14, 2013. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerly,

Regina Ste. Marie

Regina Ste. Marie
regina.ste.marie@pacelabs.com

REPORT OF LABORATORY ANALYSIS

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Laboratory Certifications

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Project: 20163473

Client: PASI Green Bay

Project ID: 4090021/Weston Solutions-IL

Washington Department of Ecology C2078
Oregon Environmental Laboratory Accreditation - LA200001
U.S. Dept. of Agriculture Foreign Soil Import P330-10-00119
Pennsylviania Dept. of Env Protection (NELAC) 68-04202
Texas Commission on Env. Quality (NELAC) T104704405-09-TX
Kansas Department of Health and Environment (NELAC) E-10266
Florida Department of Health (NELAC) E87595
Oklahoma Department of Environmental Quality - 2010-139
Illinois Environmental Protection Agency - 0025721
California Env. Lab Accreditation Program Branch - 11277CA
Louisiana Dept. of Environmental Quality (NELAC/LELAP) 02006

1/6/2014 10:44:21

Sample Cross Reference

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Project: 20163473

Client: PASI Green Bay

Project ID: 4090021/Weston Solutions-IL

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
NPL11-121213	201154128	Other	12-Dec-13 11:05	14-Dec-13 09:00
NPL1-LPI-121213	201154129	Other	12-Dec-13 11:15	14-Dec-13 09:00

Project Narrative

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Project: 20163473

Sample Receipt Condition:

All samples were received in accordance with EPA protocol.

Holding Times:

All holding times were met.

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

All MS/MSD recoveries or duplicate RPDs were within QC limits.

Surrogates:

All surrogate recoveries were within QC limits.

QC Cross Reference

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Project: 20163473

Analytical Method	Batch	Sample used for QC
EPA 8151	224324	Project sample NPL11-121213

For the sample used as the original for the DUP or MS/MSD for the batch:

Project sample means a sample from this project was used.
Client sample means a sample from the same client but in a different project was used.
Batch sample means a sample from a different client was used.

Sample Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Client: PASI Green Bay

Client ID: NPL11-121213
Project: 20163473
Project ID: 4090021/Weston Solutions-IL
Site: None
Lab ID: 201154128 (TCLP)
Matrix: Other
% Moisture: n/a
Description: None
Prep Level: TCLP
Batch: 224324
Method: EPA 8151 (TCLP)
8151 Herbs TCLP
Collected: 12-Dec-13
Received: 14-Dec-13
Prepared: 30-Dec-13

Units: mg/L

CAS No.	Analyte	Dilution	Result	Qu	Reporting Limit	Reg Limit	Analysis	
94-75-7	2,4-D	1	ND		0.0200	10.0	31-Dec-13 14:22	SNP1
93-72-1	2,4,5-TP (Silvex)	1	ND		0.0200	1.00	31-Dec-13 14:22	SNP1

2 compound(s) reported

Protocol 1/6/2014 10:46:50

ND denotes the analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Sample Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Client: PASI Green Bay

Client ID: NPL1-LPI-121213
Project: 20163473
Project ID: 4090021/Weston Solutions-IL
Site: None
Lab ID: 201154129 (TCLP)
Matrix: Other
% Moisture: n/a
Description: None
Prep Level: TCLP
Batch: 224324
Method: EPA 8151 (TCLP)
8151 Herbs TCLP
Collected: 12-Dec-13
Received: 14-Dec-13
Prepared: 30-Dec-13

Units: mg/L

CAS No.	Analyte	Dilution	Result	Qu	Reporting Limit	Reg Limit	Analysis	
94-75-7	2,4-D	1	ND		0.0200	10.0	31-Dec-13 15:10	SNP1
93-72-1	2,4,5-TP (Silvex)	1	ND		0.0200	1.00	31-Dec-13 15:10	SNP1

2 compound(s) reported

Protocol 1/6/2014 10:46:50

ND denotes the analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Surrogate Recovery

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Batch: 224324 **Project:** 20163473

Method: TCLP GC Semivolatile Organics

Lab ID	Sample ID	Qu	Sur 1 %Rec	Sur 2 %Rec	Sur 3 %Rec	Sur 4 %Rec	Sur 5 %Rec	Sur 6 %Rec	Sur 7 %Rec	Sur 8 %Rec
201154471	224324 BLANK 1		75	75						
201154505	224324 BLANK 2		69	70						
201154506	224324 BLANK 3		84	83						
201154472	224324 LCS 1		72	72						
201154128	NPL11-121213		73	75						
201154473	NPL11-121213 MS 1		82	81						
201154474	NPL11-121213 MSD 1		77	76						
201154129	NPL1-LPI-121213		68	69						
	QC limits:		10-166	10-166						

Sur 1: 2,4-DCPA (Conf)(S)
Sur 2: 2,4-DCPA (S)

*** denotes surrogate recovery outside of QC limits.**
D denotes surrogate recovery is outside of QC limits due to sample dilution, and is not considered an excursion.

Quality Control

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Batch: 224324 **Project:** 20163473 **LCS:** 201154472 31-Dec-13 14:06

Method: TCLP GC Semivolatile Organics **MS:** 201154473 31-Dec-13 14:38

Units: mg/L **MSD:** 201154474 31-Dec-13 14:54

Original for MS: Client Sample 201154128

Parameter Name	LCS Spike	LCS Found	LCS %Rec	MS Spike	Sample Found	MS Found	MSD Found	MS %Rec	MSD %Rec	RPD	QC Limits LCS	QC Limits MS/MSD	Max RPD	Qu
2,4-D	0.0400	0.0271	68	0.0400		0.0315	0.0347	78	86	10	10-151	10-160	27	
2,4,5-TP (Silvex)	0.0400	0.0287	72	0.0400		0.0324	0.0356	80	88	9	22-158	16-164	20	

2 compound(s) reported

*** denotes recovery outside of QC limits.**
MS/MSD RPD is calculated via SW-846 rules on the basis of spiked sample concentrations rather than spike recoveries.

Blank Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Blank ID: 224324 BLANK 1 **Project:** 20163473

Lab ID: 201154471

Prep Level: TCLP **Batch:** 224324

Method: TCLP GC Semivolatile Organics

Prepared: 30-Dec-13

Units: mg/L

CAS Numb	Analyte	Dilution	Result	Qu	Reporting Limit	Analysis
94-75-7	2,4-D	1	ND		0.0200	31-Dec-13 13:50 SNP1
93-72-1	2,4,5-TP (Silvex)	1	ND		0.0200	31-Dec-13 13:50 SNP1

2 compound(s) reported

Protocol Blank 1/6/2014 10:46:55

ND denotes the analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Blank Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Blank ID: 224324 BLANK 2 **Project:** 20163473

Lab ID: 201154505

Prep Level: TCLP **Batch:** 224324

Method: TCLP GC Semivolatile Organics

Prepared: 30-Dec-13

Units: mg/L

CAS Numb	Analyte	Dilution	Result	Qu	Reporting Limit	Analysis
94-75-7	2,4-D	1	ND		0.0200	31-Dec-13 15:26 SNP1
93-72-1	2,4,5-TP (Silvex)	1	ND		0.0200	31-Dec-13 15:26 SNP1

2 compound(s) reported

Protocol Blank 1/6/2014 10:46:55

ND denotes the analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Blank Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Blank ID: 224324 BLANK 3 **Project:** 20163473

Lab ID: 201154506

Prep Level: TCLP **Batch:** 224324

Method: TCLP GC Semivolatile Organics

Prepared: 30-Dec-13

Units: mg/L

CAS Numb	Analyte	Dilution	Result	Qu	Reporting Limit	Analysis
94-75-7	2,4-D	1	ND		0.0200	31-Dec-13 15:59 SNP1
93-72-1	2,4,5-TP (Silvex)	1	ND		0.0200	31-Dec-13 15:59 SNP1

2 compound(s) reported

Protocol Blank 1/6/2014 10:46:55

ND denotes the analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Definitions/Qualifiers

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose, LA 70087
(504) 469-0333

Project: 20163473

Value	Description
J	This estimated value for the analyte is below the adjusted reporting limit but above the instrument reporting limit.
U	The analyte was analyzed for but not detected at the reporting limit or method detection limit indicated.
B	This analyte was detected in the method blank.
E	The sample concentration is above the linear calibrated range of the analysis.
LCS	Laboratory Control Sample.
MS(D)	Matrix Spike (Duplicate).
DUP	Sample Duplicate.
RPD	Relative Percent Difference.

Pace Analytical Services, In
1000 Riverbend Blvd. Suite F
St. Rose, LA 7008
(504) 469-033

Chains of Custody

20163473 PASI-GB

Chain of Custody

Workorder: 4090021 **Workorder Name:** NPL4 **Owner Received Date:** 12/14/2013 **Results Requested By:** 12/31/2013

Report To	Subcontract To
Kang Khang Pace Analytical Services, Inc. 1241 Bellevue Street, Suite 9 Green Bay, WI 54302 Phone (920)469-2436 Fax (920)469-8827	Pace Analytical New Orleans 1000 Riverbend Blvd Suite F St. Rose, LA 70087 Phone 1(504)469-0333

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: TCLP Herb 2,4-d & 2,4,5-TP Silvex (8151)	LAB USE ONLY
1	NPL11-121213	PS	12/12/2013 11:05	4090021001	Solid	1	X	201154128
2	NPL1-LPI-121213	PS	12/12/2013 11:15	4090021002	Solid	1	X	201154129
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	12/26/13	1600	Fed Ex	
2	Fed Ex	12-27-13 0900	[illegible]	12-27-13 0900
3				

Comments: ***Leached in Green Bay*** - Send Leach Blank if possible.

Cooler Temperature on Receipt 4.0 °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

3003/L24
HOLDS TWS

20163473 PASI-GB

Pace Analytical

1000 Riverbend. Blvd., Suite F
St. Rose, LA 70087

Sample Conditic

Courier: ☐ Pace Courier ☐ Hired Courier ☑ Fed X ☐ UPS ☐ DHL ☐ USPS ☐ Customer ☐ Other

Custody Seal on Cooler/Box Present: [see COC]

Custody Seals Intact: ☑Yes ☐No

Therometer Used: ☐ Therm Fisher IR 5 ☐ Therm Fisher IR 6 ☑ Therm Fisher IR 7

Type of Ice: Wet Blue None

Samples on ice: [see COC]

Date and Initials of person examining contents: 12-27-13 LMB

Cooler Temperature: [see COC]

Temp should be above freezing to 6°C

Temp must be measured from Temperature blank when present

					Comments:
Temperature Blank Present"?	☐Yes	☐No	☑N/A	1	
Chain of Custody Present:	☑Yes	☐No	☐N/A	2	
Chain of Custody Complete:	☑Yes	☐No	☐N/A	3	
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	4	
Sampler Name & Signature on COC:	☐Yes	☐No	☑N/A	5	
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	6	
Sufficient Volume:	☑Yes	☐No	☐N/A	7	
Correct Containers Used:	☑Yes	☐No	☐N/A	8	
Filtered vol. Rec. for Diss. tests	☐Yes	☐No	☑N/A	9	
Sample Labels match COC:	☑Yes	☐No	☐N/A	10	
All containers received within manafacture's precautionary and/or expiration dates.	☑Yes	☐No	☐N/A	11	
All containers needing chemical preservation have been checked (except VOA, coliform, & O&G).	☐Yes	☐No	☑N/A	12	
All containers preservation checked found to be in compliance with EPA recommendation.	☐Yes	☐No	☑N/A	13	If No, was preserative added? ☐Yes ☐No If added record lot no.: HNO3 _____ H2SO4 _____
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☑N/A	14	
Trip Blank Present:	☐Yes	☑No		15	

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

ALLC003rev.08, 15Feb2013 SCUR Form - mod

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

January 15, 2014

Kang Khang
Pace Analytical Green Bay
1241 Bellevue Street
Suite 9
Green Bay, WI 54302

RE: Project: 4090021
Pace Project No.: 30109748

Dear Kang Khang:
Enclosed are the analytical results for sample(s) received by the laboratory on December 17, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris

carin.ferris@pacelabs.com
Project Manager

Enclosures

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Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 4090021
Pace Project No.: 30109748

Pennsylvania Certification IDs
1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACLASS DOD-ELAP Accreditation #: ADE-1544
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/TNI Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/TNI Certification #: LA080002
Louisiana/TNI Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188
Utah/TNI Certification #: ANTE
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

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SAMPLE SUMMARY

Project: 4090021
Pace Project No.: 30109748

Lab ID	Sample ID	Matrix	Date Collected	Date Received
4090021002	**NPL1-LPI-121213**	Solid	12/12/13 11:15	12/17/13 11:00

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SAMPLE ANALYTE COUNT

Project: 4090021
Pace Project No.: 30109748

Lab ID	Sample ID	Method	Analysts	Analytes Reported
4090021002	**NPL1-LPI-121213**	EPA 901.1m	MAH	1

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PROJECT NARRATIVE

Project: 4090021
Pace Project No.: 30109748

Method: **EPA 901.1m**
Description: 901.1 Gamma Spec INGROWTH
Client: Pace Analytical Services Inc.
Date: January 15, 2014

General Information:
1 sample was analyzed for EPA 901.1m. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 901.1m with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 4090021
Pace Project No.: 30109748

Sample: NPL1-LPI-121213 **Lab ID: 4090021002** Collected: 12/12/13 11:15 Received: 12/17/13 11:00 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.471 ± 0.337 (0.272)**	pCi/g	01/14/14 14:01	13982-63-3	

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QUALITY CONTROL DATA

Project: 4090021
Pace Project No.: 30109748

QC Batch: RADC/18073
QC Batch Method: EPA 901.1m
Analysis Method: EPA 901.1m
Analysis Description: 901.1 Gamma Spec Ingrowth
Associated Lab Samples: 4090021002

METHOD BLANK: 670463
Matrix: Solid
Associated Lab Samples: 4090021002

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
Radium-226	0.047 ± 0.070 (0.231)	pCi/g	12/17/13 12:23	

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Greensburg, PA 15601
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QUALIFIERS

Project: 4090021
Pace Project No.: 30109748

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 4090021 **Workorder Name:** NPL4 **Owner Received Date:** 12/14/2013 **Results Requested By:** 12/31/2013

Report To

Kang Khang
Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302
Phone (920)469-2436
Fax (920)469-8827

Subcontract To

Pace Analytical Pittsburgh
1638 Roseytown Road
Suites 2,3, & 4
Greensburg, PA 15601
Phone (724)850-5600

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved						Radium 226												LAB USE ONLY
1	NPL1-LPI-121213	PS	12/12/2013 11:15	4090021002	Solid	1 - 4oz Ash						X												30109748
2																								001
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	12/16/13	1600	[illegible] 12-17-13	1100
2				
3				

Comments

Cooler Temperature on Receipt 2.9 °C **Custody Seal** Y or N **Received on Ice** Y or N **Samples Intact** Y or N

Sample Condition Upon Receipt

Pace Analytical

Client Name: PACE MN Green BAY TAW 12-17-13 Project # 30109748 ARM

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 9325 1887 9468

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used 5 6 (7) Type of Ice: (Wet) Blue None ☑ Samples on ice, cooling process has begun

Cooler Temperature 2.9 Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: TAW 12-17-13

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☑Yes ☐No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☐Yes ☑No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: SL		
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☑No	Initial when completed TAW / Lot # of added preservative
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased): _____		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Carmen Sarrio **Date:** 12/18/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

F-ALL-C003-6 SCURF front 2April2012.xls

Pace Analytical

Project Number: 30109748

Client Name: PACE MN Green Bay

TAH 12-17-13.

Item No.	Matrix Code	Glass Jar (120 / 250 / 500 / 1L)	Soil kit (2 SB, 1M, soil jar)	Chemistry (250 / 500 / 1L)	Organics (1L)	Nutrient (250 / 500)	Phenolics (250 ml)	TOC (40 ml / 250 ml)	TOX (250 ml)	Total Metals	Dissolved Metals preserved Y N	O & G (1L)	TPH (1L)	VOA (40 ml 30 ml)	Cyanide (250 ml)	Sulfide (500 ml)	Bacteria (120 ml)	Wipes / swipe/ smear/ filter	Radchem Nalgene (125 / 250 / 500 / 1L)	Radchem Nalgene (1/2 gal. / 1 gal.L)	Cubitainer (500 ml / 4L)	Ziploc	Other	Other
001	SL	1																						

OTTAWA OU2 NPL-11 SITE
OTTAWA, ILLINOIS
DATA VALIDATION REPORT

Date: July 20, 2011
Laboratory: Pace Analytical (Pace), Green Bay, Wisconsin
Laboratory Project #: 4047262
Data Validation Performed By: Lisa Graczyk, Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START)
Weston Analytical TDD/Work Order #: S05-0008-1101-006/20405.016.008.1347.00

This data validation report has been prepared by WESTON START under the START III Region V contract. This report documents the data validation for one soil sample collected for the Ottawa OU2 NPL-11 Site that were analyzed for the following parameters and United States Environmental Protection Agency (U.S. EPA) methods:

- Radium 226 by Method 901.1m
- Volatile Organic Compounds (VOC) by SW-8465 Method 8260
- Semivolatile Organic Compounds (SVOC) by SW-8465 Method 8270
- Total Metals by SW-846 Methods 6010 and 7471
- Toxicity Characteristic Leaching Procedure (TCLP) Metals by SW-846 Methods 1311, 6010, and 7470
- Cyanide by SW-846 Method 9012A
- Sulfide by SW-846 Method 9034
- pH by SW-846 Method 9045

A level II data package was requested from Pace. The data validation was conducted in general accordance with the U.S. EPA "Contract Laboratory Program National Functional Guidance for Superfund Organic Methods Data Review" dated June 2008, "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" dated January 2010, and the U.S. Department of Energy "Evaluation of Radiochemical Data Usability" dated April 1997. The Attachment contains the results summary sheets.

Data Validation Report
Ottawa OU2 NP-11 Site
Pace Analytical
Laboratory Project #: 4047262

RADIUM 226 BY U.S. EPA METHOD 901.1m

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-DISPOSAL-061711	4047262001	Soil	6/17/2011	7/18/2011

2. Holding Times

The sample was analyzed within the required holding time limit of 180 days from sample collection to analysis.

3. Blank Results

A method blank was analyzed with the samples and was method blank result is less than its minimum detectable concentration (MDC) as required.

4. Overall Assessment

The Radium 226s data are acceptable for use based on the information received.

VOCs BY SW-846 METHOD 8260

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-DISPOSAL-061711	4047262001	Soil	6/17/2011	6/22/2011

2. Holding Times

The sample was analyzed within the required holding time limit of 14 days from sample collection.

3. Blanks

A method blank was analyzed with the VOC analysis and was free of target compound contamination above the reporting limit.

4. Surrogate Results

The surrogate recovery results were within the laboratory-established quality control (QC) limits.

5. Laboratory Control Sample (LCS) Results

The LCS and LCS duplicate (LCSD) recoveries were within laboratory QC limits for percent recoveries and relative percent differences (RPD) except for as follows. Acetone was detected high in both the LCS and LCSD. Because acetone was not detected in the sample, no qualification is required.

6. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Pace analyzed an MS and MSD using sample NPL11-DISPOSAL-061711 as the spiked sample. The percent recoveries and RPDs were within QC limits except for acetone which was detected high. Because acetone was not detected in the sample, no qualification is required.

7. Overall Assessment

The VOC data are acceptable for use based on the information received.

SVOCs BY SW-846 METHOD 8270

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Prepared	Date Analyzed
NPL11-DISPOSAL-061711	4047262001	Soil	6/17/2011	6/24/2011	6/24/2011

2. Holding Times

The sample was analyzed within the required holding time limit of 14 days from sample collection to extraction and 40 days from extraction to analysis.

3. Blanks

A method blank was analyzed with the SVOC analysis and was free of target compound contamination above the reporting limit.

4. Surrogate Results

The surrogate recovery results were within the laboratory-established QC limits.

5. LCS Results

The LCS recoveries were within laboratory QC limits.

6. MS and MSD Results

Pace did not analyze a site-specific MS and MSD; therefore, matrix interferences could not be evaluated using the MS/MSD for the SVOC analysis. For the MS and MSD that were analyzed, the percent recoveries and RPDs were within QC limits.

7. Overall Assessment

The SVOC data are acceptable for use based on the information received.

TOTAL METALS BY SW-846 METHODS 6010 AND 7471

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-DISPOSAL-061711	4047262001	Soil	6/17/2011	6/28/2011 – 7/1/2011

2. Holding Times

The sample was analyzed within the required holding time limit of 28 days from sample collection to analysis for mercury and 180 days from sample collection to analysis for all other metals.

3. Blank Results

Method blanks were analyzed with the metals analyses. The blanks were free of target analyte contamination above the reporting limits.

4. LCS Results

The LCS recoveries were within the laboratory-established QC limits for target analytes.

5. MS and MSD Results

Pace did not analyze a site-specific MS and MSD; therefore, matrix interferences could not be evaluated using the MS/MSD for the metals analysis. No qualification is applied for this omission.

6. Overall Assessment

The total metals data are acceptable for use based on the information received.

TCLP METALS BY SW-846 METHODS 1311, 6020, AND 7470A

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-DISPOSAL-061711	4047262001	Soil	6/17/2011	6/28/2011 – 7/1/2011

2. Holding Times

The sample was analyzed within the required holding time limit of 28 days from sample collection to analysis for mercury and 180 days from sample collection to analysis for all other metals.

3. Blank Results

Method blanks were analyzed with the TCLP metals analyses. The blanks were free of target analyte contamination above the reporting limits.

4. LCS Results

The LCS recoveries were within the laboratory-established QC limits for target analytes.

5. MS and MSD Results

Pace analyzed an MS and MSD using sample NPL11-DISPOSAL-061711 as the spiked sample. The percent recoveries and RPDs were within QC limits.

6. Overall Assessment

The TCLP metals data are acceptable for use based on the information received.

GENERAL CHEMISTRY PARAMETERS (Cyanide by SW-846 Method 9012A, Sulfide by SW-846 Method 9034, and pH by SW-846 Method 9045)

1. Samples

The following table summarizes the samples for which this data validation is being conducted.

Samples	Lab ID	Matrix	Date Collected	Date Analyzed
NPL11-DISPOSAL-061711	4047262001	Soil	6/17/2011	6/23/2011 – 6/30/2011

2. Holding Times

The holding times were acceptable.

3. Blank Results

A method blank was analyzed with the cyanide and sulfide analyses. The method blanks were free of target analyte contamination above the reporting limits.

4. LCS Results

An LCS was analyzed with the sulfide and cyanide analyses. The LCS recoveries were within the laboratory-established QC limits.

5. Laboratory Duplicate Result

A laboratory duplicate was analyzed with the pH analysis. The RPD was within QC limits.

6. MS and MSD Results

For the sulfide analysis, Pace analyzed an MS using sample NPL11-DISPOSAL-061711 as the spiked sample. The percent recover y was within QC limits.

7. Overall Assessment

The sulfide, cyanide, and pH data are acceptable for use based on the information received.

ATTACHMENT

PACE ANALYTICAL
RESULTS SUMMARY

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050							
Aluminum	**13600**	mg/kg	54.0	1	06/24/11 09:20	06/28/11 14:48	7429-90-5	
Antimony	ND	mg/kg	2.2	1	06/24/11 09:20	06/28/11 14:48	7440-36-0	
Arsenic	**5.2**	mg/kg	2.2	1	06/24/11 09:20	06/28/11 14:48	7440-38-2	
Barium	**62.0**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-39-3	
Beryllium	**0.82**	mg/kg	0.43	1	06/24/11 09:20	06/28/11 14:48	7440-41-7	
Cadmium	**0.61**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-43-9	
Calcium	**6370**	mg/kg	21.6	1	06/24/11 09:20	06/28/11 14:48	7440-70-2	
Chromium	**20.8**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-47-3	
Cobalt	**9.3**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-48-4	
Copper	**15.2**	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7440-50-8	
Iron	**16800**	mg/kg	10.8	1	06/24/11 09:20	06/28/11 14:48	7439-89-6	
Lead	**16.2**	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7439-92-1	
Magnesium	**4580**	mg/kg	21.6	1	06/24/11 09:20	06/28/11 14:48	7439-95-4	
Manganese	**414**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7439-96-5	
Nickel	**26.5**	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7440-02-0	
Potassium	**2600**	mg/kg	21.6	1	06/24/11 09:20	06/28/11 14:48	7440-09-7	
Selenium	ND	mg/kg	2.2	1	06/24/11 09:20	06/28/11 14:48	7782-49-2	
Silver	ND	mg/kg	1.1	1	06/24/11 09:20	06/28/11 14:48	7440-22-4	
Sodium	ND	mg/kg	108	1	06/24/11 09:20	06/28/11 14:48	7440-23-5	
Thallium	ND	mg/kg	4.3	1	06/24/11 09:20	06/28/11 14:48	7440-28-0	
Vanadium	**30.7**	mg/kg	0.54	1	06/24/11 09:20	06/28/11 14:48	7440-62-2	
Zinc	**56.1**	mg/kg	4.3	1	06/24/11 09:20	06/28/11 14:48	7440-66-6	
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
	Leachate Method/Date: EPA 1311; 06/22/11 00:00							
Arsenic	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7440-38-2	
Barium	ND	mg/L	0.50	1	06/28/11 10:55	06/28/11 22:59	7440-39-3	
Cadmium	ND	mg/L	0.0050	1	06/28/11 10:55	06/28/11 22:59	7440-43-9	
Chromium	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7440-47-3	
Lead	ND	mg/L	0.0075	1	06/28/11 10:55	06/28/11 22:59	7439-92-1	
Selenium	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7782-49-2	
Silver	ND	mg/L	0.050	1	06/28/11 10:55	06/28/11 22:59	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
	Leachate Method/Date: EPA 1311; 06/22/11 00:00							
Mercury	ND	ug/L	0.20	1	06/30/11 14:50	07/01/11 12:52	7439-97-6	
7471 Mercury	Analytical Method: EPA 7471 Preparation Method: EPA 7471							
Mercury	**0.019**	mg/kg	0.011	1	07/01/11 08:57	07/01/11 14:28	7439-97-6	
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546							
Acenaphthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	83-32-9	
Acenaphthylene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	208-96-8	
Anthracene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	120-12-7	

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Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546							
Benzo(a)anthracene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	56-55-3	
Benzo(a)pyrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	205-99-2	
Benzo(g,h,i)perylene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	191-24-2	
Benzo(k)fluoranthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	207-08-9	
4-Bromophenylphenyl ether	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	101-55-3	
Butylbenzylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	85-68-7	
Carbazole	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	86-74-8	
4-Chloro-3-methylphenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	59-50-7	
4-Chloroaniline	ND	ug/kg	391	1	06/24/11 10:17	06/24/11 17:41	106-47-8	
bis(2-Chloroethoxy)methane	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	111-91-1	
bis(2-Chloroethyl) ether	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	111-44-4	
2-Chloronaphthalene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-58-7	
2-Chlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-57-8	
4-Chlorophenylphenyl ether	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	7005-72-3	
Chrysene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	53-70-3	
Dibenzofuran	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	132-64-9	
1,2-Dichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	106-46-7	
3,3'-Dichlorobenzidine	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-94-1	
2,4-Dichlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	120-83-2	
Diethylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	84-66-2	
2,4-Dimethylphenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	105-67-9	
Dimethylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	131-11-3	
Di-n-butylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	84-74-2	
4,6-Dinitro-2-methylphenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	534-52-1	
2,4-Dinitrophenol	ND	ug/kg	782	1	06/24/11 10:17	06/24/11 17:41	51-28-5	
2,4-Dinitrotoluene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	121-14-2	
2,6-Dinitrotoluene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	606-20-2	
Di-n-octylphthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	117-84-0	
bis(2-Ethylhexyl)phthalate	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	117-81-7	
Fluoranthene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	206-44-0	
Fluorene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	86-73-7	
Hexachloro-1,3-butadiene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	87-68-3	
Hexachlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	118-74-1	
Hexachlorocyclopentadiene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	77-47-4	
Hexachloroethane	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	67-72-1	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	193-39-5	
Isophorone	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	78-59-1	
2-Methylnaphthalene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-57-6	
2-Methylphenol(o-Cresol)	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-48-7	
3&4-Methylphenol(m&p Cresol)	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41		
Naphthalene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	91-20-3	

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Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546							
2-Nitroaniline	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	88-74-4	
3-Nitroaniline	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	99-09-2	
4-Nitroaniline	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	100-01-6	
Nitrobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	98-95-3	
2-Nitrophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	88-75-5	
4-Nitrophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	100-02-7	
N-Nitroso-di-n-propylamine	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	621-64-7	
N-Nitrosodiphenylamine	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	86-30-6	
2,2'-Oxybis(1-chloropropane)	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	108-60-1	
Pentachlorophenol	ND	ug/kg	387	1	06/24/11 10:17	06/24/11 17:41	87-86-5	
Phenanthrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	85-01-8	
Phenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	108-95-2	
Pyrene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	129-00-0	
1,2,4-Trichlorobenzene	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	120-82-1	
2,4,5-Trichlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	95-95-4	
2,4,6-Trichlorophenol	ND	ug/kg	196	1	06/24/11 10:17	06/24/11 17:41	88-06-2	
Nitrobenzene-d5 (S)	64	%.	21-130	1	06/24/11 10:17	06/24/11 17:41	4165-60-0	
2-Fluorobiphenyl (S)	75	%.	40-130	1	06/24/11 10:17	06/24/11 17:41	321-60-8	
Terphenyl-d14 (S)	96	%.	10-164	1	06/24/11 10:17	06/24/11 17:41	1718-51-0	
Phenol-d6 (S)	65	%.	31-130	1	06/24/11 10:17	06/24/11 17:41	13127-88-3	
2-Fluorophenol (S)	61	%.	26-130	1	06/24/11 10:17	06/24/11 17:41	367-12-4	
2,4,6-Tribromophenol (S)	85	%.	10-130	1	06/24/11 10:17	06/24/11 17:41	118-79-6	
8260 MSV 5035 Low Level	Analytical Method: EPA 8260 Preparation Method: EPA 8260							
Acetone	ND	ug/kg	23.4	1	06/22/11 12:00	06/22/11 13:25	67-64-1	L3,M0
Benzene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	71-43-2	
Bromodichloromethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-27-4	
Bromoform	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-25-2	
Bromomethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	74-83-9	
2-Butanone (MEK)	ND	ug/kg	23.4	1	06/22/11 12:00	06/22/11 13:25	78-93-3	
Carbon disulfide	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-15-0	
Carbon tetrachloride	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	56-23-5	
Chlorobenzene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	108-90-7	
Chloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-00-3	
Chloroform	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	67-66-3	
Chloromethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	74-87-3	
Dibromochloromethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	124-48-1	
1,1-Dichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-34-3	
1,2-Dichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	107-06-2	
1,1-Dichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	156-60-5	
1,2-Dichloropropane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	78-87-5	
cis-1,3-Dichloropropene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	10061-02-6	

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1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035 Low Level	Analytical Method: EPA 8260 Preparation Method: EPA 8260							
Ethylbenzene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	100-41-4	
2-Hexanone	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	591-78-6	
Methylene Chloride	**15.6**	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-09-2	Z3
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	1634-04-4	
Styrene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	79-34-5	
Tetrachloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	127-18-4	
Toluene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	108-88-3	
1,1,1-Trichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	79-00-5	
Trichloroethene	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	79-01-6	
Vinyl chloride	ND	ug/kg	5.9	1	06/22/11 12:00	06/22/11 13:25	75-01-4	
Xylene (Total)	ND	ug/kg	17.6	1	06/22/11 12:00	06/22/11 13:25	1330-20-7	
Dibromofluoromethane (S)	95	%.	70-130	1	06/22/11 12:00	06/22/11 13:25	1868-53-7	
Toluene-d8 (S)	122	%.	62-153	1	06/22/11 12:00	06/22/11 13:25	2037-26-5	
4-Bromofluorobenzene (S)	76	%.	51-130	1	06/22/11 12:00	06/22/11 13:25	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**14.7**	%	0.10	1		06/22/11 07:51		
9034 Sulfide	Analytical Method: EPA 9034							
Sulfide	ND	mg/kg	58.6	1	06/30/11 10:00	06/30/11 10:00	18496-25-8	H3
9045 pH Soil	Analytical Method: EPA 9045							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		06/23/11 13:20		H3
9012 Cyanide, Total	Analytical Method: EPA 9012 Preparation Method: EPA 9012A							
Cyanide	ND	mg/kg	0.47	1	06/28/11 08:19	06/28/11 16:05	57-12-5	

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1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: NPL-11
Pace Project No.: 4047262

Sample: NPL11-DISPOSAL-061711 **Lab ID: 4047262001** Collected: 06/17/11 14:15 Received: 06/20/11 13:51 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1m	**1.57 ± 0.236 (0.119)**	pCi/g	07/18/11 11:06	13982-63-3	

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Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: NPL-11
Pace Project No.: 4047262

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-K	Pace Analytical Services - Kansas City
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

H3	Sample was received outside EPA method holding time.
H3	Sample was received outside the recognized method holding time.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.
Z3	Methylene chloride is a common laboratory contaminant. Results for this analyte should be considered estimated unless the amount found in the sample is 3 to 5 times higher than that found in the method blank.

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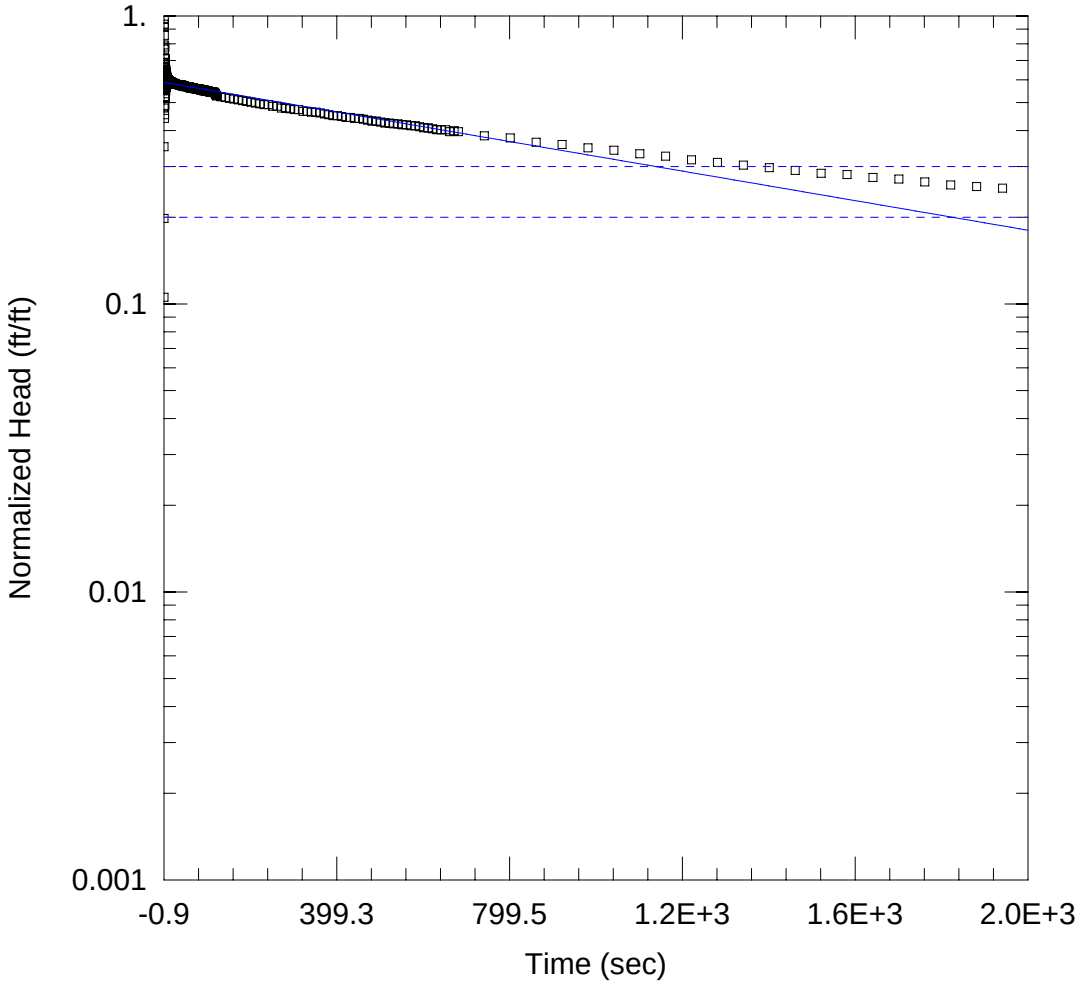
APPENDIX F
AQUIFER TEST RESULTS AND REPORTS



WELL TEST ANALYSIS

Data Set: K:\...\MW-1D Rising.aqt
Date: 06/05/12 Time: 15:24:22

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-1D
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 18.74 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1D Rising)

Initial Displacement: -3.13 ft Static Water Column Height: 11.33 ft
Total Well Penetration Depth: 18.74 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001663 cm/sec y0 = -1.838 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:24:39

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-1D

AQUIFER DATA

Saturated Thickness: 18.74 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1D Rising

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -3.13 ft
Static Water Column Height: 11.33 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 18.74 ft

No. of Observations: 362

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
-0.9	0.	18.1	-1.83
-0.8	-0.33	19.1	-1.83
-0.7	-0.62	20.1	-1.82
-0.6	-1.1	21.1	-1.82
-0.5	-1.5	22.1	-1.83
-0.4	-1.82	23.1	-1.82
-0.3	-2.16	24.1	-1.82
-0.2	-2.48	25.1	-1.82
-0.1	-2.93	26.1	-1.81
0.	-3.04	27.1	-1.81
0.1	-2.88	28.1	-1.81
0.2	-2.68	29.1	-1.81
0.3	-2.13	30.1	-1.81
0.4	-1.63	31.1	-1.81
0.5	-1.38	32.1	-1.81
0.6	-1.42	33.1	-1.81
0.7	-1.76	34.1	-1.8
0.8	-2.15	35.1	-1.8
0.9	-2.4	36.1	-1.8
1.	-2.44	37.1	-1.8
1.1	-2.23	38.1	-1.8
1.2	-1.92	39.1	-1.8
1.3	-1.64	40.1	-1.79
1.4	-1.53	41.1	-1.8
1.5	-1.62	42.1	-1.79
1.6	-1.85	43.1	-1.79
1.7	-2.08	44.1	-1.78
1.8	-2.23	45.1	-1.79
1.9	-2.22	46.1	-1.79
2.	-2.08	47.1	-1.78
2.1	-1.85	48.1	-1.78

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
2.2	-1.68	49.1	-1.78
2.3	-1.64	50.1	-1.78
2.4	-1.73	51.1	-1.78
2.5	-1.9	52.1	-1.78
2.6	-2.05	53.1	-1.78
2.7	-2.12	54.1	-1.78
2.8	-2.09	55.1	-1.77
2.9	-1.97	56.1	-1.77
3.	-1.83	57.1	-1.77
3.1	-1.73	58.1	-1.77
3.2	-1.72	59.1	-1.77
3.3	-1.81	60.1	-1.76
3.4	-1.91	61.1	-1.76
3.5	-2.01	62.1	-1.76
3.6	-2.04	63.1	-1.76
3.7	-2.	64.1	-1.76
3.8	-1.91	65.1	-1.76
3.9	-1.82	66.1	-1.76
4.	-1.77	67.1	-1.76
4.1	-1.78	68.1	-1.76
4.2	-1.84	69.1	-1.75
4.3	-1.92	70.1	-1.75
4.4	-1.98	71.1	-1.75
4.5	-1.98	72.1	-1.75
4.6	-1.94	73.1	-1.75
4.7	-1.88	74.1	-1.75
4.8	-1.82	75.1	-1.75
4.9	-1.8	76.1	-1.75
5.	-1.81	77.1	-1.74
5.1	-1.87	78.1	-1.74
5.2	-1.92	79.1	-1.75
5.3	-1.94	80.1	-1.74
5.4	-1.94	81.1	-1.74
5.5	-1.91	82.1	-1.74
5.6	-1.86	83.1	-1.73
5.7	-1.83	84.1	-1.74
5.8	-1.82	85.1	-1.73
5.9	-1.84	86.1	-1.73
6.	-1.87	87.1	-1.73
6.1	-1.91	88.1	-1.73
6.2	-1.92	89.1	-1.73
6.3	-1.9	90.1	-1.73
6.4	-1.88	91.1	-1.72
6.5	-1.85	92.1	-1.73
6.6	-1.83	93.1	-1.73
6.7	-1.83	94.1	-1.72
6.8	-1.85	95.1	-1.72
6.9	-1.88	96.1	-1.72
7.	-1.9	97.1	-1.71
7.1	-1.9	98.1	-1.71
7.2	-1.88	99.1	-1.72
7.3	-1.86	100.1	-1.71
7.4	-1.85	101.1	-1.71
7.5	-1.84	102.1	-1.72
7.6	-1.84	103.1	-1.71
7.7	-1.86	104.1	-1.71
7.8	-1.88	105.1	-1.71
7.9	-1.89	106.1	-1.7
8.	-1.88	107.1	-1.7
8.1	-1.87	108.1	-1.7
8.2	-1.85	109.1	-1.7
8.3	-1.85	110.1	-1.7
8.4	-1.84	111.1	-1.7
8.5	-1.85	112.1	-1.7
8.6	-1.86	113.1	-1.7
8.7	-1.87	114.1	-1.7

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
8.8	-1.88	115.1	-1.7
8.9	-1.87	116.1	-1.7
9.	-1.87	117.1	-1.69
9.1	-1.85	118.1	-1.68
9.2	-1.84	119.1	-1.67
9.3	-1.85	120.1	-1.66
9.4	-1.85	121.1	-1.65
9.5	-1.86	131.1	-1.64
9.6	-1.86	141.1	-1.63
9.7	-1.87	151.1	-1.62
9.8	-1.86	161.1	-1.61
9.9	-1.86	171.1	-1.6
10.	-1.85	181.1	-1.59
10.1	-1.85	191.1	-1.58
10.2	-1.85	201.1	-1.57
10.3	-1.85	211.1	-1.56
10.4	-1.85	221.1	-1.55
10.5	-1.86	231.1	-1.54
10.6	-1.86	241.1	-1.54
10.7	-1.85	251.1	-1.52
10.8	-1.85	261.1	-1.52
10.9	-1.84	271.1	-1.5
11.	-1.85	281.1	-1.5
11.1	-1.85	291.1	-1.49
11.2	-1.85	301.1	-1.48
11.3	-1.86	311.1	-1.48
11.4	-1.85	321.1	-1.46
11.5	-1.85	331.1	-1.46
11.6	-1.85	341.1	-1.45
11.7	-1.85	351.1	-1.45
11.8	-1.84	361.1	-1.44
11.9	-1.84	371.1	-1.43
12.	-1.84	381.1	-1.42
12.1	-1.85	391.1	-1.41
12.2	-1.85	401.1	-1.41
12.3	-1.85	411.1	-1.4
12.4	-1.85	421.1	-1.39
12.5	-1.84	431.1	-1.39
12.6	-1.84	441.1	-1.38
12.7	-1.84	451.1	-1.38
12.8	-1.85	461.1	-1.37
12.9	-1.85	471.1	-1.36
13.	-1.85	481.1	-1.35
13.1	-1.85	491.1	-1.35
13.2	-1.85	501.1	-1.34
13.3	-1.85	511.1	-1.33
13.4	-1.84	521.1	-1.33
13.5	-1.84	531.1	-1.32
13.6	-1.84	541.1	-1.32
13.7	-1.85	551.1	-1.31
13.8	-1.84	561.1	-1.31
13.9	-1.84	571.1	-1.3
14.	-1.84	581.1	-1.3
14.1	-1.85	591.1	-1.29
14.2	-1.84	601.1	-1.28
14.3	-1.84	611.1	-1.28
14.4	-1.84	621.1	-1.27
14.5	-1.84	631.1	-1.26
14.6	-1.84	641.1	-1.26
14.7	-1.84	651.1	-1.26
14.8	-1.84	661.1	-1.24
14.9	-1.84	671.1	-1.25
15.	-1.84	681.1	-1.24
15.1	-1.84	741.1	-1.2
15.2	-1.84	801.1	-1.18
15.3	-1.84	861.1	-1.14

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
15.4	-1.84	921.1	-1.12
15.5	-1.84	981.1	-1.09
15.6	-1.84	1041.1	-1.07
15.7	-1.84	1101.1	-1.04
15.8	-1.84	1161.1	-1.02
15.9	-1.84	1221.1	-0.99
16.	-1.84	1281.1	-0.97
16.1	-1.84	1341.1	-0.95
16.2	-1.84	1401.1	-0.93
16.3	-1.84	1461.1	-0.91
16.4	-1.84	1521.1	-0.89
16.5	-1.84	1581.1	-0.88
16.6	-1.84	1641.1	-0.86
16.7	-1.84	1701.1	-0.85
16.8	-1.84	1761.1	-0.83
16.9	-1.83	1821.1	-0.81
17.	-1.83	1881.1	-0.8
17.1	-1.83	1941.1	-0.79

SOLUTION

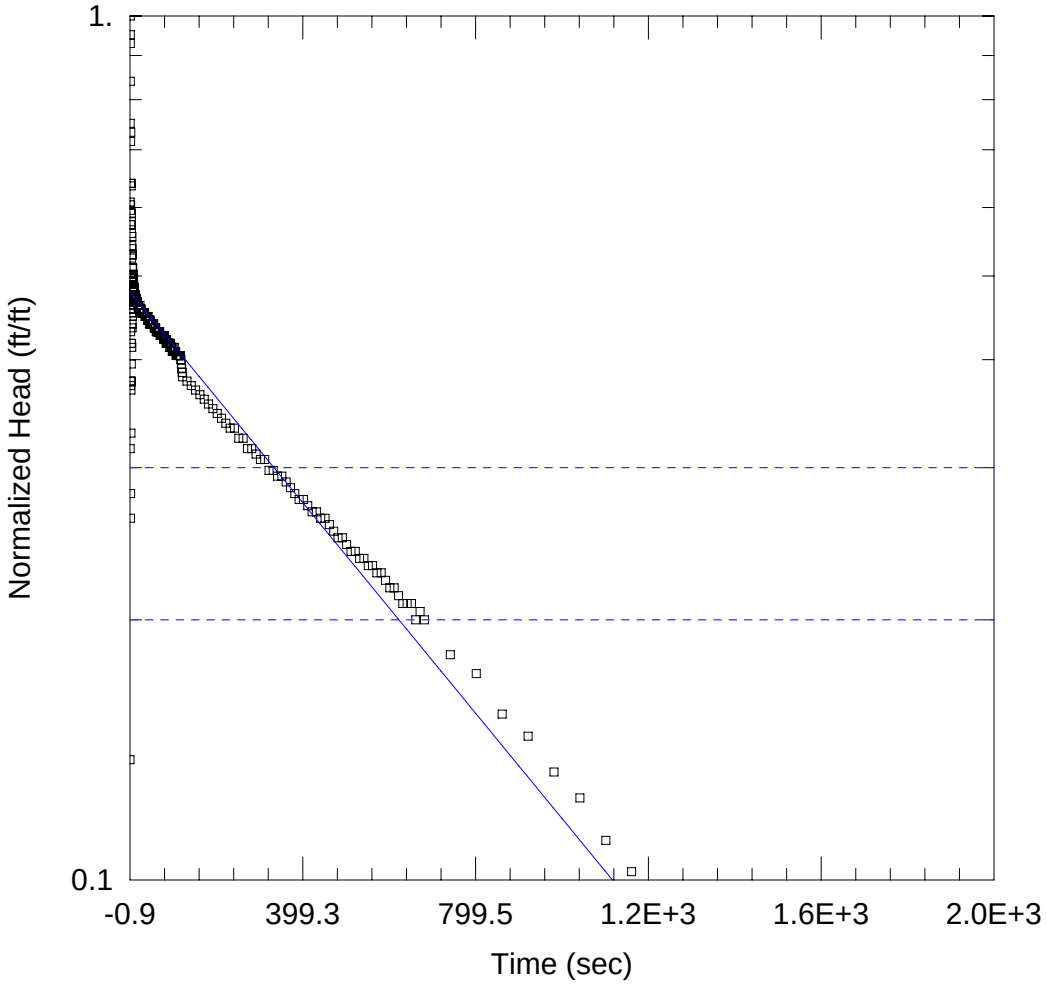
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.353

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0001663	cm/sec
y0	-1.838	ft

T = K*b = 0.09499 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-1D Falling.aqt
Date: 06/06/12 Time: 09:06:02

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-1D
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 18.74 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1D Falling)

Initial Displacement: -2.25 ft Static Water Column Height: 11.33 ft
Total Well Penetration Depth: 18.74 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0003948 cm/sec y0 = -1.076 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/06/12
Time: 09:06:21

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-1D

AQUIFER DATA

Saturated Thickness: 18.74 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1D Falling

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -2.25 ft
Static Water Column Height: 11.33 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 18.74 ft

No. of Observations: 362

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
-0.9	0.79	18.1	-1.04
-0.8	0.46	19.1	-1.04
-0.7	0.17	20.1	-1.03
-0.6	-0.31	21.1	-1.03
-0.5	-0.71	22.1	-1.04
-0.4	-1.03	23.1	-1.03
-0.3	-1.37	24.1	-1.03
-0.2	-1.69	25.1	-1.03
-0.1	-2.14	26.1	-1.02
0.	-2.25	27.1	-1.02
0.1	-2.09	28.1	-1.02
0.2	-1.89	29.1	-1.02
0.3	-1.34	30.1	-1.02
0.4	-0.84	31.1	-1.02
0.5	-0.59	32.1	-1.02
0.6	-0.63	33.1	-1.02
0.7	-0.97	34.1	-1.01
0.8	-1.36	35.1	-1.01
0.9	-1.61	36.1	-1.01
1.	-1.65	37.1	-1.01
1.1	-1.44	38.1	-1.01
1.2	-1.13	39.1	-1.01
1.3	-0.85	40.1	-1.
1.4	-0.74	41.1	-1.01
1.5	-0.83	42.1	-1.
1.6	-1.06	43.1	-1.
1.7	-1.29	44.1	-0.99
1.8	-1.44	45.1	-1.
1.9	-1.43	46.1	-1.
2.	-1.29	47.1	-0.99
2.1	-1.06	48.1	-0.99

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
2.2	-0.89	49.1	-0.99
2.3	-0.85	50.1	-0.99
2.4	-0.94	51.1	-0.99
2.5	-1.11	52.1	-0.99
2.6	-1.26	53.1	-0.99
2.7	-1.33	54.1	-0.99
2.8	-1.3	55.1	-0.98
2.9	-1.18	56.1	-0.98
3.	-1.04	57.1	-0.98
3.1	-0.94	58.1	-0.98
3.2	-0.93	59.1	-0.98
3.3	-1.02	60.1	-0.97
3.4	-1.12	61.1	-0.97
3.5	-1.22	62.1	-0.97
3.6	-1.25	63.1	-0.97
3.7	-1.21	64.1	-0.97
3.8	-1.12	65.1	-0.97
3.9	-1.03	66.1	-0.97
4.	-0.98	67.1	-0.97
4.1	-0.99	68.1	-0.97
4.2	-1.05	69.1	-0.96
4.3	-1.13	70.1	-0.96
4.4	-1.19	71.1	-0.96
4.5	-1.19	72.1	-0.96
4.6	-1.15	73.1	-0.96
4.7	-1.09	74.1	-0.96
4.8	-1.03	75.1	-0.96
4.9	-1.01	76.1	-0.96
5.	-1.02	77.1	-0.95
5.1	-1.08	78.1	-0.95
5.2	-1.13	79.1	-0.96
5.3	-1.15	80.1	-0.95
5.4	-1.15	81.1	-0.95
5.5	-1.12	82.1	-0.95
5.6	-1.07	83.1	-0.94
5.7	-1.04	84.1	-0.95
5.8	-1.03	85.1	-0.94
5.9	-1.05	86.1	-0.94
6.	-1.08	87.1	-0.94
6.1	-1.12	88.1	-0.94
6.2	-1.13	89.1	-0.94
6.3	-1.11	90.1	-0.94
6.4	-1.09	91.1	-0.93
6.5	-1.06	92.1	-0.94
6.6	-1.04	93.1	-0.94
6.7	-1.04	94.1	-0.93
6.8	-1.06	95.1	-0.93
6.9	-1.09	96.1	-0.93
7.	-1.11	97.1	-0.92
7.1	-1.11	98.1	-0.92
7.2	-1.09	99.1	-0.93
7.3	-1.07	100.1	-0.92
7.4	-1.06	101.1	-0.92
7.5	-1.05	102.1	-0.93
7.6	-1.05	103.1	-0.92
7.7	-1.07	104.1	-0.92
7.8	-1.09	105.1	-0.92
7.9	-1.1	106.1	-0.91
8.	-1.09	107.1	-0.91
8.1	-1.08	108.1	-0.91
8.2	-1.06	109.1	-0.91
8.3	-1.06	110.1	-0.91
8.4	-1.05	111.1	-0.91
8.5	-1.06	112.1	-0.91
8.6	-1.07	113.1	-0.91
8.7	-1.08	114.1	-0.91

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
8.8	-1.09	115.1	-0.91
8.9	-1.08	116.1	-0.91
9.	-1.08	117.1	-0.9
9.1	-1.06	118.1	-0.89
9.2	-1.05	119.1	-0.88
9.3	-1.06	120.1	-0.87
9.4	-1.06	121.1	-0.86
9.5	-1.07	131.1	-0.85
9.6	-1.07	141.1	-0.84
9.7	-1.08	151.1	-0.83
9.8	-1.07	161.1	-0.82
9.9	-1.07	171.1	-0.81
10.	-1.06	181.1	-0.8
10.1	-1.06	191.1	-0.79
10.2	-1.06	201.1	-0.78
10.3	-1.06	211.1	-0.77
10.4	-1.06	221.1	-0.76
10.5	-1.07	231.1	-0.75
10.6	-1.07	241.1	-0.75
10.7	-1.06	251.1	-0.73
10.8	-1.06	261.1	-0.73
10.9	-1.05	271.1	-0.71
11.	-1.06	281.1	-0.71
11.1	-1.06	291.1	-0.7
11.2	-1.06	301.1	-0.69
11.3	-1.07	311.1	-0.69
11.4	-1.06	321.1	-0.67
11.5	-1.06	331.1	-0.67
11.6	-1.06	341.1	-0.66
11.7	-1.06	351.1	-0.66
11.8	-1.05	361.1	-0.65
11.9	-1.05	371.1	-0.64
12.	-1.05	381.1	-0.63
12.1	-1.06	391.1	-0.62
12.2	-1.06	401.1	-0.62
12.3	-1.06	411.1	-0.61
12.4	-1.06	421.1	-0.6
12.5	-1.05	431.1	-0.6
12.6	-1.05	441.1	-0.59
12.7	-1.05	451.1	-0.59
12.8	-1.06	461.1	-0.58
12.9	-1.06	471.1	-0.57
13.	-1.06	481.1	-0.56
13.1	-1.06	491.1	-0.56
13.2	-1.06	501.1	-0.55
13.3	-1.06	511.1	-0.54
13.4	-1.05	521.1	-0.54
13.5	-1.05	531.1	-0.53
13.6	-1.05	541.1	-0.53
13.7	-1.06	551.1	-0.52
13.8	-1.05	561.1	-0.52
13.9	-1.05	571.1	-0.51
14.	-1.05	581.1	-0.51
14.1	-1.06	591.1	-0.5
14.2	-1.05	601.1	-0.49
14.3	-1.05	611.1	-0.49
14.4	-1.05	621.1	-0.48
14.5	-1.05	631.1	-0.47
14.6	-1.05	641.1	-0.47
14.7	-1.05	651.1	-0.47
14.8	-1.05	661.1	-0.45
14.9	-1.05	671.1	-0.46
15.	-1.05	681.1	-0.45
15.1	-1.05	741.1	-0.41
15.2	-1.05	801.1	-0.39
15.3	-1.05	861.1	-0.35

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
15.4	-1.05	921.1	-0.33
15.5	-1.05	981.1	-0.3
15.6	-1.05	1041.1	-0.28
15.7	-1.05	1101.1	-0.25
15.8	-1.05	1161.1	-0.23
15.9	-1.05	1221.1	-0.2
16.	-1.05	1281.1	-0.18
16.1	-1.05	1341.1	-0.16
16.2	-1.05	1401.1	-0.14
16.3	-1.05	1461.1	-0.12
16.4	-1.05	1521.1	-0.1
16.5	-1.05	1581.1	-0.09
16.6	-1.05	1641.1	-0.07
16.7	-1.05	1701.1	-0.06
16.8	-1.05	1761.1	-0.04
16.9	-1.04	1821.1	-0.02
17.	-1.04	1881.1	-0.01
17.1	-1.04	1941.1	0.

SOLUTION

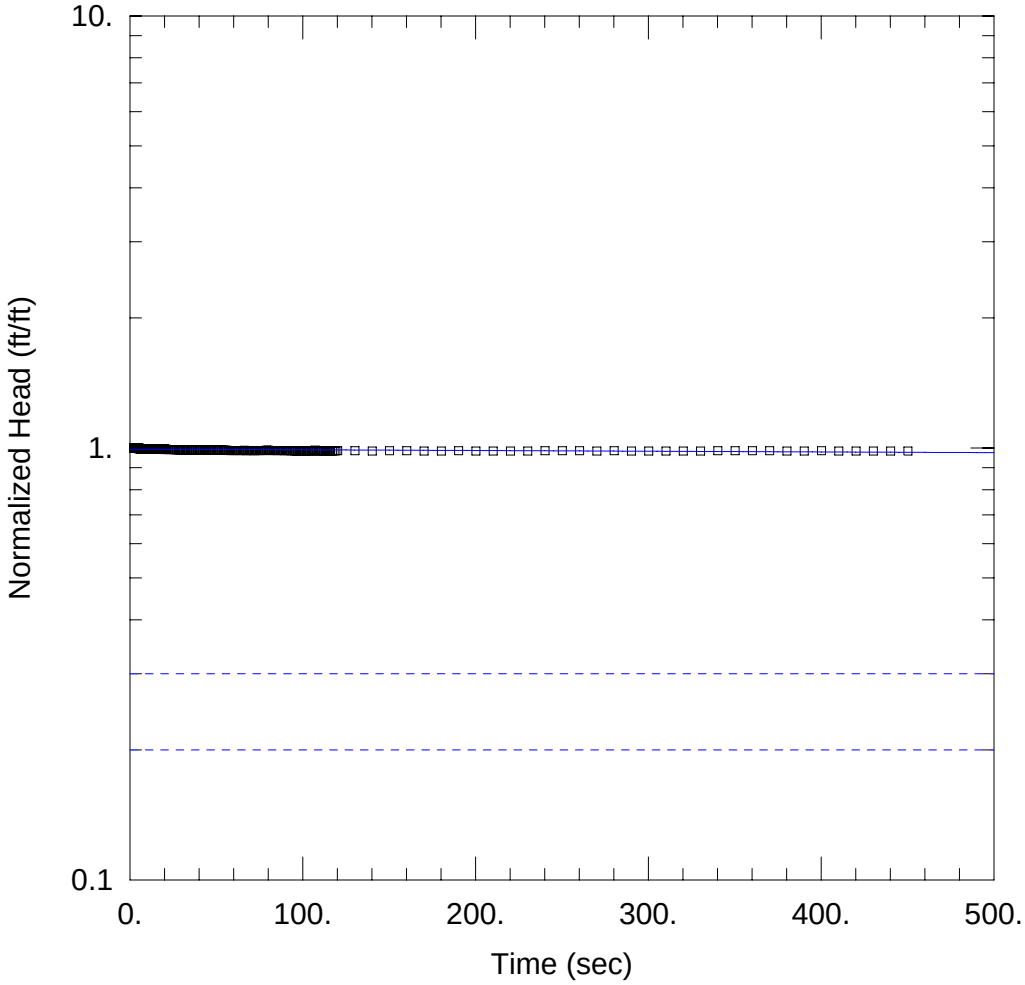
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.353

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0003948	cm/sec
y0	-1.076	ft

T = K*b = 0.2255 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-1S Falling.aqt
Date: 06/05/12 Time: 15:23:20

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-1S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 9.53 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1S Falling)

Initial Displacement: 7.99 ft Static Water Column Height: 7.99 ft
Total Well Penetration Depth: 15.06 ft Screen Length: 10. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 5.732E-6 cm/sec y0 = 7.941 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:23:35

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-1S

AQUIFER DATA

Saturated Thickness: 9.53 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1S Falling

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 7.99 ft
Static Water Column Height: 7.99 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 10. ft
Total Well Penetration Depth: 15.06 ft

No. of Observations: 333

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.3	7.99	17.	7.93
0.4	7.99	17.1	7.94
0.5	7.98	17.2	7.94
0.6	7.98	17.3	7.93
0.7	7.99	17.4	7.93
0.8	7.98	17.5	7.93
0.9	7.98	17.6	7.93
1.	7.98	17.7	7.93
1.1	7.98	17.8	7.93
1.2	7.98	17.9	7.93
1.3	7.98	18.	7.93
1.4	7.98	18.1	7.93
1.5	7.98	18.2	7.93
1.6	7.98	18.3	7.93
1.7	7.98	18.4	7.93
1.8	7.98	18.5	7.93
1.9	7.98	18.6	7.93
2.	7.98	18.7	7.93
2.1	7.97	18.8	7.93
2.2	7.98	18.9	7.93
2.3	7.98	19.	7.93
2.4	7.98	19.1	7.93
2.5	7.98	19.2	7.93
2.6	7.97	19.3	7.93
2.7	7.98	19.4	7.93
2.8	7.97	19.5	7.93
2.9	7.97	19.6	7.93
3.	7.98	19.7	7.93
3.1	7.97	19.8	7.92
3.2	7.97	19.9	7.93
3.3	7.97	20.	7.93

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.4	7.97	20.1	7.93
3.5	7.97	20.2	7.93
3.6	7.97	21.2	7.93
3.7	7.97	22.2	7.92
3.8	7.97	23.2	7.92
3.9	7.98	24.2	7.92
4.	7.97	25.2	7.92
4.1	7.97	26.2	7.92
4.2	7.97	27.2	7.91
4.3	7.97	28.2	7.91
4.4	7.97	29.2	7.91
4.5	7.97	30.2	7.92
4.6	7.97	31.2	7.91
4.7	7.97	32.2	7.91
4.8	7.96	33.2	7.91
4.9	7.97	34.2	7.91
5.	7.97	35.2	7.9
5.1	7.97	36.2	7.9
5.2	7.96	37.2	7.9
5.3	7.97	38.2	7.9
5.4	7.96	39.2	7.9
5.5	7.97	40.2	7.9
5.6	7.97	41.2	7.89
5.7	7.96	42.2	7.9
5.8	7.96	43.2	7.9
5.9	7.96	44.2	7.89
6.	7.96	45.2	7.89
6.1	7.96	46.2	7.89
6.2	7.96	47.2	7.9
6.3	7.96	48.2	7.89
6.4	7.96	49.2	7.89
6.5	7.96	50.2	7.89
6.6	7.96	51.2	7.89
6.7	7.96	52.2	7.89
6.8	7.96	53.2	7.89
6.9	7.96	54.2	7.89
7.	7.96	55.2	7.89
7.1	7.96	56.2	7.89
7.2	7.96	57.2	7.88
7.3	7.96	58.2	7.88
7.4	7.96	59.2	7.88
7.5	7.96	60.2	7.88
7.6	7.96	61.2	7.88
7.7	7.96	62.2	7.88
7.8	7.96	63.2	7.88
7.9	7.96	64.2	7.88
8.	7.96	65.2	7.88
8.1	7.96	66.2	7.89
8.2	7.96	67.2	7.87
8.3	7.96	68.2	7.88
8.4	7.96	69.2	7.88
8.5	7.95	70.2	7.88
8.6	7.96	71.2	7.88
8.7	7.95	72.2	7.87
8.8	7.96	73.2	7.88
8.9	7.95	74.2	7.88
9.	7.95	75.2	7.88
9.1	7.95	76.2	7.88
9.2	7.95	77.2	7.88
9.3	7.95	78.2	7.88
9.4	7.95	79.2	7.9
9.5	7.95	80.2	7.89
9.6	7.95	81.2	7.88
9.7	7.95	82.2	7.88
9.8	7.95	83.2	7.88
9.9	7.95	84.2	7.88

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.	7.95	85.2	7.88
10.1	7.95	86.2	7.88
10.2	7.95	87.2	7.88
10.3	7.95	88.2	7.88
10.4	7.95	89.2	7.87
10.5	7.95	90.2	7.88
10.6	7.95	91.2	7.88
10.7	7.95	92.2	7.88
10.8	7.95	93.2	7.87
10.9	7.95	94.2	7.87
11.	7.94	95.2	7.87
11.1	7.95	96.2	7.87
11.2	7.95	97.2	7.87
11.3	7.94	98.2	7.87
11.4	7.94	99.2	7.87
11.5	7.95	100.2	7.87
11.6	7.95	101.2	7.87
11.7	7.95	102.2	7.87
11.8	7.94	103.2	7.87
11.9	7.94	104.2	7.87
12.	7.95	105.2	7.87
12.1	7.94	106.2	7.87
12.2	7.94	107.2	7.9
12.3	7.94	108.2	7.87
12.4	7.94	109.2	7.87
12.5	7.94	110.2	7.87
12.6	7.94	111.2	7.87
12.7	7.94	112.2	7.87
12.8	7.95	113.2	7.87
12.9	7.94	114.2	7.87
13.	7.94	115.2	7.87
13.1	7.94	116.2	7.87
13.2	7.94	117.2	7.87
13.3	7.94	118.2	7.87
13.4	7.94	119.2	7.87
13.5	7.94	120.2	7.87
13.6	7.94	130.2	7.87
13.7	7.94	140.2	7.86
13.8	7.94	150.2	7.87
13.9	7.94	160.2	7.87
14.	7.94	170.2	7.86
14.1	7.94	180.2	7.86
14.2	7.94	190.2	7.87
14.3	7.94	200.2	7.86
14.4	7.94	210.2	7.86
14.5	7.94	220.2	7.86
14.6	7.94	230.2	7.86
14.7	7.94	240.2	7.87
14.8	7.94	250.2	7.87
14.9	7.94	260.2	7.87
15.	7.94	270.2	7.86
15.1	7.94	280.2	7.87
15.2	7.94	290.2	7.86
15.3	7.94	300.2	7.86
15.4	7.94	310.2	7.86
15.5	7.94	320.2	7.86
15.6	7.94	330.2	7.86
15.7	7.94	340.2	7.87
15.8	7.94	350.2	7.87
15.9	7.94	360.2	7.87
16.	7.93	370.2	7.87
16.1	7.94	380.2	7.86
16.2	7.93	390.2	7.86
16.3	7.94	400.2	7.87
16.4	7.94	410.2	7.86
16.5	7.94	420.2	7.86

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
16.6	7.93	430.2	7.86
16.7	7.93	440.2	7.86
16.8	7.93	450.2	7.86
16.9	7.93		

SOLUTION

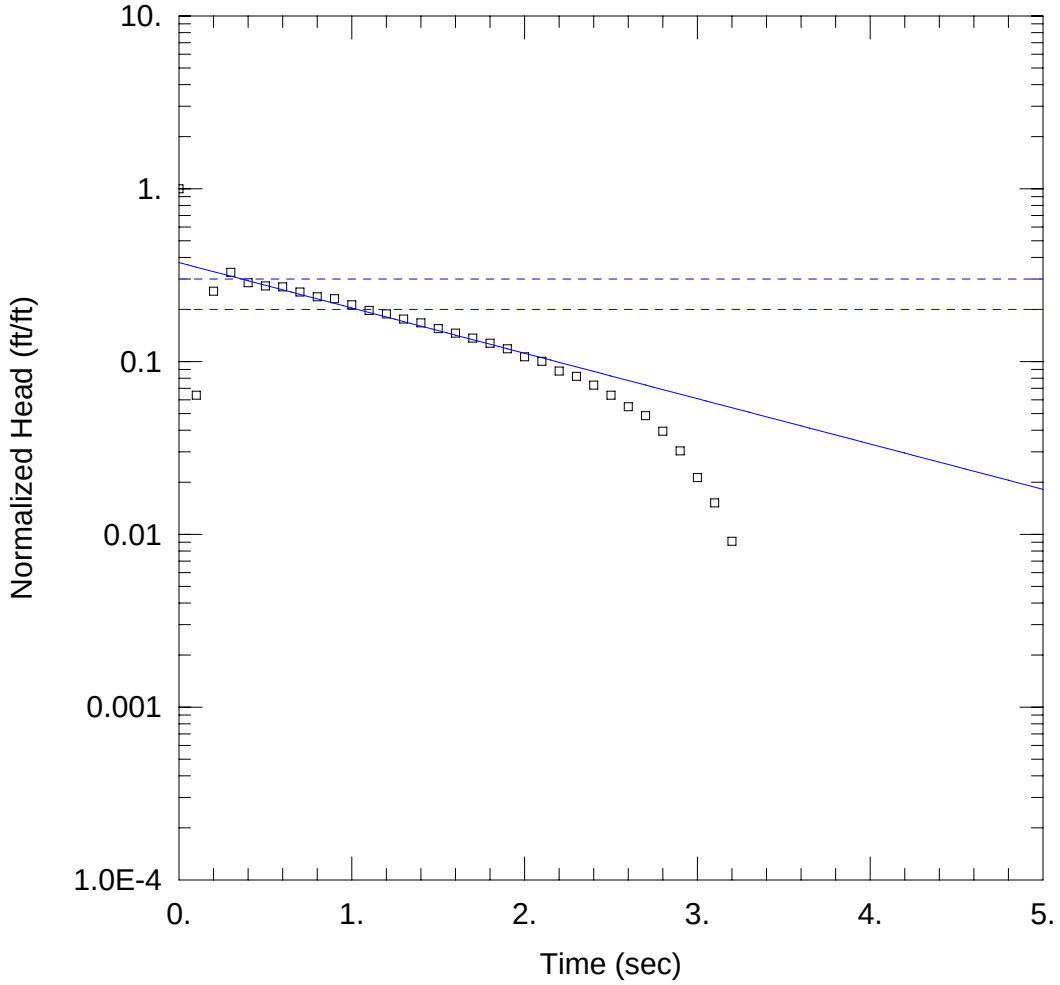
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.395

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	5.732E-6	cm/sec
y0	7.941	ft

T = K*b = 0.001665 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-1S Rising.aqt
Date: 06/05/12 Time: 15:22:49

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-1S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 9.53 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1S Rising)

Initial Displacement: -3.29 ft Static Water Column Height: 7.17 ft
Total Well Penetration Depth: 15.06 ft Screen Length: 10. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0904 cm/sec y0 = -1.229 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:23:03

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-1S

AQUIFER DATA

Saturated Thickness: 9.53 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1S Rising

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -3.29 ft
Static Water Column Height: 7.17 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 10. ft
Total Well Penetration Depth: 15.06 ft

No. of Observations: 286

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	-3.29	14.3	0.56
0.1	-0.21	14.4	0.55
0.2	-0.84	14.5	0.56
0.3	-1.08	14.6	0.56
0.4	-0.94	14.7	0.56
0.5	-0.9	14.8	0.56
0.6	-0.89	14.9	0.56
0.7	-0.83	15.	0.56
0.8	-0.78	15.1	0.56
0.9	-0.76	15.2	0.56
1.	-0.7	15.3	0.56
1.1	-0.65	15.4	0.56
1.2	-0.62	15.5	0.56
1.3	-0.58	15.6	0.56
1.4	-0.55	15.7	0.57
1.5	-0.51	15.8	0.56
1.6	-0.48	15.9	0.56
1.7	-0.45	16.	0.57
1.8	-0.42	16.1	0.57
1.9	-0.39	16.2	0.57
2.	-0.35	16.3	0.57
2.1	-0.33	16.4	0.57
2.2	-0.29	16.5	0.57
2.3	-0.27	16.6	0.57
2.4	-0.24	16.7	0.57
2.5	-0.21	16.8	0.57
2.6	-0.18	16.9	0.57
2.7	-0.16	17.	0.57
2.8	-0.13	17.1	0.57
2.9	-0.1	17.2	0.57
3.	-0.07	17.3	0.57

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.1	-0.05	17.4	0.57
3.2	-0.03	17.5	0.57
3.3	0.	17.6	0.57
3.4	0.02	17.7	0.57
3.5	0.05	17.8	0.58
3.6	0.06	17.9	0.58
3.7	0.09	18.	0.57
3.8	0.1	18.1	0.58
3.9	0.13	18.2	0.58
4.	0.14	18.3	0.57
4.1	0.16	18.4	0.58
4.2	0.18	18.5	0.58
4.3	0.2	18.6	0.58
4.4	0.21	18.7	0.58
4.5	0.23	18.8	0.58
4.6	0.24	18.9	0.58
4.7	0.26	19.	0.58
4.8	0.27	19.1	0.58
4.9	0.28	19.2	0.58
5.	0.3	19.3	0.58
5.1	0.31	19.4	0.59
5.2	0.33	19.5	0.58
5.3	0.33	19.6	0.58
5.4	0.34	20.6	0.58
5.5	0.35	21.6	0.59
5.6	0.36	22.6	0.59
5.7	0.37	23.6	0.6
5.8	0.38	24.6	0.6
5.9	0.38	25.6	0.61
6.	0.39	26.6	0.6
6.1	0.4	27.6	0.61
6.2	0.4	28.6	0.61
6.3	0.41	29.6	0.61
6.4	0.41	30.6	0.62
6.5	0.42	31.6	0.62
6.6	0.42	32.6	0.63
6.7	0.43	33.6	0.63
6.8	0.43	34.6	0.63
6.9	0.44	35.6	0.63
7.	0.44	36.6	0.63
7.1	0.45	37.6	0.63
7.2	0.45	38.6	0.64
7.3	0.46	39.6	0.64
7.4	0.46	40.6	0.64
7.5	0.46	41.6	0.64
7.6	0.47	42.6	0.64
7.7	0.47	43.6	0.65
7.8	0.47	44.6	0.65
7.9	0.47	45.6	0.65
8.	0.47	46.6	0.65
8.1	0.48	47.6	0.65
8.2	0.48	48.6	0.65
8.3	0.49	49.6	0.66
8.4	0.49	50.6	0.66
8.5	0.49	51.6	0.66
8.6	0.49	52.6	0.66
8.7	0.49	53.6	0.66
8.8	0.49	54.6	0.67
8.9	0.5	55.6	0.66
9.	0.5	56.6	0.66
9.1	0.5	57.6	0.66
9.2	0.51	58.6	0.66
9.3	0.51	59.6	0.67
9.4	0.51	60.6	0.67
9.5	0.51	61.6	0.67
9.6	0.51	62.6	0.67

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.7	0.51	63.6	0.67
9.8	0.51	64.6	0.67
9.9	0.51	65.6	0.68
10.	0.52	66.6	0.68
10.1	0.52	67.6	0.67
10.2	0.52	68.6	0.68
10.3	0.52	69.6	0.68
10.4	0.53	70.6	0.68
10.5	0.52	71.6	0.68
10.6	0.53	72.6	0.68
10.7	0.53	73.6	0.68
10.8	0.53	74.6	0.68
10.9	0.53	75.6	0.69
11.	0.53	76.6	0.68
11.1	0.53	77.6	0.69
11.2	0.53	78.6	0.68
11.3	0.53	79.6	0.68
11.4	0.53	80.6	0.68
11.5	0.53	81.6	0.68
11.6	0.53	82.6	0.69
11.7	0.53	83.6	0.69
11.8	0.54	84.6	0.69
11.9	0.54	85.6	0.68
12.	0.54	86.6	0.69
12.1	0.54	87.6	0.69
12.2	0.54	88.6	0.69
12.3	0.54	89.6	0.69
12.4	0.54	90.6	0.69
12.5	0.55	91.6	0.69
12.6	0.55	92.6	0.69
12.7	0.54	93.6	0.69
12.8	0.54	94.6	0.69
12.9	0.54	95.6	0.69
13.	0.55	96.6	0.69
13.1	0.55	97.6	0.7
13.2	0.55	98.6	0.69
13.3	0.55	99.6	0.69
13.4	0.55	100.6	0.69
13.5	0.55	101.6	0.69
13.6	0.55	102.6	0.7
13.7	0.55	103.6	0.69
13.8	0.55	104.6	0.69
13.9	0.55	105.6	0.7
14.	0.55	106.6	0.7
14.1	0.55	107.6	0.7
14.2	0.55	108.6	0.69

SOLUTION

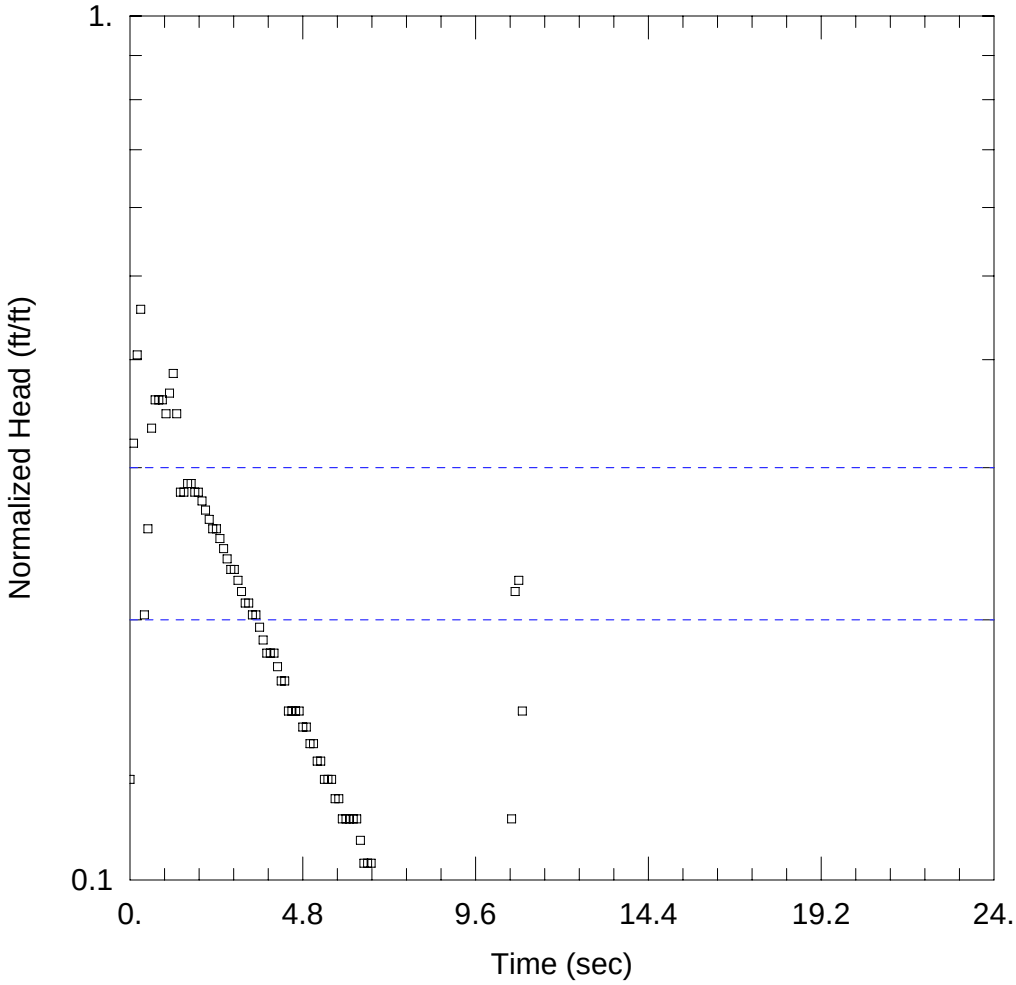
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.395

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0904	cm/sec
y0	-1.229	ft

T = K*b = 26.26 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-2D Rising.aqt
Date: 06/06/12 Time: 09:25:51

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-2S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 14.18 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2D Rising)

Initial Displacement: -1.53 ft Static Water Column Height: 14.18 ft
Total Well Penetration Depth: 14.18 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.003751 cm/sec y0 = 0.1163 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/06/12
Time: 09:26:12

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 14.18 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-2D Rising

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -1.53 ft
Static Water Column Height: 14.18 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 14.18 ft

No. of Observations: 306

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	-0.2	15.3	-0.06
0.1	-0.49	15.4	-0.05
0.2	-0.62	15.5	-0.06
0.3	-0.7	15.6	-0.05
0.4	-0.31	15.7	-0.05
0.5	-0.39	15.8	-0.06
0.6	-0.51	15.9	-0.05
0.7	-0.55	16.	-0.05
0.8	-0.55	16.1	-0.05
0.9	-0.55	16.2	-0.06
1.	-0.53	16.3	-0.05
1.1	-0.56	16.4	-0.06
1.2	-0.59	16.5	-0.05
1.3	-0.53	16.6	-0.05
1.4	-0.43	16.7	-0.05
1.5	-0.43	16.8	-0.05
1.6	-0.44	16.9	-0.05
1.7	-0.44	17.	-0.05
1.8	-0.43	17.1	-0.05
1.9	-0.43	17.2	-0.05
2.	-0.42	17.3	-0.05
2.1	-0.41	17.4	-0.05
2.2	-0.4	17.5	-0.05
2.3	-0.39	17.6	-0.05
2.4	-0.39	17.7	-0.05
2.5	-0.38	17.8	-0.05
2.6	-0.37	17.9	-0.05
2.7	-0.36	18.	-0.04
2.8	-0.35	18.1	-0.05
2.9	-0.35	18.2	-0.04
3.	-0.34	18.3	-0.05

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.1	-0.33	18.4	-0.05
3.2	-0.32	18.5	-0.05
3.3	-0.32	18.6	-0.05
3.4	-0.31	19.6	-0.04
3.5	-0.31	20.6	-0.04
3.6	-0.3	20.7	-0.04
3.7	-0.29	20.8	-0.04
3.8	-0.28	20.9	-0.04
3.9	-0.28	21.	-0.04
4.	-0.28	21.1	-0.03
4.1	-0.27	21.2	-0.03
4.2	-0.26	21.3	-0.03
4.3	-0.26	21.4	-0.04
4.4	-0.24	21.5	-0.03
4.5	-0.24	21.6	-0.04
4.6	-0.24	21.7	-0.03
4.7	-0.24	21.8	-0.03
4.8	-0.23	21.9	-0.03
4.9	-0.23	22.	-0.03
5.	-0.22	22.1	-0.03
5.1	-0.22	22.2	-0.02
5.2	-0.21	22.3	-0.03
5.3	-0.21	22.4	-0.03
5.4	-0.2	22.5	-0.03
5.5	-0.2	22.6	-0.03
5.6	-0.2	22.7	-0.03
5.7	-0.19	22.8	-0.03
5.8	-0.19	22.9	-0.03
5.9	-0.18	23.	-0.03
6.	-0.18	23.1	-0.02
6.1	-0.18	23.2	-0.03
6.2	-0.18	23.3	-0.03
6.3	-0.18	23.4	-0.01
6.4	-0.17	23.5	-0.02
6.5	-0.16	23.6	-0.03
6.6	-0.16	23.7	-0.03
6.7	-0.16	23.8	-0.02
6.8	-0.15	23.9	-0.02
6.9	-0.15	24.	-0.02
7.	-0.15	24.1	-0.02
7.1	-0.15	24.2	-0.02
7.2	-0.15	24.3	-0.03
7.3	-0.14	24.4	-0.02
7.4	-0.14	24.5	-0.03
7.5	-0.13	24.6	-0.02
7.6	-0.14	24.7	-0.02
7.7	-0.13	24.8	-0.02
7.8	-0.13	24.9	-0.02
7.9	-0.13	25.	-0.02
8.	-0.13	25.1	-0.02
8.1	-0.12	25.2	-0.02
8.2	-0.12	25.3	-0.02
8.3	-0.12	25.4	-0.02
8.4	-0.12	25.5	-0.02
8.5	-0.12	25.6	-0.02
8.6	-0.14	25.7	-0.02
8.7	-0.11	25.8	-0.02
8.8	-0.1	25.9	-0.02
8.9	-0.1	26.	-0.02
9.	-0.1	26.1	-0.02
9.1	-0.1	26.2	-0.02
9.2	-0.1	26.3	-0.02
9.3	-0.1	26.4	-0.02
9.4	-0.1	26.5	-0.02
9.5	-0.1	26.6	-0.02
9.6	-0.1	26.7	-0.02

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.7	-0.1	26.8	-0.02
9.8	-0.1	26.9	-0.02
9.9	0.08	27.	-0.02
10.	0.09	27.1	-0.02
10.1	0.06	27.2	-0.02
10.2	0.2	27.3	-0.02
10.3	0.11	27.4	-0.01
10.4	0.01	27.5	-0.02
10.5	-0.01	27.6	-0.01
10.6	-0.18	27.7	-0.02
10.7	-0.33	27.8	-0.02
10.8	-0.34	27.9	-0.01
10.9	-0.24	28.	-0.01
11.	-0.15	28.1	-0.01
11.1	-0.13	28.2	-0.02
11.2	-0.11	28.3	-0.02
11.3	-0.11	28.4	-0.01
11.4	-0.1	28.5	-0.02
11.5	-0.09	28.6	-0.02
11.6	-0.1	28.7	-0.01
11.7	-0.09	28.8	-0.01
11.8	-0.08	28.9	-0.02
11.9	-0.08	29.	-0.02
12.	-0.08	29.1	-0.01
12.1	-0.08	29.2	-0.02
12.2	-0.08	29.3	-0.01
12.3	-0.07	29.4	-0.02
12.4	-0.08	29.5	-0.01
12.5	-0.07	29.6	-0.01
12.6	-0.07	29.7	-0.01
12.7	-0.07	29.8	-0.02
12.8	-0.07	29.9	-0.01
12.9	-0.07	30.	-0.01
13.	-0.07	30.1	-0.02
13.1	-0.07	30.2	-0.02
13.2	-0.07	30.3	-0.01
13.3	-0.06	30.4	-0.02
13.4	-0.06	40.4	-0.02
13.5	-0.06	50.4	-0.01
13.6	-0.06	60.4	-0.01
13.7	-0.06	70.4	-0.01
13.8	-0.06	80.4	-0.01
13.9	-0.06	90.4	-0.01
14.	-0.06	100.4	-0.01
14.1	-0.06	110.4	-0.01
14.2	-0.06	120.4	-0.01
14.3	-0.06	130.4	-0.01
14.4	-0.06	140.4	-0.01
14.5	-0.06	150.4	-0.01
14.6	-0.06	160.4	0.
14.7	-0.06	170.4	-0.01
14.8	-0.05	180.4	0.
14.9	-0.06	190.4	-0.01
15.	-0.06	200.4	-0.01
15.1	-0.06	210.4	-0.01
15.2	-0.06	220.4	0.

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.197

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.03368	cm/sec
y0	-0.5658	ft

T = K*b = 14.56 cm²/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
K	0.003751	0.005025	+/- 0.009889	0.7466	cm/sec
y0	0.1163	0.05727	+/- 0.1127	2.031	ft

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 1.621 cm²/sec

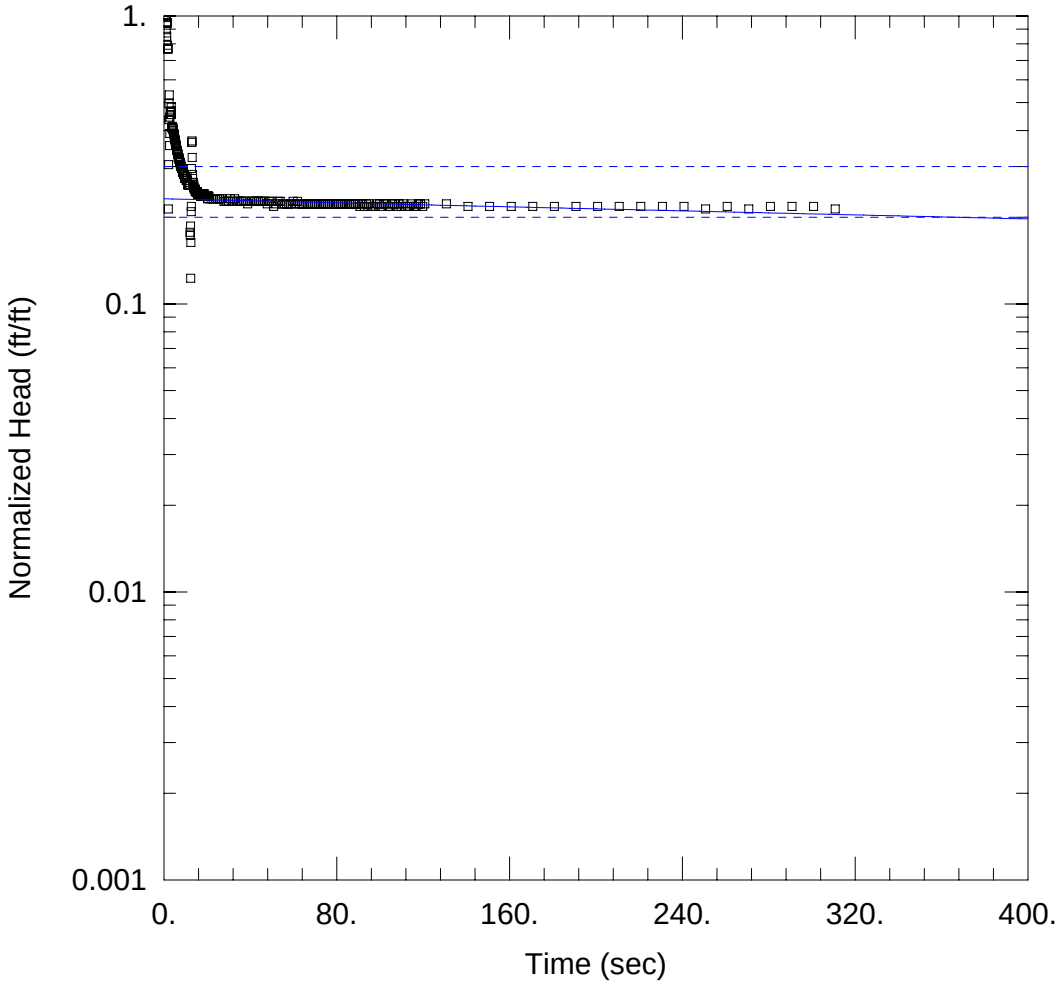
Parameter Correlations

	K	y0
K	1.00	-0.71
y0	-0.71	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . 19.76 ft^2
Variance . . . . . 0.065 ft^2
Std. Deviation . . . . . 0.2549 ft
Mean . . . . . -0.2022 ft
No. of Residuals 306
No. of Estimates 2



WELL TEST ANALYSIS

Data Set: K:\...\MW-2D Falling.aqt
Date: 06/05/12 Time: 15:26:45

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-2S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 14.18 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2D Falling)

Initial Displacement: 2.2 ft Static Water Column Height: 14.18 ft
Total Well Penetration Depth: 14.18 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001082 cm/sec y0 = 0.5099 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:26:59

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 14.18 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-2D Falling

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.2 ft
Static Water Column Height: 14.18 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 14.18 ft

No. of Observations: 319

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.9	2.2	16.9	0.53
1.	2.17	17.	0.52
1.1	1.97	17.1	0.53
1.2	1.8	17.2	0.53
1.3	1.87	17.3	0.53
1.4	2.08	17.4	0.53
1.5	2.08	17.5	0.53
1.6	2.08	17.6	0.52
1.7	1.74	17.7	0.53
1.8	1.69	17.8	0.52
1.9	1.69	17.9	0.52
2.	0.47	18.	0.53
2.1	0.	18.1	0.52
2.2	0.67	18.2	0.52
2.3	0.96	18.3	0.52
2.4	1.09	18.4	0.53
2.5	1.17	18.5	0.52
2.6	0.78	18.6	0.53
2.7	0.86	18.7	0.52
2.8	0.98	18.8	0.52
2.9	1.02	18.9	0.52
3.	1.02	19.	0.52
3.1	1.02	19.1	0.52
3.2	1.	19.2	0.52
3.3	1.03	19.3	0.52
3.4	1.06	19.4	0.52
3.5	1.	19.5	0.52
3.6	0.9	19.6	0.52
3.7	0.9	19.7	0.52
3.8	0.91	19.8	0.52
3.9	0.91	19.9	0.52

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
4.	0.9	20.	0.52
4.1	0.9	20.1	0.52
4.2	0.89	20.2	0.51
4.3	0.88	20.3	0.52
4.4	0.87	20.4	0.51
4.5	0.86	20.5	0.52
4.6	0.86	20.6	0.52
4.7	0.85	20.7	0.52
4.8	0.84	20.8	0.52
4.9	0.83	21.8	0.51
5.	0.82	22.8	0.51
5.1	0.82	23.8	0.51
5.2	0.81	24.8	0.51
5.3	0.8	25.8	0.51
5.4	0.79	26.8	0.51
5.5	0.79	27.8	0.5
5.6	0.78	28.8	0.5
5.7	0.78	29.8	0.5
5.8	0.77	30.8	0.51
5.9	0.76	31.8	0.5
6.	0.75	32.8	0.51
6.1	0.75	33.8	0.5
6.2	0.75	34.8	0.5
6.3	0.74	35.8	0.5
6.4	0.73	36.8	0.5
6.5	0.73	37.8	0.5
6.6	0.71	38.8	0.49
6.7	0.71	39.8	0.5
6.8	0.71	40.8	0.5
6.9	0.71	41.8	0.5
7.	0.7	42.8	0.5
7.1	0.7	43.8	0.5
7.2	0.69	44.8	0.5
7.3	0.69	45.8	0.5
7.4	0.68	46.8	0.5
7.5	0.68	47.8	0.49
7.6	0.67	48.8	0.5
7.7	0.67	49.8	0.5
7.8	0.67	50.8	0.48
7.9	0.66	51.8	0.49
8.	0.66	52.8	0.5
8.1	0.65	53.8	0.5
8.2	0.65	54.8	0.49
8.3	0.65	55.8	0.49
8.4	0.65	56.8	0.49
8.5	0.65	57.8	0.49
8.6	0.64	58.8	0.49
8.7	0.63	59.8	0.5
8.8	0.63	60.8	0.49
8.9	0.63	61.8	0.5
9.	0.62	62.8	0.49
9.1	0.62	63.8	0.49
9.2	0.62	64.8	0.49
9.3	0.62	65.8	0.49
9.4	0.62	66.8	0.49
9.5	0.61	67.8	0.49
9.6	0.61	68.8	0.49
9.7	0.6	69.8	0.49
9.8	0.61	70.8	0.49
9.9	0.6	71.8	0.49
10.	0.6	72.8	0.49
10.1	0.6	73.8	0.49
10.2	0.6	74.8	0.49
10.3	0.59	75.8	0.49
10.4	0.59	76.8	0.49
10.5	0.59	77.8	0.49

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.6	0.59	78.8	0.49
10.7	0.59	79.8	0.49
10.8	0.61	80.8	0.49
10.9	0.58	81.8	0.49
11.	0.57	82.8	0.49
11.1	0.57	83.8	0.49
11.2	0.57	84.8	0.49
11.3	0.57	85.8	0.49
11.4	0.57	86.8	0.49
11.5	0.57	87.8	0.49
11.6	0.57	88.8	0.49
11.7	0.57	89.8	0.49
11.8	0.57	90.8	0.48
11.9	0.57	91.8	0.49
12.	0.57	92.8	0.48
12.1	0.39	93.8	0.49
12.2	0.38	94.8	0.49
12.3	0.41	95.8	0.48
12.4	0.27	96.8	0.48
12.5	0.36	97.8	0.48
12.6	0.46	98.8	0.49
12.7	0.48	99.8	0.49
12.8	0.65	100.8	0.48
12.9	0.8	101.8	0.49
13.	0.81	102.8	0.49
13.1	0.71	103.8	0.48
13.2	0.62	104.8	0.48
13.3	0.6	105.8	0.49
13.4	0.58	106.8	0.49
13.5	0.58	107.8	0.48
13.6	0.57	108.8	0.49
13.7	0.56	109.8	0.48
13.8	0.57	110.8	0.49
13.9	0.56	111.8	0.48
14.	0.55	112.8	0.48
14.1	0.55	113.8	0.48
14.2	0.55	114.8	0.49
14.3	0.55	115.8	0.48
14.4	0.55	116.8	0.48
14.5	0.54	117.8	0.49
14.6	0.55	118.8	0.49
14.7	0.54	119.8	0.48
14.8	0.54	120.8	0.49
14.9	0.54	130.8	0.49
15.	0.54	140.8	0.48
15.1	0.54	150.8	0.48
15.2	0.54	160.8	0.48
15.3	0.54	170.8	0.48
15.4	0.54	180.8	0.48
15.5	0.53	190.8	0.48
15.6	0.53	200.8	0.48
15.7	0.53	210.8	0.48
15.8	0.53	220.8	0.48
15.9	0.53	230.8	0.48
16.	0.53	240.8	0.48
16.1	0.53	250.8	0.47
16.2	0.53	260.8	0.48
16.3	0.53	270.8	0.47
16.4	0.53	280.8	0.48
16.5	0.53	290.8	0.48
16.6	0.53	300.8	0.48
16.7	0.53	310.8	0.47
16.8	0.53		

SOLUTION

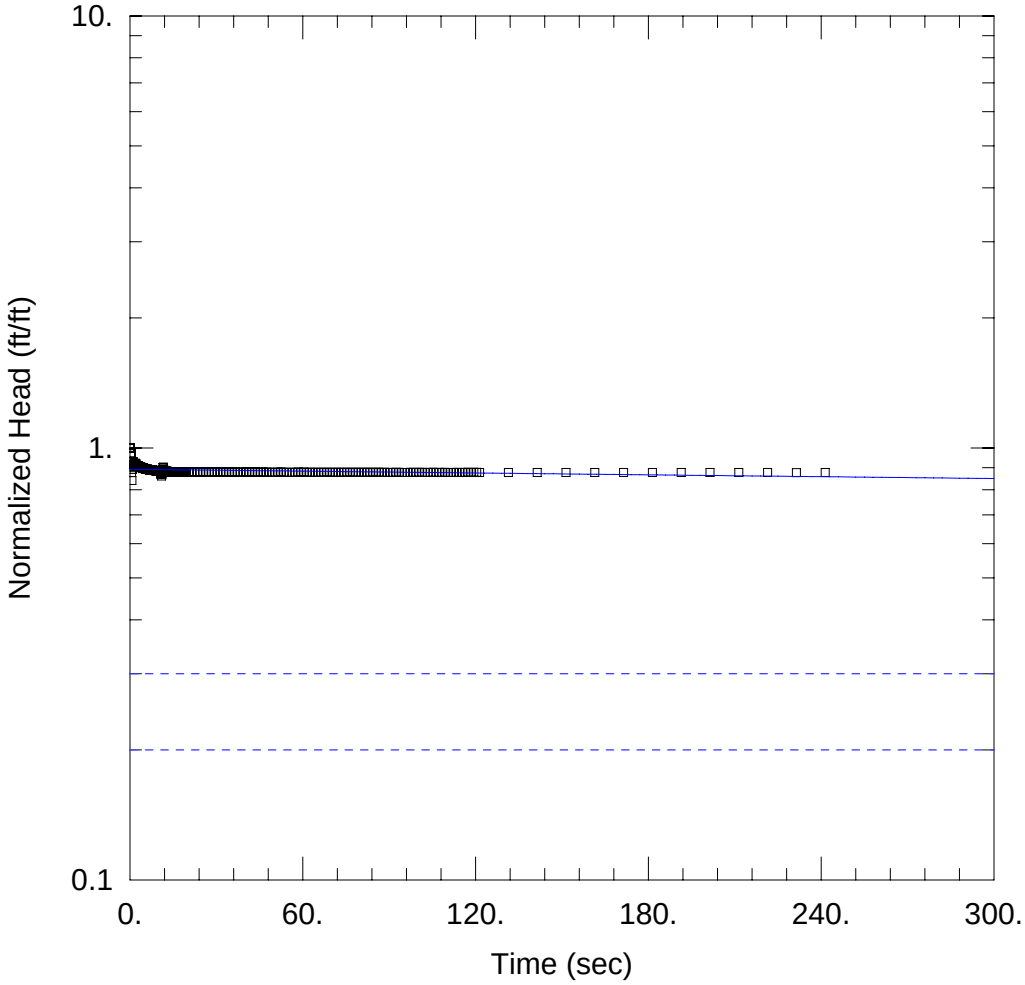
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.197

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0001082	cm/sec
y0	0.5099	ft

T = K*b = 0.04676 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-2S Falling.aqt
Date: 06/05/12 Time: 15:25:55

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-2S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 13.04 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2S Falling)

Initial Displacement: 13.04 ft Static Water Column Height: 12.83 ft
Total Well Penetration Depth: 12.31 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 3.871E-5 cm/sec y0 = 11.64 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:26:08

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 13.04 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-2S Falling

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 13.04 ft
Static Water Column Height: 12.83 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 12.31 ft

No. of Observations: 309

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	13.04	15.5	11.49
0.1	13.04	15.6	11.48
0.2	13.04	15.7	11.49
0.3	12.7	15.8	11.49
0.4	12.65	15.9	11.49
0.5	12.65	16.	11.49
0.6	11.43	16.1	11.49
0.7	10.96	16.2	11.48
0.8	11.63	16.3	11.49
0.9	11.92	16.4	11.48
1.	12.05	16.5	11.48
1.1	12.13	16.6	11.49
1.2	11.74	16.7	11.48
1.3	11.82	16.8	11.48
1.4	11.94	16.9	11.48
1.5	11.98	17.	11.49
1.6	11.98	17.1	11.48
1.7	11.98	17.2	11.49
1.8	11.96	17.3	11.48
1.9	11.99	17.4	11.48
2.	12.02	17.5	11.48
2.1	11.96	17.6	11.48
2.2	11.86	17.7	11.48
2.3	11.86	17.8	11.48
2.4	11.87	17.9	11.48
2.5	11.87	18.	11.48
2.6	11.86	18.1	11.48
2.7	11.86	18.2	11.48
2.8	11.85	18.3	11.48
2.9	11.84	18.4	11.48
3.	11.83	18.5	11.48

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.1	11.82	18.6	11.48
3.2	11.82	18.7	11.48
3.3	11.81	18.8	11.47
3.4	11.8	18.9	11.48
3.5	11.79	19.	11.47
3.6	11.78	19.1	11.48
3.7	11.78	19.2	11.48
3.8	11.77	19.3	11.48
3.9	11.76	19.4	11.48
4.	11.75	20.4	11.47
4.1	11.75	21.4	11.47
4.2	11.74	22.4	11.47
4.3	11.74	23.4	11.47
4.4	11.73	24.4	11.47
4.5	11.72	25.4	11.47
4.6	11.71	26.4	11.46
4.7	11.71	27.4	11.46
4.8	11.71	28.4	11.46
4.9	11.7	29.4	11.47
5.	11.69	30.4	11.46
5.1	11.69	31.4	11.47
5.2	11.67	32.4	11.46
5.3	11.67	33.4	11.46
5.4	11.67	34.4	11.46
5.5	11.67	35.4	11.46
5.6	11.66	36.4	11.46
5.7	11.66	37.4	11.45
5.8	11.65	38.4	11.46
5.9	11.65	39.4	11.46
6.	11.64	40.4	11.46
6.1	11.64	41.4	11.46
6.2	11.63	42.4	11.46
6.3	11.63	43.4	11.46
6.4	11.63	44.4	11.46
6.5	11.62	45.4	11.46
6.6	11.62	46.4	11.45
6.7	11.61	47.4	11.46
6.8	11.61	48.4	11.46
6.9	11.61	49.4	11.44
7.	11.61	50.4	11.45
7.1	11.61	51.4	11.46
7.2	11.6	52.4	11.46
7.3	11.59	53.4	11.45
7.4	11.59	54.4	11.45
7.5	11.59	55.4	11.45
7.6	11.58	56.4	11.45
7.7	11.58	57.4	11.45
7.8	11.58	58.4	11.46
7.9	11.58	59.4	11.45
8.	11.58	60.4	11.46
8.1	11.57	61.4	11.45
8.2	11.57	62.4	11.45
8.3	11.56	63.4	11.45
8.4	11.57	64.4	11.45
8.5	11.56	65.4	11.45
8.6	11.56	66.4	11.45
8.7	11.56	67.4	11.45
8.8	11.56	68.4	11.45
8.9	11.55	69.4	11.45
9.	11.55	70.4	11.45
9.1	11.55	71.4	11.45
9.2	11.55	72.4	11.45
9.3	11.55	73.4	11.45
9.4	11.57	74.4	11.45
9.5	11.54	75.4	11.45
9.6	11.53	76.4	11.45

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.7	11.53	77.4	11.45
9.8	11.53	78.4	11.45
9.9	11.53	79.4	11.45
10.	11.53	80.4	11.45
10.1	11.53	81.4	11.45
10.2	11.53	82.4	11.45
10.3	11.53	83.4	11.45
10.4	11.53	84.4	11.45
10.5	11.53	85.4	11.45
10.6	11.53	86.4	11.45
10.7	11.35	87.4	11.45
10.8	11.34	88.4	11.45
10.9	11.37	89.4	11.44
11.	11.23	90.4	11.45
11.1	11.32	91.4	11.44
11.2	11.42	92.4	11.45
11.3	11.44	93.4	11.45
11.4	11.61	94.4	11.44
11.5	11.76	95.4	11.44
11.6	11.77	96.4	11.44
11.7	11.67	97.4	11.45
11.8	11.58	98.4	11.45
11.9	11.56	99.4	11.44
12.	11.54	100.4	11.45
12.1	11.54	101.4	11.45
12.2	11.53	102.4	11.44
12.3	11.52	103.4	11.44
12.4	11.53	104.4	11.45
12.5	11.52	105.4	11.45
12.6	11.51	106.4	11.44
12.7	11.51	107.4	11.45
12.8	11.51	108.4	11.44
12.9	11.51	109.4	11.45
13.	11.51	110.4	11.44
13.1	11.5	111.4	11.44
13.2	11.51	112.4	11.44
13.3	11.5	113.4	11.45
13.4	11.5	114.4	11.44
13.5	11.5	115.4	11.44
13.6	11.5	116.4	11.45
13.7	11.5	117.4	11.45
13.8	11.5	118.4	11.44
13.9	11.5	119.4	11.45
14.	11.5	120.4	11.45
14.1	11.49	121.4	11.44
14.2	11.49	131.4	11.44
14.3	11.49	141.4	11.44
14.4	11.49	151.4	11.44
14.5	11.49	161.4	11.44
14.6	11.49	171.4	11.44
14.7	11.49	181.4	11.44
14.8	11.49	191.4	11.44
14.9	11.49	201.4	11.44
15.	11.49	211.4	11.44
15.1	11.49	221.4	11.44
15.2	11.49	231.4	11.43
15.3	11.49	241.4	11.44
15.4	11.49		

SOLUTION

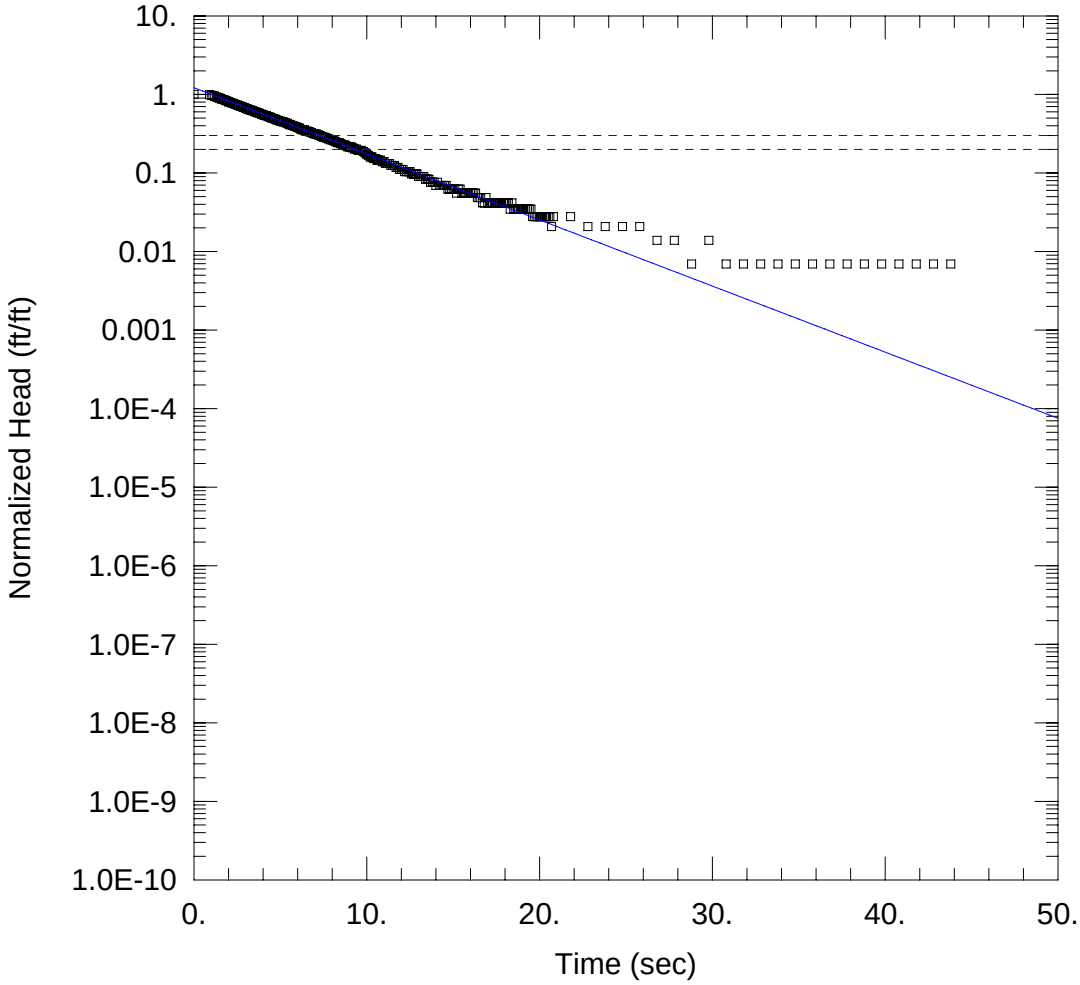
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.807

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	3.871E-5	cm/sec
y0	11.64	ft

T = K*b = 0.01539 cm^2/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-2S Rising.aqt
Date: 06/05/12 Time: 15:25:01

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-2S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 11.42 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2S Rising)

Initial Displacement: 1.44 ft Static Water Column Height: 12.83 ft
Total Well Penetration Depth: 12.31 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.05073 cm/sec y0 = 1.757 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:25:16

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 11.42 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-2S Rising

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.44 ft
Static Water Column Height: 12.83 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 12.31 ft

No. of Observations: 223

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.9	1.43	12.1	0.16
1.	1.41	12.2	0.15
1.1	1.39	12.3	0.15
1.2	1.37	12.4	0.15
1.3	1.34	12.5	0.15
1.4	1.31	12.6	0.14
1.5	1.29	12.7	0.14
1.6	1.26	12.8	0.14
1.7	1.24	12.9	0.14
1.8	1.22	13.	0.13
1.9	1.19	13.1	0.13
2.	1.16	13.2	0.13
2.1	1.14	13.3	0.13
2.2	1.12	13.4	0.12
2.3	1.1	13.5	0.12
2.4	1.08	13.6	0.12
2.5	1.06	13.7	0.11
2.6	1.04	13.8	0.11
2.7	1.02	13.9	0.11
2.8	1.	14.	0.1
2.9	0.98	14.1	0.11
3.	0.96	14.2	0.1
3.1	0.94	14.3	0.1
3.2	0.92	14.4	0.1
3.3	0.91	14.5	0.1
3.4	0.89	14.6	0.1
3.5	0.87	14.7	0.09
3.6	0.86	14.8	0.09
3.7	0.84	14.9	0.09
3.8	0.83	15.	0.09
3.9	0.81	15.1	0.09

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
4.	0.79	15.2	0.08
4.1	0.78	15.3	0.09
4.2	0.77	15.4	0.09
4.3	0.75	15.5	0.08
4.4	0.74	15.6	0.08
4.5	0.72	15.7	0.08
4.6	0.71	15.8	0.08
4.7	0.7	15.9	0.08
4.8	0.68	16.	0.08
4.9	0.67	16.1	0.08
5.	0.66	16.2	0.08
5.1	0.65	16.3	0.08
5.2	0.64	16.4	0.07
5.3	0.63	16.5	0.07
5.4	0.62	16.6	0.07
5.5	0.6	16.7	0.06
5.6	0.59	16.8	0.06
5.7	0.58	16.9	0.07
5.8	0.57	17.	0.06
5.9	0.56	17.1	0.06
6.	0.55	17.2	0.06
6.1	0.54	17.3	0.06
6.2	0.52	17.4	0.06
6.3	0.51	17.5	0.06
6.4	0.51	17.6	0.06
6.5	0.49	17.7	0.06
6.6	0.49	17.8	0.06
6.7	0.48	17.9	0.06
6.8	0.47	18.	0.06
6.9	0.46	18.1	0.06
7.	0.45	18.2	0.06
7.1	0.45	18.3	0.05
7.2	0.44	18.4	0.06
7.3	0.43	18.5	0.05
7.4	0.42	18.6	0.05
7.5	0.41	18.7	0.05
7.6	0.41	18.8	0.05
7.7	0.4	18.9	0.05
7.8	0.39	19.	0.05
7.9	0.38	19.1	0.05
8.	0.38	19.2	0.05
8.1	0.37	19.3	0.05
8.2	0.36	19.4	0.05
8.3	0.35	19.5	0.05
8.4	0.35	19.6	0.04
8.5	0.34	19.7	0.04
8.6	0.33	19.8	0.04
8.7	0.33	19.9	0.04
8.8	0.32	20.	0.04
8.9	0.31	20.1	0.04
9.	0.31	20.2	0.04
9.1	0.31	20.3	0.04
9.2	0.3	20.4	0.04
9.3	0.29	20.5	0.04
9.4	0.29	20.6	0.04
9.5	0.28	20.7	0.03
9.6	0.28	20.8	0.04
9.7	0.28	21.8	0.04
9.8	0.27	22.8	0.03
9.9	0.26	23.8	0.03
10.	0.25	24.8	0.03
10.1	0.24	25.8	0.03
10.2	0.23	26.8	0.02
10.3	0.23	27.8	0.02
10.4	0.22	28.8	0.01
10.5	0.22	29.8	0.02

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.6	0.21	30.8	0.01
10.7	0.21	31.8	0.01
10.8	0.21	32.8	0.01
10.9	0.2	33.8	0.01
11.	0.2	34.8	0.01
11.1	0.19	35.8	0.01
11.2	0.19	36.8	0.01
11.3	0.19	37.8	0.01
11.4	0.18	38.8	0.01
11.5	0.18	39.8	0.01
11.6	0.18	40.8	0.01
11.7	0.17	41.8	0.01
11.8	0.17	42.8	0.01
11.9	0.16	43.8	0.01
12.	0.16		

SOLUTION

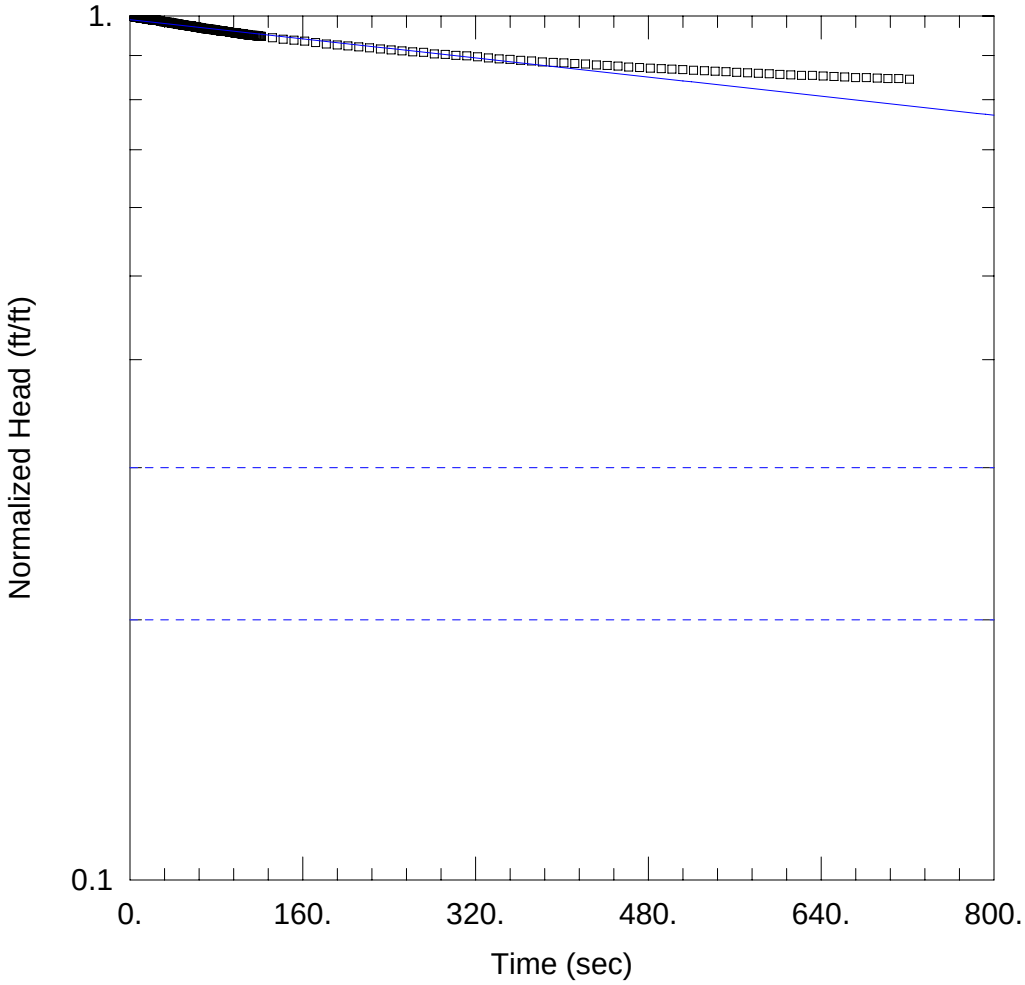
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.116

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.05073	cm/sec
y0	1.757	ft

T = K*b = 17.66 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-3D Falling.aqt
Date: 06/05/12 Time: 15:29:43

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-3D
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 13.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3D Falling)

Initial Displacement: 8.32 ft Static Water Column Height: 13.51 ft
Total Well Penetration Depth: 13.51 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 8.471E-5 cm/sec y0 = 8.236 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:30:04

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-3D

AQUIFER DATA

Saturated Thickness: 13.51 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-3D Falling

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 8.32 ft
Static Water Column Height: 13.51 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 13.51 ft

No. of Observations: 360

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.1	8.32	19.1	8.25
1.2	8.32	19.2	8.24
1.3	8.32	19.3	8.24
1.4	8.32	19.4	8.24
1.5	8.32	19.5	8.24
1.6	8.32	19.6	8.24
1.7	8.32	19.7	8.24
1.8	8.32	19.8	8.24
1.9	8.32	19.9	8.24
2.	8.32	20.	8.24
2.1	8.32	20.1	8.24
2.2	8.32	20.2	8.24
2.3	8.32	20.3	8.24
2.4	8.31	20.4	8.24
2.5	8.31	20.5	8.24
2.6	8.32	20.6	8.24
2.7	8.32	20.7	8.24
2.8	8.32	20.8	8.24
2.9	8.32	20.9	8.23
3.	8.31	21.9	8.24
3.1	8.31	22.9	8.23
3.2	8.31	23.9	8.23
3.3	8.32	24.9	8.23
3.4	8.31	25.9	8.22
3.5	8.31	26.9	8.22
3.6	8.31	27.9	8.21
3.7	8.31	28.9	8.2
3.8	8.31	29.9	8.2
3.9	8.31	30.9	8.19
4.	8.31	31.9	8.19
4.1	8.3	32.9	8.19

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
4.2	8.31	33.9	8.18
4.3	8.31	34.9	8.18
4.4	8.31	35.9	8.17
4.5	8.31	36.9	8.18
4.6	8.31	37.9	8.17
4.7	8.31	38.9	8.16
4.8	8.31	39.9	8.16
4.9	8.3	40.9	8.16
5.	8.3	41.9	8.15
5.1	8.31	42.9	8.15
5.2	8.31	43.9	8.14
5.3	8.3	44.9	8.14
5.4	8.3	45.9	8.14
5.5	8.3	46.9	8.13
5.6	8.3	47.9	8.13
5.7	8.3	48.9	8.12
5.8	8.3	49.9	8.12
5.9	8.3	50.9	8.12
6.	8.3	51.9	8.11
6.1	8.3	52.9	8.11
6.2	8.3	53.9	8.1
6.3	8.3	54.9	8.1
6.4	8.3	55.9	8.1
6.5	8.29	56.9	8.1
6.6	8.3	57.9	8.09
6.7	8.3	58.9	8.09
6.8	8.3	59.9	8.08
6.9	8.3	60.9	8.07
7.	8.3	61.9	8.08
7.1	8.29	62.9	8.07
7.2	8.3	63.9	8.07
7.3	8.29	64.9	8.06
7.4	8.29	65.9	8.06
7.5	8.29	66.9	8.05
7.6	8.29	67.9	8.05
7.7	8.3	68.9	8.05
7.8	8.29	69.9	8.04
7.9	8.29	70.9	8.04
8.	8.29	71.9	8.04
8.1	8.29	72.9	8.03
8.2	8.29	73.9	8.03
8.3	8.29	74.9	8.03
8.4	8.29	75.9	8.03
8.5	8.29	76.9	8.02
8.6	8.29	77.9	8.02
8.7	8.29	78.9	8.02
8.8	8.29	79.9	8.01
8.9	8.29	80.9	8.01
9.	8.29	81.9	8.
9.1	8.28	82.9	8.
9.2	8.29	83.9	7.99
9.3	8.28	84.9	7.99
9.4	8.28	85.9	7.99
9.5	8.28	86.9	7.99
9.6	8.28	87.9	7.98
9.7	8.28	88.9	7.98
9.8	8.29	89.9	7.98
9.9	8.28	90.9	7.98
10.	8.28	91.9	7.97
10.1	8.28	92.9	7.96
10.2	8.28	93.9	7.96
10.3	8.28	94.9	7.96
10.4	8.28	95.9	7.96
10.5	8.28	96.9	7.95
10.6	8.28	97.9	7.95
10.7	8.28	98.9	7.95

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.8	8.28	99.9	7.94
10.9	8.28	100.9	7.94
11.	8.27	101.9	7.94
11.1	8.28	102.9	7.93
11.2	8.28	103.9	7.93
11.3	8.28	104.9	7.93
11.4	8.28	105.9	7.92
11.5	8.28	106.9	7.92
11.6	8.27	107.9	7.92
11.7	8.28	108.9	7.91
11.8	8.28	109.9	7.91
11.9	8.27	110.9	7.9
12.	8.27	111.9	7.9
12.1	8.27	112.9	7.9
12.2	8.27	113.9	7.9
12.3	8.27	114.9	7.9
12.4	8.27	115.9	7.9
12.5	8.27	116.9	7.89
12.6	8.27	117.9	7.89
12.7	8.27	118.9	7.89
12.8	8.27	119.9	7.88
12.9	8.27	120.9	7.88
13.	8.27	121.9	7.88
13.1	8.27	131.9	7.85
13.2	8.27	141.9	7.82
13.3	8.27	151.9	7.8
13.4	8.27	161.9	7.78
13.5	8.27	171.9	7.75
13.6	8.27	181.9	7.72
13.7	8.27	191.9	7.7
13.8	8.27	201.9	7.68
13.9	8.27	211.9	7.66
14.	8.26	221.9	7.64
14.1	8.27	231.9	7.62
14.2	8.27	241.9	7.6
14.3	8.26	251.9	7.58
14.4	8.26	261.9	7.56
14.5	8.26	271.9	7.55
14.6	8.26	281.9	7.52
14.7	8.26	291.9	7.51
14.8	8.26	301.9	7.49
14.9	8.26	311.9	7.48
15.	8.26	321.9	7.46
15.1	8.26	331.9	7.44
15.2	8.26	341.9	7.42
15.3	8.26	351.9	7.41
15.4	8.26	361.9	7.39
15.5	8.26	371.9	7.38
15.6	8.26	381.9	7.36
15.7	8.26	391.9	7.35
15.8	8.26	401.9	7.34
15.9	8.26	411.9	7.33
16.	8.25	421.9	7.32
16.1	8.25	431.9	7.3
16.2	8.25	441.9	7.29
16.3	8.26	451.9	7.28
16.4	8.25	461.9	7.26
16.5	8.25	471.9	7.25
16.6	8.25	481.9	7.24
16.7	8.25	491.9	7.23
16.8	8.26	501.9	7.22
16.9	8.26	511.9	7.21
17.	8.25	521.9	7.2
17.1	8.25	531.9	7.19
17.2	8.25	541.9	7.18
17.3	8.25	551.9	7.17

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
17.4	8.25	561.9	7.16
17.5	8.25	571.9	7.15
17.6	8.25	581.9	7.14
17.7	8.25	591.9	7.13
17.8	8.25	601.9	7.12
17.9	8.25	611.9	7.11
18.	8.25	621.9	7.1
18.1	8.25	631.9	7.1
18.2	8.24	641.9	7.09
18.3	8.25	651.9	7.08
18.4	8.25	661.9	7.07
18.5	8.25	671.9	7.06
18.6	8.25	681.9	7.06
18.7	8.24	691.9	7.05
18.8	8.25	701.9	7.04
18.9	8.24	711.9	7.04
19.	8.24	721.9	7.03

SOLUTION

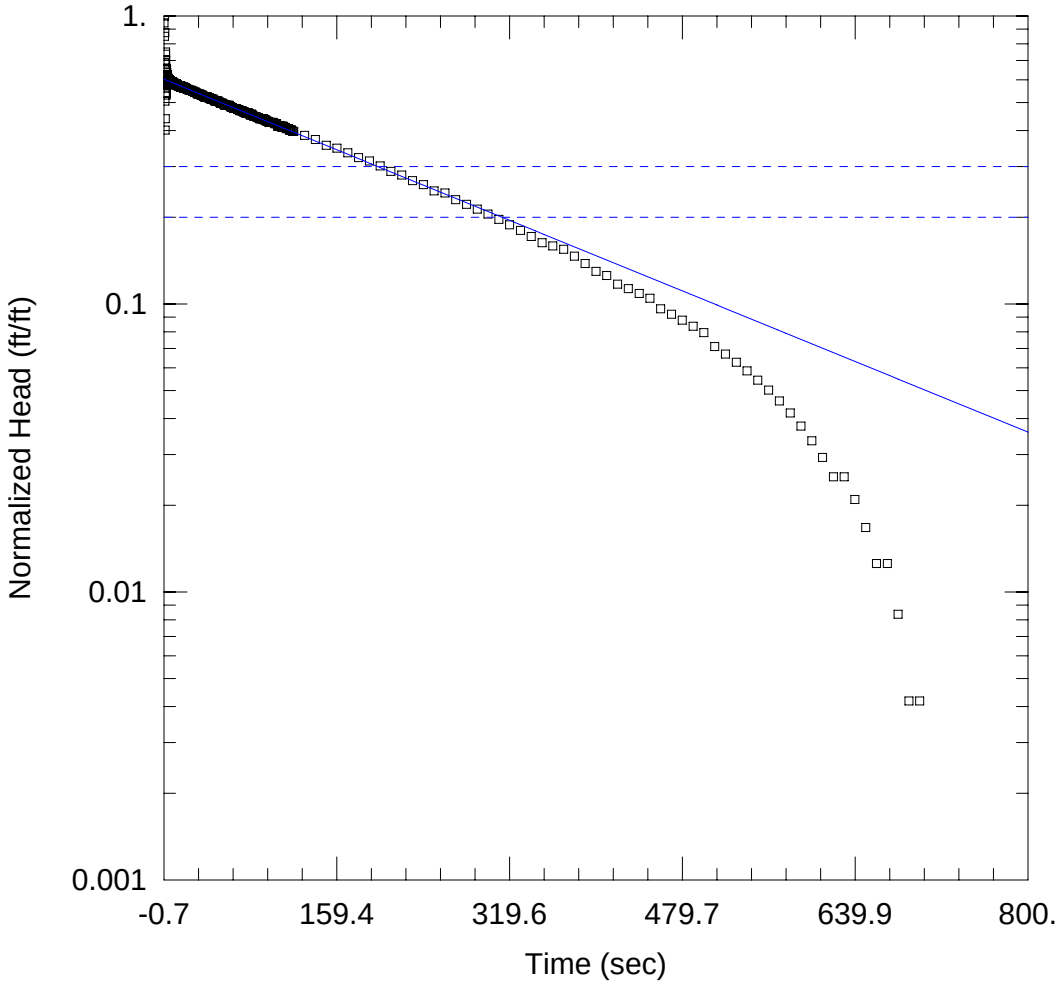
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.169

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	8.471E-5	cm/sec
y0	8.236	ft

T = K*b = 0.03488 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-3D Rising.aqt
Date: 06/05/12 Time: 15:29:05

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-3D
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 13.51 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3D Rising)

Initial Displacement: -2.39 ft Static Water Column Height: 13.51 ft
Total Well Penetration Depth: 13.51 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0009376 cm/sec y0 = -1.437 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:29:19

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-3D

AQUIFER DATA

Saturated Thickness: 13.51 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-3D Rising

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -2.39 ft
Static Water Column Height: 13.51 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 13.51 ft

No. of Observations: 360

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
-0.7	-2.26	17.8	-1.34
-0.2	-2.03	17.9	-1.34
0.	-2.39	18.	-1.34
0.1	-2.09	18.1	-1.35
0.2	-1.64	18.2	-1.34
0.3	-1.21	18.3	-1.34
0.4	-0.96	18.4	-1.35
0.5	-1.05	18.5	-1.34
0.6	-1.29	18.6	-1.34
0.7	-1.56	18.7	-1.34
0.8	-1.76	18.8	-1.34
0.9	-1.79	18.9	-1.34
1.	-1.68	19.	-1.34
1.1	-1.5	19.1	-1.34
1.2	-1.34	19.2	-1.34
1.3	-1.27	19.3	-1.34
1.4	-1.29	19.4	-1.34
1.5	-1.39	19.5	-1.34
1.6	-1.49	19.6	-1.34
1.7	-1.56	19.7	-1.34
1.8	-1.57	20.7	-1.33
1.9	-1.52	21.7	-1.33
2.	-1.46	22.7	-1.32
2.1	-1.4	23.7	-1.32
2.2	-1.38	24.7	-1.32
2.3	-1.39	25.7	-1.31
2.4	-1.43	26.7	-1.31
2.5	-1.47	27.7	-1.3
2.6	-1.49	28.7	-1.3
2.7	-1.48	29.7	-1.29
2.8	-1.46	30.7	-1.28

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
2.9	-1.44	31.7	-1.28
3.	-1.41	32.7	-1.28
3.1	-1.41	33.7	-1.27
3.2	-1.41	34.7	-1.27
3.3	-1.43	35.7	-1.26
3.4	-1.45	36.7	-1.25
3.5	-1.45	37.7	-1.25
3.6	-1.44	38.7	-1.25
3.7	-1.44	39.7	-1.25
3.8	-1.43	40.7	-1.24
3.9	-1.42	41.7	-1.24
4.	-1.41	42.7	-1.23
4.1	-1.42	43.7	-1.23
4.2	-1.43	44.7	-1.23
4.3	-1.43	45.7	-1.22
4.4	-1.43	46.7	-1.21
4.5	-1.43	47.7	-1.21
4.6	-1.42	48.7	-1.21
4.7	-1.42	49.7	-1.21
4.8	-1.42	50.7	-1.2
4.9	-1.42	51.7	-1.19
5.	-1.42	52.7	-1.19
5.1	-1.42	53.7	-1.19
5.2	-1.41	54.7	-1.18
5.3	-1.41	55.7	-1.17
5.4	-1.41	56.7	-1.17
5.5	-1.41	57.7	-1.17
5.6	-1.41	58.7	-1.17
5.7	-1.41	59.7	-1.17
5.8	-1.41	60.7	-1.16
5.9	-1.41	61.7	-1.15
6.	-1.41	62.7	-1.15
6.1	-1.41	63.7	-1.14
6.2	-1.41	64.7	-1.14
6.3	-1.41	65.7	-1.14
6.4	-1.41	66.7	-1.14
6.5	-1.41	67.7	-1.13
6.6	-1.41	68.7	-1.13
6.7	-1.41	69.7	-1.12
6.8	-1.41	70.7	-1.12
6.9	-1.41	71.7	-1.12
7.	-1.41	72.7	-1.11
7.1	-1.4	73.7	-1.11
7.2	-1.41	74.7	-1.1
7.3	-1.41	75.7	-1.1
7.4	-1.4	76.7	-1.1
7.5	-1.41	77.7	-1.1
7.6	-1.4	78.7	-1.09
7.7	-1.4	79.7	-1.08
7.8	-1.4	80.7	-1.09
7.9	-1.4	81.7	-1.08
8.	-1.4	82.7	-1.07
8.1	-1.39	83.7	-1.07
8.2	-1.4	84.7	-1.07
8.3	-1.4	85.7	-1.06
8.4	-1.39	86.7	-1.06
8.5	-1.4	87.7	-1.05
8.6	-1.39	88.7	-1.05
8.7	-1.39	89.7	-1.05
8.8	-1.39	90.7	-1.05
8.9	-1.39	91.7	-1.05
9.	-1.39	92.7	-1.04
9.1	-1.39	93.7	-1.04
9.2	-1.39	94.7	-1.03
9.3	-1.39	95.7	-1.03
9.4	-1.39	96.7	-1.02

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.5	-1.39	97.7	-1.02
9.6	-1.39	98.7	-1.02
9.7	-1.39	99.7	-1.02
9.8	-1.39	100.7	-1.02
9.9	-1.38	101.7	-1.01
10.	-1.38	102.7	-1.01
10.1	-1.39	103.7	-1.01
10.2	-1.38	104.7	-0.99
10.3	-1.38	105.7	-0.99
10.4	-1.38	106.7	-0.99
10.5	-1.39	107.7	-0.99
10.6	-1.39	108.7	-0.98
10.7	-1.38	109.7	-0.99
10.8	-1.38	110.7	-0.98
10.9	-1.39	111.7	-0.98
11.	-1.38	112.7	-0.97
11.1	-1.38	113.7	-0.97
11.2	-1.38	114.7	-0.97
11.3	-1.38	115.7	-0.96
11.4	-1.38	116.7	-0.96
11.5	-1.38	117.7	-0.96
11.6	-1.38	118.7	-0.95
11.7	-1.38	119.7	-0.95
11.8	-1.38	129.7	-0.92
11.9	-1.38	139.7	-0.89
12.	-1.38	149.7	-0.85
12.1	-1.37	159.7	-0.83
12.2	-1.37	169.7	-0.8
12.3	-1.37	179.7	-0.77
12.4	-1.37	189.7	-0.75
12.5	-1.37	199.7	-0.72
12.6	-1.37	209.7	-0.69
12.7	-1.37	219.7	-0.67
12.8	-1.37	229.7	-0.64
12.9	-1.37	239.7	-0.62
13.	-1.37	249.7	-0.59
13.1	-1.37	259.7	-0.58
13.2	-1.37	269.7	-0.55
13.3	-1.37	279.7	-0.53
13.4	-1.37	289.7	-0.51
13.5	-1.37	299.7	-0.49
13.6	-1.36	309.7	-0.47
13.7	-1.37	319.7	-0.45
13.8	-1.37	329.7	-0.43
13.9	-1.37	339.7	-0.41
14.	-1.37	349.7	-0.39
14.1	-1.37	359.7	-0.38
14.2	-1.36	369.7	-0.37
14.3	-1.37	379.7	-0.35
14.4	-1.36	389.7	-0.33
14.5	-1.36	399.7	-0.31
14.6	-1.36	409.7	-0.3
14.7	-1.36	419.7	-0.28
14.8	-1.36	429.7	-0.27
14.9	-1.36	439.7	-0.26
15.	-1.36	449.7	-0.25
15.1	-1.35	459.7	-0.23
15.2	-1.36	469.7	-0.22
15.3	-1.35	479.7	-0.21
15.4	-1.36	489.7	-0.2
15.5	-1.36	499.7	-0.19
15.6	-1.35	509.7	-0.17
15.7	-1.36	519.7	-0.16
15.8	-1.35	529.7	-0.15
15.9	-1.36	539.7	-0.14
16.	-1.35	549.7	-0.13

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
16.1	-1.35	559.7	-0.12
16.2	-1.35	569.7	-0.11
16.3	-1.35	579.7	-0.1
16.4	-1.35	589.7	-0.09
16.5	-1.35	599.7	-0.08
16.6	-1.35	609.7	-0.07
16.7	-1.35	619.7	-0.06
16.8	-1.35	629.7	-0.06
16.9	-1.35	639.7	-0.05
17.	-1.35	649.7	-0.04
17.1	-1.35	659.7	-0.03
17.2	-1.35	669.7	-0.03
17.3	-1.35	679.7	-0.02
17.4	-1.35	689.7	-0.01
17.5	-1.34	699.7	-0.01
17.6	-1.35	709.7	0.
17.7	-1.35	719.7	0.

SOLUTION

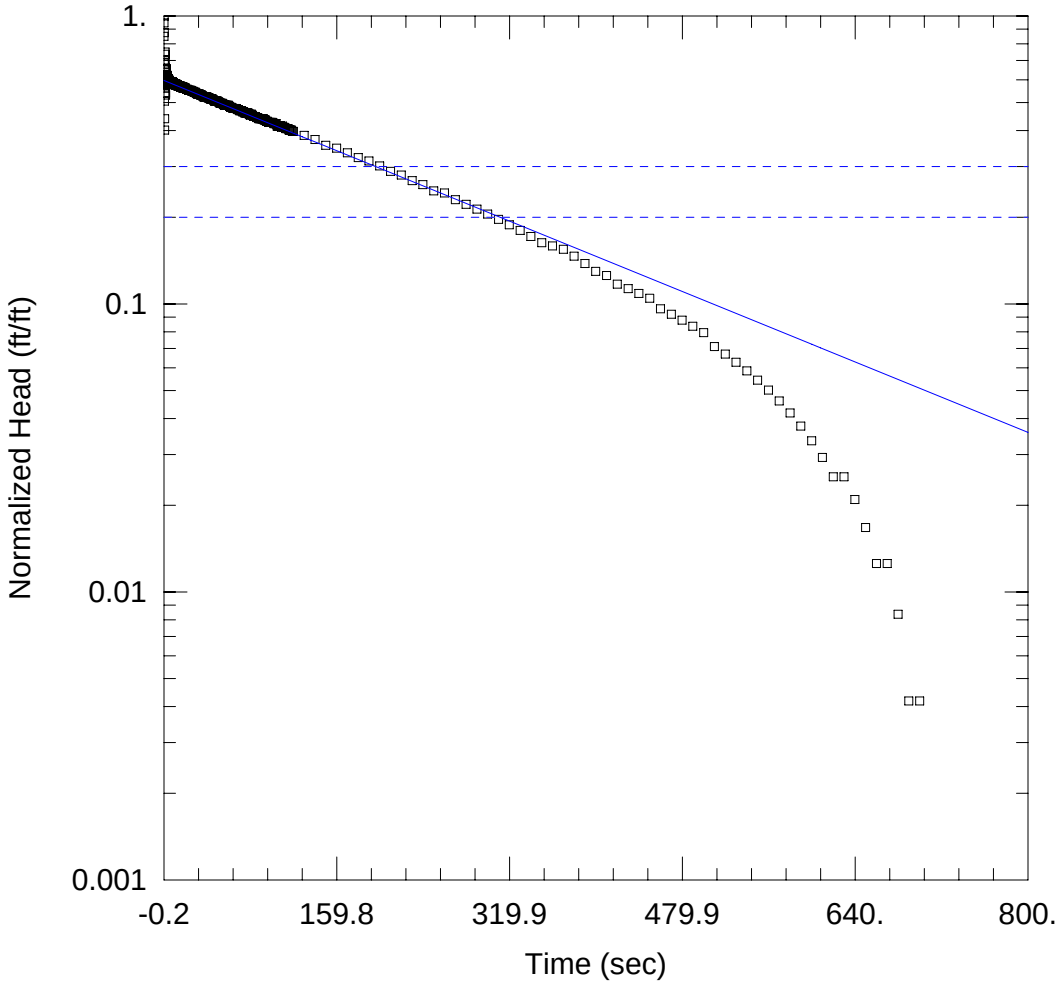
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.169

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0009376	cm/sec
y0	-1.437	ft

T = K*b = 0.3861 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-3S Rising.aqt
Date: 06/05/12 Time: 15:27:28

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-2S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 7.34 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3S Rising)

Initial Displacement: -2.39 ft Static Water Column Height: 7.34 ft
Total Well Penetration Depth: 7.36 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0008303 cm/sec y0 = -1.426 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:27:45

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 7.34 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-3S Rising

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -2.39 ft
Static Water Column Height: 7.34 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 7.36 ft

No. of Observations: 360

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
-0.2	-2.03	17.8	-1.34
-0.1	-2.26	17.9	-1.34
0.	-2.39	18.	-1.34
0.1	-2.09	18.1	-1.35
0.2	-1.64	18.2	-1.34
0.3	-1.21	18.3	-1.34
0.4	-0.96	18.4	-1.35
0.5	-1.05	18.5	-1.34
0.6	-1.29	18.6	-1.34
0.7	-1.56	18.7	-1.34
0.8	-1.76	18.8	-1.34
0.9	-1.79	18.9	-1.34
1.	-1.68	19.	-1.34
1.1	-1.5	19.1	-1.34
1.2	-1.34	19.2	-1.34
1.3	-1.27	19.3	-1.34
1.4	-1.29	19.4	-1.34
1.5	-1.39	19.5	-1.34
1.6	-1.49	19.6	-1.34
1.7	-1.56	19.7	-1.34
1.8	-1.57	20.7	-1.33
1.9	-1.52	21.7	-1.33
2.	-1.46	22.7	-1.32
2.1	-1.4	23.7	-1.32
2.2	-1.38	24.7	-1.32
2.3	-1.39	25.7	-1.31
2.4	-1.43	26.7	-1.31
2.5	-1.47	27.7	-1.3
2.6	-1.49	28.7	-1.3
2.7	-1.48	29.7	-1.29
2.8	-1.46	30.7	-1.28

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
2.9	-1.44	31.7	-1.28
3.	-1.41	32.7	-1.28
3.1	-1.41	33.7	-1.27
3.2	-1.41	34.7	-1.27
3.3	-1.43	35.7	-1.26
3.4	-1.45	36.7	-1.25
3.5	-1.45	37.7	-1.25
3.6	-1.44	38.7	-1.25
3.7	-1.44	39.7	-1.25
3.8	-1.43	40.7	-1.24
3.9	-1.42	41.7	-1.24
4.	-1.41	42.7	-1.23
4.1	-1.42	43.7	-1.23
4.2	-1.43	44.7	-1.23
4.3	-1.43	45.7	-1.22
4.4	-1.43	46.7	-1.21
4.5	-1.43	47.7	-1.21
4.6	-1.42	48.7	-1.21
4.7	-1.42	49.7	-1.21
4.8	-1.42	50.7	-1.2
4.9	-1.42	51.7	-1.19
5.	-1.42	52.7	-1.19
5.1	-1.42	53.7	-1.19
5.2	-1.41	54.7	-1.18
5.3	-1.41	55.7	-1.17
5.4	-1.41	56.7	-1.17
5.5	-1.41	57.7	-1.17
5.6	-1.41	58.7	-1.17
5.7	-1.41	59.7	-1.17
5.8	-1.41	60.7	-1.16
5.9	-1.41	61.7	-1.15
6.	-1.41	62.7	-1.15
6.1	-1.41	63.7	-1.14
6.2	-1.41	64.7	-1.14
6.3	-1.41	65.7	-1.14
6.4	-1.41	66.7	-1.14
6.5	-1.41	67.7	-1.13
6.6	-1.41	68.7	-1.13
6.7	-1.41	69.7	-1.12
6.8	-1.41	70.7	-1.12
6.9	-1.41	71.7	-1.12
7.	-1.41	72.7	-1.11
7.1	-1.4	73.7	-1.11
7.2	-1.41	74.7	-1.1
7.3	-1.41	75.7	-1.1
7.4	-1.4	76.7	-1.1
7.5	-1.41	77.7	-1.1
7.6	-1.4	78.7	-1.09
7.7	-1.4	79.7	-1.08
7.8	-1.4	80.7	-1.09
7.9	-1.4	81.7	-1.08
8.	-1.4	82.7	-1.07
8.1	-1.39	83.7	-1.07
8.2	-1.4	84.7	-1.07
8.3	-1.4	85.7	-1.06
8.4	-1.39	86.7	-1.06
8.5	-1.4	87.7	-1.05
8.6	-1.39	88.7	-1.05
8.7	-1.39	89.7	-1.05
8.8	-1.39	90.7	-1.05
8.9	-1.39	91.7	-1.05
9.	-1.39	92.7	-1.04
9.1	-1.39	93.7	-1.04
9.2	-1.39	94.7	-1.03
9.3	-1.39	95.7	-1.03
9.4	-1.39	96.7	-1.02

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.5	-1.39	97.7	-1.02
9.6	-1.39	98.7	-1.02
9.7	-1.39	99.7	-1.02
9.8	-1.39	100.7	-1.02
9.9	-1.38	101.7	-1.01
10.	-1.38	102.7	-1.01
10.1	-1.39	103.7	-1.01
10.2	-1.38	104.7	-0.99
10.3	-1.38	105.7	-0.99
10.4	-1.38	106.7	-0.99
10.5	-1.39	107.7	-0.99
10.6	-1.39	108.7	-0.98
10.7	-1.38	109.7	-0.99
10.8	-1.38	110.7	-0.98
10.9	-1.39	111.7	-0.98
11.	-1.38	112.7	-0.97
11.1	-1.38	113.7	-0.97
11.2	-1.38	114.7	-0.97
11.3	-1.38	115.7	-0.96
11.4	-1.38	116.7	-0.96
11.5	-1.38	117.7	-0.96
11.6	-1.38	118.7	-0.95
11.7	-1.38	119.7	-0.95
11.8	-1.38	129.7	-0.92
11.9	-1.38	139.7	-0.89
12.	-1.38	149.7	-0.85
12.1	-1.37	159.7	-0.83
12.2	-1.37	169.7	-0.8
12.3	-1.37	179.7	-0.77
12.4	-1.37	189.7	-0.75
12.5	-1.37	199.7	-0.72
12.6	-1.37	209.7	-0.69
12.7	-1.37	219.7	-0.67
12.8	-1.37	229.7	-0.64
12.9	-1.37	239.7	-0.62
13.	-1.37	249.7	-0.59
13.1	-1.37	259.7	-0.58
13.2	-1.37	269.7	-0.55
13.3	-1.37	279.7	-0.53
13.4	-1.37	289.7	-0.51
13.5	-1.37	299.7	-0.49
13.6	-1.36	309.7	-0.47
13.7	-1.37	319.7	-0.45
13.8	-1.37	329.7	-0.43
13.9	-1.37	339.7	-0.41
14.	-1.37	349.7	-0.39
14.1	-1.37	359.7	-0.38
14.2	-1.36	369.7	-0.37
14.3	-1.37	379.7	-0.35
14.4	-1.36	389.7	-0.33
14.5	-1.36	399.7	-0.31
14.6	-1.36	409.7	-0.3
14.7	-1.36	419.7	-0.28
14.8	-1.36	429.7	-0.27
14.9	-1.36	439.7	-0.26
15.	-1.36	449.7	-0.25
15.1	-1.35	459.7	-0.23
15.2	-1.36	469.7	-0.22
15.3	-1.35	479.7	-0.21
15.4	-1.36	489.7	-0.2
15.5	-1.36	499.7	-0.19
15.6	-1.35	509.7	-0.17
15.7	-1.36	519.7	-0.16
15.8	-1.35	529.7	-0.15
15.9	-1.36	539.7	-0.14
16.	-1.35	549.7	-0.13

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
16.1	-1.35	559.7	-0.12
16.2	-1.35	569.7	-0.11
16.3	-1.35	579.7	-0.1
16.4	-1.35	589.7	-0.09
16.5	-1.35	599.7	-0.08
16.6	-1.35	609.7	-0.07
16.7	-1.35	619.7	-0.06
16.8	-1.35	629.7	-0.06
16.9	-1.35	639.7	-0.05
17.	-1.35	649.7	-0.04
17.1	-1.35	659.7	-0.03
17.2	-1.35	669.7	-0.03
17.3	-1.35	679.7	-0.02
17.4	-1.35	689.7	-0.01
17.5	-1.34	699.7	-0.01
17.6	-1.35	709.7	0.
17.7	-1.35	719.7	0.

SOLUTION

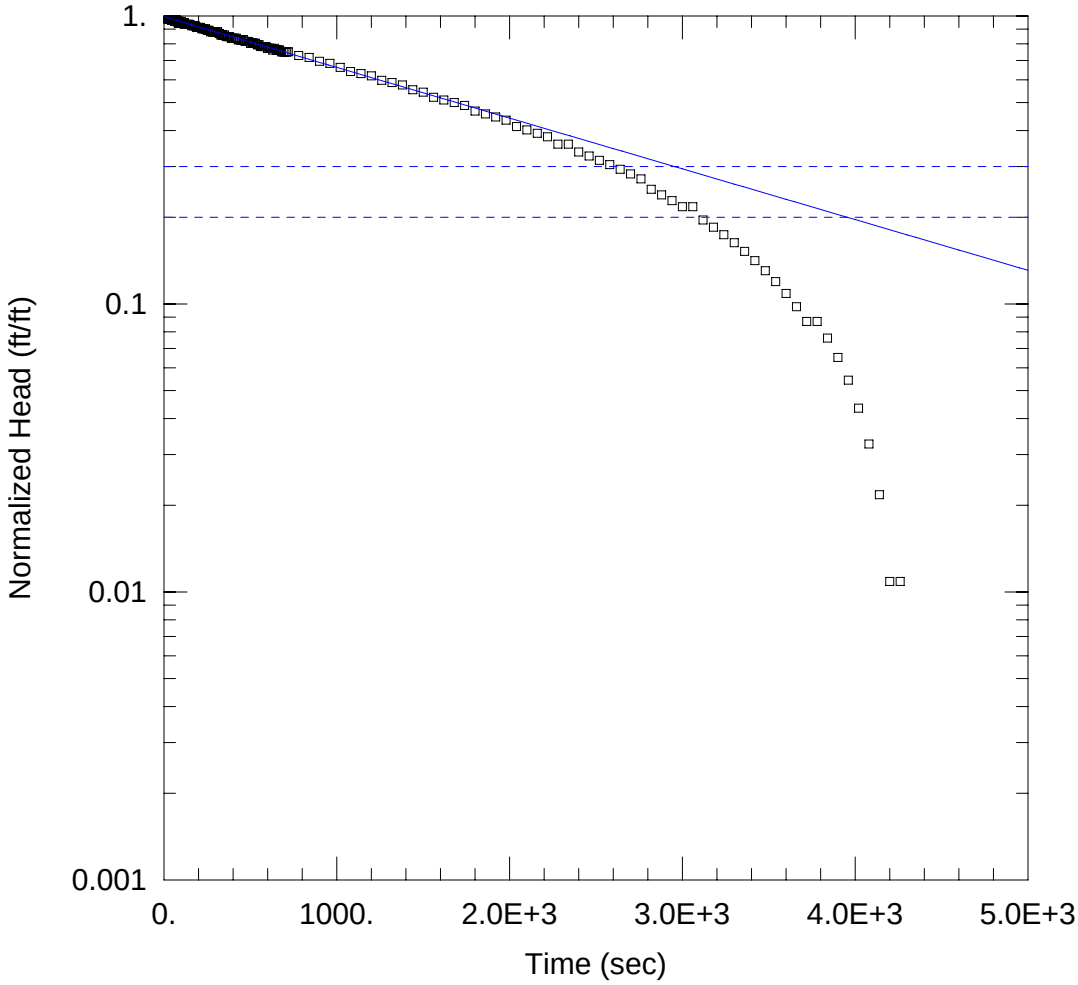
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.812

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0008303	cm/sec
y0	-1.426	ft

T = K*b = 0.1858 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-3S Falling.aqt
Date: 06/05/12 Time: 15:28:13

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Well: MW-2S
Test Date: 6-16-11

AQUIFER DATA

Saturated Thickness: 7.34 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3S Falling)

Initial Displacement: 0.92 ft Static Water Column Height: 7.34 ft
Total Well Penetration Depth: 7.36 ft Screen Length: 5. ft
Casing Radius: 0.166 ft Well Radius: 0.166 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 9.578E-5 cm/sec y0 = 0.9142 ft

Data Set: K:\EPA\EPA R5 START3\Site Files\Ottawa OU2\Ottawa NPL-11\NPL-11 Hydraulic Conductivity Data\Pro
Date: 06/05/12
Time: 15:28:31

PROJECT INFORMATION

Company: Weston
Client: U.S. EPA
Location: Ottawa, IL
Test Date: 6-16-11
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 7.34 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-3S Falling

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.92 ft
Static Water Column Height: 7.34 ft
Casing Radius: 0.166 ft
Well Radius: 0.166 ft
Well Skin Radius: 0.6875 ft
Screen Length: 5. ft
Total Well Penetration Depth: 7.36 ft

No. of Observations: 420

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.4	0.92	31.3	0.9
0.5	0.92	32.3	0.9
0.6	0.91	33.3	0.9
0.7	0.92	34.3	0.9
0.8	0.92	35.3	0.9
0.9	0.92	36.3	0.9
1.	0.92	37.3	0.9
1.1	0.92	38.3	0.9
1.2	0.92	39.3	0.9
1.3	0.92	40.3	0.9
1.4	0.92	41.3	0.9
1.5	0.92	42.3	0.9
1.6	0.92	43.3	0.89
1.7	0.91	44.3	0.89
1.8	0.92	45.3	0.9
1.9	0.92	46.3	0.9
2.	0.92	47.3	0.89
2.1	0.92	48.3	0.89
2.2	0.92	49.3	0.89
2.3	0.92	50.3	0.89
2.4	0.92	51.3	0.89
2.5	0.92	52.3	0.89
2.6	0.92	53.3	0.89
2.7	0.92	54.3	0.89
2.8	0.92	55.3	0.89
2.9	0.91	56.3	0.89
3.	0.92	57.3	0.89
3.1	0.92	58.3	0.89
3.2	0.92	59.3	0.89
3.3	0.91	60.3	0.89
3.4	0.92	61.3	0.88

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.5	0.91	62.3	0.89
3.6	0.92	63.3	0.89
3.7	0.91	64.3	0.89
3.8	0.92	65.3	0.89
3.9	0.92	66.3	0.89
4.	0.92	67.3	0.89
4.1	0.91	68.3	0.88
4.2	0.92	69.3	0.89
4.3	0.92	70.3	0.88
4.4	0.92	71.3	0.89
4.5	0.91	72.3	0.88
4.6	0.92	73.3	0.88
4.7	0.92	74.3	0.88
4.8	0.91	75.3	0.88
4.9	0.91	76.3	0.88
5.	0.92	77.3	0.88
5.1	0.92	78.3	0.88
5.2	0.92	79.3	0.88
5.3	0.92	80.3	0.88
5.4	0.92	81.3	0.88
5.5	0.92	82.3	0.87
5.6	0.92	83.3	0.88
5.7	0.91	84.3	0.87
5.8	0.91	85.3	0.88
5.9	0.92	86.3	0.88
6.	0.91	87.3	0.88
6.1	0.91	88.3	0.88
6.2	0.91	89.3	0.88
6.3	0.92	90.3	0.87
6.4	0.92	91.3	0.87
6.5	0.92	92.3	0.88
6.6	0.92	93.3	0.87
6.7	0.91	94.3	0.87
6.8	0.91	95.3	0.88
6.9	0.91	96.3	0.87
7.	0.92	97.3	0.87
7.1	0.92	98.3	0.87
7.2	0.92	99.3	0.88
7.3	0.92	100.3	0.87
7.4	0.91	101.3	0.87
7.5	0.92	102.3	0.87
7.6	0.91	103.3	0.87
7.7	0.91	104.3	0.87
7.8	0.91	105.3	0.87
7.9	0.91	106.3	0.87
8.	0.91	107.3	0.87
8.1	0.91	108.3	0.87
8.2	0.92	109.3	0.87
8.3	0.91	110.3	0.87
8.4	0.91	111.3	0.87
8.5	0.91	112.3	0.87
8.6	0.91	113.3	0.87
8.7	0.91	114.3	0.87
8.8	0.92	115.3	0.87
8.9	0.91	116.3	0.87
9.	0.91	117.3	0.86
9.1	0.91	118.3	0.87
9.2	0.91	119.3	0.86
9.3	0.91	120.3	0.86
9.4	0.91	130.3	0.86
9.5	0.91	140.3	0.86
9.6	0.91	150.3	0.86
9.7	0.92	160.3	0.85
9.8	0.91	170.3	0.85
9.9	0.91	180.3	0.85
10.	0.91	190.3	0.84

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.1	0.91	200.3	0.84
10.2	0.91	210.3	0.84
10.3	0.91	220.3	0.83
10.4	0.91	230.3	0.83
10.5	0.91	240.3	0.83
10.6	0.91	250.3	0.82
10.7	0.91	260.3	0.82
10.8	0.92	270.3	0.81
10.9	0.91	280.3	0.81
11.	0.91	290.3	0.81
11.1	0.91	300.3	0.81
11.2	0.91	310.3	0.81
11.3	0.91	320.3	0.8
11.4	0.91	330.3	0.79
11.5	0.91	340.3	0.79
11.6	0.91	350.3	0.79
11.7	0.91	360.3	0.78
11.8	0.91	370.3	0.78
11.9	0.91	380.3	0.78
12.	0.91	390.3	0.77
12.1	0.91	400.3	0.77
12.2	0.91	410.3	0.77
12.3	0.91	420.3	0.77
12.4	0.91	430.3	0.76
12.5	0.91	440.3	0.76
12.6	0.91	450.3	0.76
12.7	0.91	460.3	0.76
12.8	0.91	470.3	0.75
12.9	0.91	480.3	0.75
13.	0.91	490.3	0.75
13.1	0.91	500.3	0.74
13.2	0.91	510.3	0.74
13.3	0.91	520.3	0.74
13.4	0.91	530.3	0.74
13.5	0.91	540.3	0.73
13.6	0.91	550.3	0.73
13.7	0.91	560.3	0.72
13.8	0.91	570.3	0.72
13.9	0.91	580.3	0.72
14.	0.91	590.3	0.72
14.1	0.91	600.3	0.71
14.2	0.91	610.3	0.71
14.3	0.91	620.3	0.71
14.4	0.91	630.3	0.7
14.5	0.91	640.3	0.71
14.6	0.91	650.3	0.7
14.7	0.91	660.3	0.7
14.8	0.91	670.3	0.7
14.9	0.91	680.3	0.69
15.	0.91	690.3	0.69
15.1	0.91	700.3	0.69
15.2	0.91	710.3	0.69
15.3	0.91	720.3	0.69
15.4	0.91	780.3	0.67
15.5	0.91	840.3	0.66
15.6	0.91	900.3	0.64
15.7	0.91	960.3	0.63
15.8	0.91	1020.3	0.61
15.9	0.91	1080.3	0.59
16.	0.91	1140.3	0.58
16.1	0.91	1200.3	0.57
16.2	0.91	1260.3	0.55
16.3	0.91	1320.3	0.54
16.4	0.91	1380.3	0.53
16.5	0.91	1440.3	0.51
16.6	0.91	1500.3	0.5

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
16.7	0.91	1560.3	0.48
16.8	0.91	1620.3	0.47
16.9	0.91	1680.3	0.46
17.	0.91	1740.3	0.45
17.1	0.91	1800.3	0.43
17.2	0.9	1860.3	0.42
17.3	0.91	1920.3	0.41
17.4	0.91	1980.3	0.4
17.5	0.91	2040.3	0.38
17.6	0.91	2100.3	0.37
17.7	0.9	2160.3	0.36
17.8	0.91	2220.3	0.35
17.9	0.91	2280.3	0.33
18.	0.91	2340.3	0.33
18.1	0.91	2400.3	0.31
18.2	0.91	2460.3	0.3
18.3	0.91	2520.3	0.29
18.4	0.91	2580.3	0.28
18.5	0.91	2640.3	0.27
18.6	0.91	2700.3	0.26
18.7	0.91	2760.3	0.25
18.8	0.91	2820.3	0.23
18.9	0.91	2880.3	0.22
19.	0.91	2940.3	0.21
19.1	0.91	3000.3	0.2
19.2	0.91	3060.3	0.2
19.3	0.91	3120.3	0.18
19.4	0.9	3180.3	0.17
19.5	0.91	3240.3	0.16
19.6	0.91	3300.3	0.15
19.7	0.91	3360.3	0.14
19.8	0.91	3420.3	0.13
19.9	0.9	3480.3	0.12
20.	0.91	3540.3	0.11
20.1	0.91	3600.3	0.1
20.2	0.91	3660.3	0.09
20.3	0.9	3720.3	0.08
21.3	0.9	3780.3	0.08
22.3	0.9	3840.3	0.07
23.3	0.9	3900.3	0.06
24.3	0.91	3960.3	0.05
25.3	0.9	4020.3	0.04
26.3	0.9	4080.3	0.03
27.3	0.9	4140.3	0.02
28.3	0.9	4200.3	0.01
29.3	0.9	4260.3	0.01
30.3	0.9	4320.3	0.

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.812

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	9.578E-5	cm/sec
y0	0.9142	ft

T = K*b = 0.02143 cm²/sec