Health Consultation

PUBLIC COMMENT VERSION

Analysis of Environmental Contaminants in Air and Soil

L'ANSE WARDEN ELECTRIC COMPANY (LWEC)

L'ANSE, BARAGA COUNTY, MICHIGAN

DECEMBER 6, 2017

COMMENT PERIOD ENDS: JANUARY 22, 2018

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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L' ANSE WARDEN ELECTRIC COMPANY (LWEC)

L'ANSE, BARAGA COUNTY, MICHIGAN

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Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
BaP	benzo(a)pyrene
BaP TE	benzo(a)pyrene toxic equivalent
BLL	blood lead level
CDC	Centers for Disease Control and Prevention
CDD	chlorinated dibenzo-p-dioxins
CDF	chlorinated dibenzofurans
Cl_2	chlorine
CREG	Cancer Risk Evaluation Guide
CRL	EPA Central Regional Laboratory
CSF	cancer slope factor
CTE	central tendency exposure
DV	design value
DHHS	Department of Health and Human Services
EJSCREEN	Environmental Justice Screen
EMEG	Environmental Media Evaluation Guide
EPA	U.S. Environmental Protection Agency
HCl	hydrochloric acid
HCV	health comparison value
HQ	hazard quotient
IARC	International Agency for Research on Cancer
KBIC	Keweenaw Bay Indian Community
LOAEL	lowest observed adverse effect level
LWEC	L'Anse Warden Electric Company
µg/day	micrograms per day
$\mu g/m^3$	micrograms per cubic meter
mg/kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
MAER	M.A. Energy Resources, LLC
MDEQ	Michigan Department of Environmental Quality
MRL	minimal risk level
NAAQS	National Ambient Air Quality Standard
OCDD	octachlorodibnzo-p-dioxin
PAH	polycyclic aromatic hydrocarbon
PCP	pentachlorophenol
PEF	Potency Equivalency Factor
PM	particulate matter
PM_{10}	particulate matter smaller than 10 microns
$PM_{2.5}$	particulate matter smaller than 2.5 microns
ppb	parts per billion
ppm	parts per million

ppt	parts per trillion
RfD	reference dose
RME	reasonable maximum exposure
RMEG	Reference Dose Media Evaluation Guides
RML	Removal Management Level
RSL	Regional Screening Level
SVOC	semi-volatile organic compound
TEF	toxic equivalence factor
TEQ	toxic equivalent
VOC	volatile organic compound

1. EXECUTIVE SUMMARY

Introduction

The Agency for Toxic Substances and Disease Registry's (ATSDR's) purpose is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent people from coming into contact with harmful toxic substances.

In May 2016, the United States Environmental Protection Agency (EPA) Region 5 Air and Radiation Division requested that ATSDR evaluate air modeling results and soil sampling data collected near the L'Anse Warden Electric Company (LWEC) in L'Anse, Baraga County, Michigan. The potentially exposed population is located in nearby residential properties, the commercial center, public schools, medical facilities, and the Keweenaw Bay Indian Community (KBIC) L'Anse Reservation.

EPA provided ATSDR with air modeling results in February 2017. EPA performed air dispersion modeling using stack testing results provided by LWEC in 2016. LWEC tested its emissions for particulate matter (PM), hydrochloric acid (HCl), chlorine, dioxins, volatile organic compounds (VOCs), cresol isomers, and several metals. EPA also provided ATSDR with the results of surface soil samples collected in November 2016 that were analyzed for metals, dioxins, and semi-volatile organic compounds (SVOCs), including the pesticide pentachlorophenol (PCP) and polycyclic aromatic hydrocarbons (PAHs). Based on ATSDR's recommendation, EPA collected additional soil samples for dioxin testing in August 2017.

The purpose of this public health consultation is to evaluate the public health significance of exposures to contaminants in ambient air and surface soil in this community. ATSDR's review is limited to 2016 conditions, after LWEC had removed PCP-contaminated material from its fuel stream and had better control of its HCl emissions. ATSDR cannot evaluate people's prior health risk from PCP and HCl exposures, nor can we evaluate the effects of ground-level PM emissions that were not fully characterized and have since been reduced.

Conclusions

Following its review of the L'Anse surface soil data and air dispersion modeling, based on 2016 operating conditions at LWEC, ATSDR reached two health-based conclusions.

Conclusion 1

Contact with dioxins, metals, the pesticide pentachlorophenol (PCP), and polycyclic aromatic hydrocarbons (PAHs) in soil in L'Anse is not expected to harm people's health.

Basis for Conclusion 1

- ATSDR reviewed soil samples collected at 16 private residences and public facilities in L'Anse and 4 background sites in Zeba, a community 4 miles north of L'Anse. ATSDR evaluated the soil concentrations for dioxins and metals, specifically arsenic, barium, chromium, cobalt, copper, manganese, nickel, vanadium, and zinc. Dioxins exceeded ATSDR's health comparison value at one residence about 700 meters southeast of LWEC. The calculated toxic equivalent (TEQ) for dioxin and dioxin-like compounds was 140 parts per trillion. The origin of the dioxin-like

compounds at this residence is not known. Metals concentrations at all sampled properties were below their respective cancer and non-cancer health comparison levels.

- Human and animal studies have shown links between dioxin exposure and non-cancer developmental effects. The amount of dioxin at the property of interest are below the levels that are associated with health effects in research studies, therefore harmful health effects are not expected. After reviewing the results for the initial round of sampling, ATSDR recommended additional soil testing to learn whether higher dioxin levels may exist on the property or at nearby homes in southern L'Anse. Follow-up testing confirmed that dioxins were present at levels similar to those previously reported at this property and not of health concern. Previously untested homes in the area have dioxin levels below health comparison values and will not cause harmful health effects.

- ATSDR evaluated the initial 20 soil samples for cancer-causing metals, the pesticide pentachlorophenol (PCP), dioxin and dioxin-like compounds, and polycyclic aromatic hydrocarbons (PAHs). Cancer-causing metals, arsenic and chromium, as well as PCP were found at concentrations well below their respective cancer risk screening levels and are not likely to cause health effects.

- PAHs and dioxins levels in soil warranted a more detailed cancer risk assessment. ATSDR determined that, at the home with the highest levels of dioxin, the estimated cancer risk from soil exposure was approximately 4 cases per 100,000 people. The highest estimated cancer risk in the area near LWEC was approximately 2 cases per 100,000 people. This is a low risk for increased cancer in the L'Anse community.

Conclusion 2

ATSDR concludes that breathing the estimated levels of air contaminants emitted by LWEC is not expected to harm people's health. This conclusion is based on 2016 conditions when EPA received emissions data from LWEC. ATSDR cannot characterize potential health effects in the past when certain contaminants were emitted in larger amounts.

Basis for Conclusion 2

- ATSDR reviewed concentrations of air pollutants as estimated by EPA using computer modeling. All of the modeled air contaminant levels were well below their regulatory standards and health comparison values and are unlikely to cause health effects. These findings represent 2016 conditions and cannot address people's previous exposures to PCP, a pesticide used to treat fuel materials that LWEC no longer uses. ATSDR also cannot characterize the potential health effects of hydrochloric acid (HCl) which are known to have been higher in the past.

- EPA provided maximum predicted pollutant levels for the L'Anse area for particulate matter (PM), HCl, dioxins and dioxin-like compounds, and metals: lead, arsenic, manganese, and nickel. PM less than 2.5 microns in diameter ($PM_{2.5}$), PM less than 10 microns (PM_{10}), and lead were

compared against their respective National Ambient Air Quality Standards (NAAQS) established by EPA and World Health Organization's Air Quality Guidelines. HCl, dioxin, arsenic, manganese, and nickel were screened against ATSDR's HCVs.

- EPA modeling did not characterize ground-level (fugitive) PM emissions from LWEC operations, only stack emissions from the boiler. Since 2016, LWEC has implemented requirements by Michigan Department of Environmental Quality (MDEQ) to limit air contaminant emissions, most notably HCl and PM. MDEQ and EPA have not received citizen complaints about dust emissions since these changes were made. ATSDR cannot characterize possible health effects of past exposures to PM and HCl.

Limitations and Uncertainties

ATSDR faced several limitations and uncertainties in the effort to characterize worst-case community exposures to pollutants from LWEC.

- Soil sampling was conducted in areas where EPA predicted the greatest potential exposures to contaminants from LWEC based on air dispersion modeling. Local meteorological data were not available, thus there are significant uncertainties in EPA's modeling predictions.

- EPA collected limited surface soil samples in the areas deemed to be most impacted by LWEC. Not all potentially affected properties were tested. Occupants were not interviewed to identify areas of greatest potential soil exposure based on their activities.

- EPA modeled air emissions based on stack testing conducted by LWEC. EPA modeling likely underestimated the local impacts of emissions from LWEC because only the boiler stack emissions were included. Fugitive dust from fuel storage, processing, and transport were not estimated. These fugitive emissions have been reduced due to enforcement actions taken by MDEQ.

- EPA could not characterize potential exposures when LWEC violated its air permit, as it has in the past. Stack testing represents emissions during optimal operating conditions. The resulting air modeling cannot estimate air pollutant concentrations when emissions controls are not optimized.

- The stack test was performed after LWEC had removed PCP from its fuel stream. Other pollutants were tested but the results were below detection limits: chlorine, cresol isomers, and volatile organic compounds (VOCs). ATSDR cannot estimate past exposures to PCP and current exposures to chlorine, cresol isomers, and VOCs.

Recommendations

ATSDR recommends that MDEQ and EPA continue monitoring contaminant emissions at LWEC. Regulators should also confirm that requirements to limit fugitive dust emissions are implemented and

maintained. MDEQ and EPA should respond appropriately if any violations causing community exposures to air pollutants occur.

Next Steps

In order to achieve the above recommendation, ATSDR will check with MDEQ and EPA on a quarterly basis regarding LWEC's compliance with requirements for HCl stack testing and implementation of the fugitive emissions plan.

For More Information

Call ATSDR at 1-800-CDC-INFO and ask for information on the L'Anse Warden Electric Company site.

2. BACKGROUND AND STATEMENT OF ISSUES

In May 2016, ATSDR received a letter from the U.S. Environmental Protection Agency (EPA) Region 5 Air and Radiation Division requesting assistance in evaluating the potential health impacts of the L'Anse Warden Electric Company's (LWEC) operations on the adjacent community. Specifically, EPA asked ATSDR to review soil sampling results and the estimated ambient air pollutant levels that were based on dispersion modeling. The air modeling was performed by EPA using stack air emissions testing results that EPA required LWEC to conduct [EPA 2016c; ATSDR 2016e]. The limitations of using air modeling to estimate contaminant exposures through breathing are discussed in Section 7.1.

LWEC is a 20 megawatt power plant that first began operation in 1959. See Figure 1. The plant was permitted to burn fossil fuels – coal, oil, and natural gas. Beginning in 1993 the plant was put into "cold stand-by mode" and operated only during peak periods using natural gas. In 2007 LWEC applied for approval to convert to biomass fuel. LWEC was permitted by the Michigan Department of Environmental Quality (MDEQ) to burn ground railroad ties treated with pentachlorophenol (PCP) and creosote, chipped wood, and tires. LWEC also accepted a mixture of paper sludge and residual ash from a local paper mill. Currently, M.A. Energy Resources, LLC (MAER) operates a Fuel Aggregation Facility adjacent to LWEC where materials are stored and processed. MAER operates the storage site on property leased from CertainTeed, the ceiling tile plant directly west of LWEC. LWEC provides steam and electricity to CertainTeed [LWEC 2007, 2016a].

Since LWEC converted to biomass, residents reported odors and fugitive dust to MDEQ and EPA. They also expressed concerns about potential health risks and regulatory compliance issues at LWEC. These issues are discussed in more detail in Section 8.

MDEQ and EPA conducted several onsite inspections at LWEC in 2015 and 2016 [EPA 2017d]. EPA issued LWEC a Clean Air Act Section 114 Information Request in November 2015 requesting documentation of internal audits, compliance certifications, and various forms of emissions characterization [EPA 2015]. MDEQ issued a violation notice to LWEC in December 2015 because a routine emissions test showed that the company exceeded the allowable limit for hydrochloric acid (HCl) [MDEQ 2015]. MDEQ issued another violation notice in February 2016 for LWEC allowing fugitive dust to escape their fuel conveyance equipment [MDEQ 2016b]. EPA issued two additional 114 Requests in February and April of 2016 requiring installation of fenceline air monitors and completion of stack testing, respectively [EPA 2016f, g]. In April 2016 LWEC submitted an application to MDEQ to remove PCP-treated fuel from their operating permit. [MDEQ 2016a]

MDEQ and LWEC agreed to a Consent Order in October 2016 to resolve outstanding air quality violations. LWEC committed to limit emissions of HCl and hazardous air pollutants, to control fugitive dust emissions and to increase frequency of HCl stack tests. LWEC also agreed to install permanent enclosures around fuel conveyors and the fuel receiving hopper to minimize fugitive emissions and to cease operation of their pneumatic conveyor system [MDEQ 2016a].

Figure 1. Location of L'Anse Warden Electric Company (LWEC) and Related Facilities

EPA committed to LWEC in November 2016 that the request to install air monitors would be removed once the MDEQ-required fugitive dust controls are implemented. LWEC provided an updated Fugitive Emissions Control Plan dated April 2017. In May 2017, LWEC sent EPA documentation that the dust-containing enclosures are installed and operational. EPA sent LWEC a letter on June 22, 2017 indicating that, based on the supplied information and the fact that EPA has not received recent PM complaints from the community, the monitoring requirement has been removed [EPA 2017c; LWEC 2017b]. The latest stack test in March 2017 demonstrated that LWEC was in compliance with permitted limits [LWEC 2017a].

LWEC applied to MDEQ in March 2017 for permission to alter their fuel mix to include engineered fuel pellets comprised of paper fibers and clean plastics. LWEC will install a dry sorbent injection system to remove HCl and sulfur dioxide emissions. On August 18, 2017, MDEQ approved LWEC's permit allowing them to conduct a trial burn [MDEQ 2017c; LWEC 2017c].

LWEC is situated at the west end of L'Anse, a village of 2,011 residents [Census 2012] in Michigan's Upper Peninsula. L'Anse is on the banks of Keweenaw Bay, an inlet on Lake Superior. The northern end of L'Anse overlaps with the KBIC L'Anse Reservation. The Tribal land totals 92 square miles and includes 3,703 residents [Census 2010].

EPA's Environmental Justice Screen (EJSCREEN) tool estimates a population of 2,471 in L'Anse and the surrounding suburban area (See polygon outlined in Appendix A). Among the 95% of residents who identified their race, 83% are White, 10% American Indian, 5% Two or More Races, and 1% Black. The L'Anse area is in the 88th percentile for "Population over 64 years of age" both in the State of Michigan and nationally, indicating that this area has more seniors than most other communities. L'Anse has relatively low percentiles for other demographic indicators such as "Low Income Population" (56th percentile in the US) and "Population with Less Than High School Education" (57th percentile in the US). [EPA 2016b]

3. EXPOSURE PATHWAY EVALUATION

To determine whether people 1) are exposed to contaminants now or 2) were exposed in the past, ATSDR examines the path between a contaminant and a person or group of people who could be exposed. Completed exposure pathways have five required elements. ATSDR evaluates a pathway to determine whether all five factors are present. Each of these five factors or elements must be present for a person to be exposed to a contaminant:

1. A contamination source,
2. Transport through an environmental medium,
3. An exposure point,
4. A route to human exposure, and
5. People who could be exposed.

For the LWEC site, ATSDR considers exposures to outdoor air and surface soil contaminants to be completed exposure pathways. Exposure to contaminants in surface water, drinking water, fish, and homegrown garden produce are potential exposure pathways.

Nearby residents and other people who spend time adjacent to and downwind of LWEC may inhale contaminants. Chemicals may be in a gaseous form or associated with solid particles emitted from the facility. Some air pollutants, referred to as fugitive emissions, may be generated by ground-level activities at LWEC. Other chemicals may be emitted as stack emissions from the LWEC boiler itself. Fugitive emissions will have the highest concentration near the point of release and then lower levels with increasing distance from the plant as a result of deposition or of mixing with outdoor air. Stack emissions are released at a point above ground level, for this reason they may loft over the LWEC property line and potentially have the highest concentrations some distance downwind of the plant. Stack emissions will also be diluted by outdoor air with distance from the area of maximum impact.

Off-site surface soil near the LWEC site in L'Anse could be impacted by aerial deposition of wind-blown particles emitted from the LWEC facility that have chemical contaminants. Contaminants may also migrate off- site through surface water runoff and flooding.

Exposure to contaminants in surface soil occurs through skin contact and by inadvertently swallowing dirt. Preschool age children tend to swallow more soil than other age groups because they have more

contact with soil through their play activities and because they exhibit mouthing of objects and hand-to-mouth behavior. It is important to note that some children eat non-food items like soil. Children age 1-3 are at increased risk for this type of exposure. The amount of vegetative or other soil cover in an area, the amount of time spent outdoors, and weather conditions also influence people's exposure to soil.

Given the relatively low levels of contaminants in soil and air, ATSDR does not expect that water, fish, and produce are significant routes of exposure to LWEC contaminants in the community. Surface water and drinking water could potentially be contaminated by aerial deposition, flooding, and wastewater effluent released from LWEC. The L'Anse population uses Keweenaw Bay as its source of municipal drinking water as well as for recreational purposes. Fish that live in Keweenaw Bay may absorb contaminants in their tissues. People may, in turn, ingest trace levels of contaminants when they eat fish caught in the Bay. Homegrown garden produce could be impacted by aerial deposition of particles, root uptake, and through direct soil contact. ATDSR does not have data on contaminant levels in these other media.

4. ENVIRONMENTAL DATA AND HEALTH RISK SCREENING

4.1 Air Quality Modeling and Inhalation Risk Screening

EPA conducted air dispersion modeling based on July 2016 stack test results provided by LWEC. The air modeling had two purposes: to identify areas of maximum impact for developing a soil sampling plan and to estimate ambient air pollutant concentrations for use in ATSDR's Health Consultation. EPA used the AERMOD model with meteorological data from the nearby Munising Lakeshore station and LWEC's stack test results for particulate matter (PM), HCl, chlorine, dioxins, volatile organic compounds (VOCs), cresol isomers, and several metals: lead, arsenic, manganese, and nickel. EPA used the highest of four test runs submitted by LWEC. EPA calculated peak ambient air contaminant concentrations with variable averaging times, as requested by ATSDR, to correspond with the exposure periods of their respective health comparison values and EPA's National Ambient Air Quality Standards (NAAQS). Stack test results and EPA's detailed protocol are provided in Appendix B.

Modeling results indicate that LWEC's stack emissions are unlikely to cause a NAAQS exceedance for $PM_{2.5}$ (particles smaller than 2.5 micrometers in aerodynamic diameter), PM_{10} (particles smaller than 10 micrometers aerodynamic diameter), or lead. The $PM_{2.5}$ NAAQS has two forms, the 24-hour and annual standard; the lead NAAQS is a rolling 3-month average [EPA 2017b]. The modeled PM concentrations are also below the World Health Organization's (WHO) Air Quality Guidelines (AQGs) [WHO 2000]. The NAAQS and AQGs are presented below in Table 1 together with the appropriate time-averaged maximum modeled concentration, called the design value (DV), for NAAQS regulatory comparison. Background PM and non-NAAQS pollutant monitoring data are not collected in L'Anse by any regulatory agencies. The ambient $PM_{2.5}$ levels in L'Anse are likely to be similar to those reported in other similar communities around Lake Superior. According to data submitted by regulatory agencies to EPA's Air Quality System database, the 2013-15 $PM_{2.5}$ DVs were 6.1 ug/m^3 in Sault Ste. Marie, MI; 5.9 ug/m^3 in Duluth, MN; and 5.1 ug/m^3 in Odanah, WI [EPA 2017a]. Assuming that the background $PM_{2.5}$ in L'Anse is in this range of 5-7 ug/m^3, the addition of the $PM_{2.5}$ concentration modeled by EPA will not cause an exceedance of the annual NAAQS. Similarly, the background concentration for non-source oriented lead

monitors in suburban Detroit (Allen Park, MI) and rural Minnesota (e.g. Virginia or City of Lakes) does not exceed a DV of 0.01 ug/m^3[EPA 2017b]. The modeled lead concentrations in L'Anse would also not cause a NAAQS violation.

The EPA modeled concentrations of air toxics are also orders of magnitude lower than their corresponding health comparison values (HCVs). Arsenic and dioxins are carcinogens thus the maximum long-term modeled exposure is compared against ATSDR's Cancer Risk Evaluation Guide (CREG) levels on Table 1 [ATSDR 2017a]. The CREG is equivalent to an exposure concentration associated with a lifetime inhalation cancer risk one additional cancer case among a million exposed individuals. ATSDR's health comparison values are fully explained in Appendix C. Dioxin and dioxin-like compounds are considered as a mixture and their concentration is expressed in terms of toxic equivalency (TEQ) values. The use of TEQs is detailed in Section 5.2 along with L'Anse soil sampling results.

Table 1. Maximum Modeled Air Concentrations, National Ambient Air Quality Standards (NAAQS), World Health Organization (WHO) Air Quality Guidelines (AQG), and Health Comparison Values (HCVs,) ug/m^3

Pollutant	Long-term concentrations		Short-term concentrations	
	Standard or HCV	Max exposure	Standard or HCVs	Max exposure or regulatory statistic
$PM_{2.5}$	12 (Annual NAAQS); 10 (Annual WHO AQG)	0.16 (3-year average)	35 (24hr NAAQS); 25 (24hr WHO AQG)	0.86 [1]
PM_{10}	-	-	150 (24hr NAAQS); 50 (24hr WHO AQG)	1.3
Lead	-	-	0.15 (NAAQS)	4.3E-05 (3-month average)
Arsenic	2.3E-04 (CREG)[2]	3.1E-06	-	-
Manganese	0.05 (EPA RfC)[3]	6.3E-05	-	-
Nickel	0.09 (chr MRL)	2.6E-05	0.20 (int MRL)	2.7E-04 (24-hr max)
Hydrochloric acid (HCl)	20 (EPA RfC)	0.042	-	-
Dioxin Toxic Equivalency (TEQ)	7.4E-08 (EPA RSL)[4]	4.5E-11	-	-

1. The regulatory statistic for the 24-hr NAAQS is the 98th percentile 24-hr concentration averaged over 3 years
2. Cancer Risk Evaluation Guide (CREG)
3. Reference Concentration (RfC)
4. Regional Screening Level (RSL) is equivalent to 1-in-1-million excess lifetime cancer risk

Manganese, nickel, and hydrogen chloride are compared with ATSDR's chronic Minimal Risk Level (chr MRL), which is a screening tool to estimate an exposure level that is likely to be without appreciable risk of adverse non-cancer health effects over a lifetime of exposure. Additionally, nickel has an intermediate MRL for 14 to 365-day exposure, which is conservatively compared against a maximum 24-hour value.

A series of maps depicting EPA's modeling results are included in Appendix D. The predicted area with the highest $PM_{2.5}$, PM_{10}, lead, and air toxics concentrations is about 1/3-mile (1/2 kilometer) away from LWEC. The air model predicted this area of greatest impact in the vicinity of L'Anse's commercial and municipal center, along the lakefront, however the precise location is a subject of significant uncertainty as explained further in Appendix B.

4.2 Soil Sampling and Health Risk Screening

EPA initially conducted soil sampling in November 2016 to determine whether emissions from LWEC have resulted in significant contaminant deposition and potentially contributed to people's health risk in the areas downwind of the plant. EPA's sampling protocol is presented in Appendix E. EPA collected samples in the top three inches of residential yards, schools, and public properties in the areas with the highest air pollutant concentrations as predicted by modeling. Samples were collected as a composite of five smaller samples following a standard geometric pattern. EPA also collected comparison samples in the non-impacted community of Zeba, Michigan, four miles to the northeast. EPA sampled 16 locations in L'Anse and 4 in Zeba. Sampling areas are shown on Figure 2.

Figure 2. Soil Sampling Areas in L'Anse and Zeba, MI

The final air modeling that EPA provided ATSDR in 2017 used meteorology from a more appropriate airport than the one originally considered in 2016. Because the prevailing wind direction was different,

the predicted areas of maximum impact changed in the final modeling results. (This issue is fully explained in Appendix B.) Originally, EPA identified both a North plume and a South plume of emissions. They called the area directly east of LWEC "Old A"; this is where residents' odor and dust complaints were most common. Thus, the soil sample results in Appendix E are coded for N (North), S (South), A (Old A), and Z (Background Zeba).

However, the final air modeling indicated that there is a prevailing north plume and emissions are less likely to be carried south. To reflect this updated understanding of local meteorology, ATSDR re-categorized the sampling groups as follows: 6 samples "East" (E1 through E6) in the area directly east and southeast of LWEC; 3 samples "North" (N1-N3) in the area of predicted highest PM and chemical concentrations in downtown L'Anse; 7 in the remainder of "L'Anse" (L1-L7) to the north and south in areas of lesser predicted impacts; and 4 background sites in "Zeba" (Z1-Z4). A site key with both sets of sample names is provided on Table 1F in Appendix F.

4.2.1 Metals

Samples were analyzed for metals and semi-volatile organic compounds (SVOCs) at the EPA-R5 Chicago Regional Laboratory (CRL). EPA reported a standard list of metals via EPA-CRL's Standard Operating Procedure for ICP-MS [EPA 2016d]. Fourteen of the reported metals have health comparison values (HCVs) based on soil exposure. All of the metals concentrations were below the levels potentially associated with long-term health effects. Sample results and HCVs are presented on Table 2 [ATSDR 2017c; EPA 2016e]. ATSDR's HCVs are fully explained in Appendix C. The following metals were either below detection limits in most samples or consistently below HCVs, and are not presented on the table: antimony, beryllium, cadmium, molybdenum, selenium, and silver. Complete results are presented in Appendix F.

ATSDR does not have an HCV for lead. The CDC states that "No safe blood lead level in children has been identified. Even low levels of lead in blood have been shown to affect IQ, ability to pay attention, and academic achievement. [CDC 2012]". Although soil lead concentrations in L'Anse are relatively low, it should be noted that lead in soil may add to environmental exposures from other sources, including lead-based paint and drinking water.

4.2.2 Semi-volatile Organic Compounds

EPA-CRL reported a standard list of SVOCs via gas chromatography/mass spectrometry and added a modification to include PCP and cresol isomers (2-, 3-, and 4-methylphenol) [EPA 2016a]. Cresols isomers were below detection limits in all soil samples. The majority of other compounds reported via this analysis are referred to as polycyclic aromatic hydrocarbons (PAHs). PCP and PAHs are carcinogenic, and benzo(a)pyrene (BaP) is considered to be one of the most potent PAHs. ATSDR assesses the cancer risk of five other PAHs through the use of Potency Equivalency Factors (PEFs) that are relative to BaP. BaP is the index compound, thus its BaP-PEF is 1.0, and other PAHs have a PEF ranging from 0.01 to 0.1. The BaP Toxicity Equivalence (BaP TE) for each soil sample is calculated by multiplying the concentration of each respective PAH by its PEF and then summing these numbers by site. These PAHs are listed with their PEFs on Table 1G in Appendix G.

Table 2. Metals Concentrations in Soil and Health Comparison Values (HCVs), parts per million (ppm)

Site/ Metal	Arsenic	Barium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Vanadium	Zinc
HCV	17 (EMEG)[1]	11,000 (EMEG)	51 (EMEG)[2]	570 (int EMEG)	570 (int EMEG)	(not available)	2,900 (RMEG)[3]	1,100 (RMEG)	570 (int EMEG)	17,000 (EMEG)
E1	2.7	57	12	3.8	47	70	210	9.4	18	110
E2	4.7	29	6.8	2.2	9.3	8.6	190	5.9	13	23
E3	2.5	53	14	3.9	46	65	250	11	18	90
E4	2.3	56	13	3.6	30	68	190	9.3	18	81
E5	2.5	26	10	3.0	25	11	150	9.1	17	28
E6	2.3	41	9.8	3.2	18	14	130	9.4	18	51
N1	2.8	55	14	7.4	29	33	150	8.2	17	61
N2	2.0	54	11	3.2	35	21	160	9.0	18	41
N3	5.0	210	11	3.2	29	26	480	9.4	25	51
L1	3.3	43	11	4.3	15	6.8	530	10	21	38
L2	2.0	18	6.5	2.0	11	7.1	120	6.5	12	28
L3	1.8	29	7.8	2.5	13	7.3	140	7.1	15	24
L4	1.5	31	4.6	1.0	6.3	8.2	98	2.9	11	16
L5	2.4	96	9.6	2.5	46	11	150	6.7	16	67
L6	2.5	39	12	3.8	8.1	7.8	290	9.4	21	28
L7	2.0	32	7.9	1.8	9.2	7.0	140	7.5	14	31
Z1	2.2	32	7.8	2.7	17	12	160	7.7	14	32
Z2	2.3	33	8.8	3.1	7.4	5.3	130	7.9	18	26
Z3	1.7	28	6.8	2.3	6.4	3.8	120	5.6	15	18
Z4	2.2	40	10	3.1	13	10	180	8.9	21	37

1. Environmental Media Evaluation Guide (EMEG)
2. The chromium EMEG is specific to hexavalent chromium; it is conservatively applied (health protective) here to total chromium compounds.
3. Reference Dose Media Evaluation Guide (RMEG)

Soil concentrations and HCVs for BaP-TE and PCP are shown on Table 3 [ATSDR 2017c; EPA 2016e]. PAH and PCP concentrations were highest in the East and North areas and lower in other portions of L'Anse and Zeba. Complete soil results are presented on Table 2F in Appendix F. A detailed health evaluation is presented in Section 6.

The soil sampling groups have different concentrations of total carcinogenic PAHs; the averages of East and North areas are 1,838 and 1,636 ppb, respectively (excluding site E1 which is 6,420 ppb); the remaining L'Anse samples are much lower with an average 205 ppb and the background site (Zeba) averages 113 ppb. The chemical fingerprints for the L'Anse PAH soil data were compared to look for potential patterns (method details and findings are presented in Appendix G). The PAH chemical profiles are essentially the same, suggesting that PAHs in the L'Anse and Zeba communities are derived from the same source or group of sources.

PAHs are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. PAHs in urban soils can result from accumulation over many decades from various non-industrial activities including wood-burning stoves, home heating boilers, on-road vehicle emissions, diesel train emissions, residential trash burning, road and roofing tar, driveway

sealers, automotive oil, and others. Industrial sources that emit PAHs include industrial boilers, electric power plants, coke ovens, and petroleum refineries. [ATSDR 1995].

According to studies in other communities, BaP background concentrations in soil range from 4.6 to 900 ppb [ATSDR 1995]. The BaP levels observed in L'Anse (see Table 2F in Appendix F) are largely within this range, with the exception of Site E1 (1100 ppb), and do not indicate an unusual level of PAHs in soil.

Table 3. Semi-Volatile Organic Compounds (SVOCs) in Soil and Health Comparison Values (HCVs), parts per billion (ppb)

Site/ Pollutant[1]	Benzo(a)pyrene Toxic Equivalent (BaP TE)	Pentachlorophenol (PCP)
HCV	120 (CREG)[2]	940 (CREG)
E1	1507	100
E2	232	22
E3	366	15
E4	477	8
E5	366	13
E6	517	4
N1	288	7
N2	565	3
N3	235	3
L1	19	3
L2	92	4
L3	27	1
L4	58	1
L5	68	2
L6	24	1
L7	14	1
Z1	79	1
Z2	2	1
Z3	5	1
Z4	20	1

1. Soil concentrations above the HCV shaded gray.
2. Cancer Risk Evaluation Guide (CREG)

The PAH profile observed in L'Anse is typical of the chemical ratios observed in urban background soil around the United States [ARCADIS 2013; EPRI 2008]. The PAHs observed in L'Anse appear to be a typical urban mix with higher concentrations in the areas historically impacted by a greater density of residential sources (e.g. emissions from trains, trucks, and other vehicles, as well as local industrial contributions. Among these sources, the broader community is likely impacted by several decades of emissions from LWEC during the period (1959-1993) when the power plant used coal and oil for fuel.

4.2.3 Dioxins and Furans

Samples were analyzed by EPA for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) via High Resolution Gas Chromatography/High Resolution Mass Spectrometry. The laboratory reported a standard list of CDD/CDFs and the calculated toxic equivalent (TEQ). The TEQ is a weighted

measure based on the toxicity of each member of the dioxin and dioxin-like compounds category relative to the most toxic members of the category. The most toxic dioxin compounds – 2,3,7,8-TCDD and 1,2,3,7,8-PeCDD – are assigned a toxic equivalence factor (TEF) of 1.0. Other compounds have a lower toxicity, for example 1,2,3,6,7,8-HxCDD has a TEF of 0.1 and 1,2,3,4,6,7,8-HpCDD has a TEF of 0.01. The concentrations of each dioxin-like compound is multiplied by its respective TEF and the resulting TEF-adjusted concentrations are summed by site to calculate the TEQ. EPA calculates TEQs using the TEFs developed by the World Health Organization and updated in 2005 [Van de Berg 2006]. An example of TEQ calculations from this dataset is provided on Table 3F.

See Table 4 for HCVs and TEQs at each sampling location from the first round of sampling in November 2016. Details for individual CDDs and CDFs are provided on Table 4F and complete soil results are in Appendix F [ATSDR 2017c].

Table 4. Dioxin Toxic Equivalent (TEQ) in Soil and Health Comparison Values (HCVs), parts per trillion (ppt)

HCV/Site	TEQ[4]
EMEG[1]	57
RMEG[2]	40
CREG[3]	2.9
E1	23
E2	10
E3	14
E4	7.3
E5	5
E6	1.9
N1	7.2
N2	3.6
N3	3.0
L1	0.7
L2	0.83
L3	0.32
L4	**140**
L5	3.4
L6	0.48
L7	0.53
Z1	0.095
Z2	0.076
Z3	0.05
Z4	1.3

1. Environmental Media Evaluation Guide (EMEG)
2. Reference Dose Media Evaluation Guide (RMEG)
3. Cancer Risk Evaluation Guide (CREG)
4. Shaded results exceed CREG; shaded and bold results exceed CREG, RMEG, and EMEG

One sample, L4 (in bold and shaded gray), exceeds ATSDR's child chronic EMEG (57 parts per trillion, ppt) and the child chronic RMEG (40 ppt) for dioxins. There are 9 other samples (shaded), mostly in the

areas near LWEC, that exceed the ATSDR CREG for dioxin (2.9 ppt). A detailed health evaluation is presented in Section 6.

The soil samples collected in the East and North areas generally have higher TEQs than the samples collected elsewhere in L'Anse or in Zeba. The exception to this trend is sample L4, which has the highest TEQ despite being located in an area not predicted by air modeling to have the greatest impacts from LWEC. Site L4 is a private residence about 700 meters southeast of LWEC in a wooded area.

Fingerprint analysis was performed on the dioxin results to evaluate data trends and potential sources. Details are explained in Appendix G and visualized on Figure G2. The total concentration of selected CDD/CDFs decreases with distance from LWEC: the average is 7.6 ppt at the East sites, 3.4 ppt North, 1.1 in the remainder of L'Anse, and 0.8 ppt in Zeba. The chemical fingerprint in the East and North areas near LWEC are similar to each other, but different from the L'Anse and Zeba zones. Sample L4 has a uniquely different dioxin profile, suggesting that the soil contamination in this area has a different source.

ATSDR recommended that EPA collect additional soil samples at Site L4 in the areas where residents report the greatest likelihood of contact with soils. ATSDR also suggested testing adjacent properties to determine whether other yards exceed HCVs for dioxin. EPA resampled Site L4 and four other properties in the area on August 16th, 2017. Two new samples collected at Site L4 confirmed previous results: the samples had a TEQ of 204 and 82, with an average of 143 ppt. One of the other homes had a TEQ that exceeded the dioxin CREG (10.5 compared with the CREG of 2.9 ppt), similar to other properties in the East and North areas. The other samples were below HCVs. Detailed results are provided in Appendix F.

CDDs are an unintentional byproduct of industrial, municipal, and domestic incineration and combustion processes. Emissions from incinerator sources vary greatly and depend on management practices and applied technologies. Burning of many materials that may contain chlorine, such as plastics, wood treated with PCP, pesticide-treated wastes, other polychlorinated chemicals, and even bleached paper can produce CDDs. [ATSDR 1998]

A previous EPA study in Mississippi found impacts to the local community from a facility that treats wood with creosote and PCPs and also burns waste wood in an onsite boiler [Dahlgren 2007]. The facility's records confirmed air and water emissions of creosote, PCP, and dioxin-like compounds. Residential dust wipes and soil samples collected within two miles of the plant showed elevated levels of dioxins, particularly octachlorodibenzo-p-dioxin (OCDD) and 1,2,3,4,6,7,8-hepta-CDD. These two compounds are also elevated in the soil samples collected near the LWEC facility, in contrast to samples collected further away. The average OCDD concentration was 2,808 ppt at the East sites, 1,203 ppt at the North sites, 266 ppt at the remaining L'Anse sites, and 35 ppt in Zeba. Similarly, 1,2,3,4,6,7,8-HpCDD average concentrations were 357, 148, 37, and 18 ppt, respectively in the East, North, L'Anse, and Zeba areas.

Researchers in Belgium reviewed multiple historic studies that characterized dioxin emissions from wood-burning facilities [Lavric 2003]. The studies showed that CDD and CDFs can be formed in the gas phase as well as on solid particulate emissions. They reported that "combustion of natural, uncontaminated wood

leads to much lower [dioxin] emissions than of contaminated wood", i.e. material treated with PCP, creosote, and other organic compounds. They also found that good combustion conditions and use of an efficient secondary device to remove PM are important to effective control of dioxin emissions.

Similarly, an EPA study of tire-burning power plants revealed that the amount of toxic emissions depends on how well controlled the facility is [EPA 1997]. The report concluded that "potential emissions from [tire-derived fuel] are not expected to be very much different than from other conventional fossil fuels, as long as combustion occurs in a well-designed, well-operated, and well-maintained combustion device." However, poorly controlled facilities may emit some of the same pollutants as open tire fires: PM, VOCs, PAHs, CDD/CDFs, HCl, polychlorinated biphenyls, and metals. These pollutants are limited in a facility with good combustion efficiency and add-on PM controls.

4.3 Other Environmental Media

Surface water, drinking water, fish, and homegrown produce are potential pathways of exposure to LWEC contaminants. Given the low levels of soil contamination in most areas of L'Anse and the low modeled air concentrations, ATSDR does not have evidence that these media are likely to be impacted by emissions from LWEC. If additional data become available, ATSDR will update this Health Consultation to assess potential health risks from these pathways.

Chemicals emitted by LWEC may contaminate surface water through aerial deposition, flooding, and wastewater effluent. Surface water contamination may, by extension, impact drinking water and local fish. Homegrown garden produce may also be affected by aerial deposition of chemicals. ATSDR is unable to evaluate these potential exposure pathways given the limited environmental data and exclusion of key contaminants, most notably CDD/CDFs.

The residents of L'Anse use Keweenaw Bay for recreation and as their source of municipal drinking water. The 2015 Annual Drinking Water Report references a 2003 source water assessment by the State of Michigan that rated Keweenaw Bay as "highly susceptible" to various biotic and chemical contaminants. Drinking water testing conducted by L'Anse in 2014-15 indicated that there were no violations of EPA's acceptable limits for lead, copper, radioactive contaminants, several minerals (fluoride, nitrate, chlorine, and sodium), and organic byproducts of drinking water disinfection (haloacetic acids and trihalomethanes). L'Anse drinking water is not tested for VOCs, PAHs, CDD/CDFs, or pesticides [L'Anse 2016]. PAHs and CDD/CDFs are relatively insoluble in water and, if present, are more likely to be associated with sediments in the Bay and not the water extracted for drinking.

At MDEQ's request, LWEC developed a Work Plan for a Short-Term Storm Water Characterization Study in June 2016. LWEC characterized plant operations that could contribute to stormwater runoff, listing specific activities that could cause these pollutants to leave their property: particulates, creosote, PCP, hydraulic fluid, diesel fuel, and lubricants. A single outfall sample was collected on June 21, 2016 at the Fuel Aggregation Facility. The sample was tested for oil and grease, total suspended particulates, PCP, and phenol derivatives. All of these chemicals were below detection limits in the sampled water. The sample was not analyzed for VOCs or CDD/CDFs [LWEC 2016b, c].

L'Anse residents may also be exposed to LWEC emissions through their diet. People may be exposed to contaminants when they eat fish caught in the Bay or when they consume homegrown produce contaminated by aerial deposition of LWEC contaminants. ATSDR is not aware of any locally collected fish or produce that have been analyzed for pollutants emitted from LWEC.

5. ENVIRONMENTAL HEALTH EVALUATION

5.1 Non-cancer Health Effects

As detailed in Section 5.2, ATSDR performed a risk screening on the first round of soil samples from November 2016 with health comparison values. The results showed that dioxin and dioxin-like compounds in soil may potentially cause non-cancer health effects in one area of L'Anse and required further evaluation to determine if harmful effects are possible. The soil concentrations of metals and PAHs were below available non-cancer health screening levels and are not likely to cause health effects. ATSDR does not have an HCV for lead in soil. Reported lead levels in L'Anse soil were consistent with concentrations in other rural and suburban areas of the United States: naturally occurring soil background levels range from <10-30 ppm and small towns were reported as averaging <50-58 ppm [ATSDR 2007]. However, because there is no known safe blood lead level, children and pregnant women should avoid contact with all sources of lead. Screening for non-cancer health risks due to inhalation exposure (Section 5.1) did not reveal potential health concerns.

ATSDR evaluated exposures to dioxins in soil at one property, located about 700 meters southeast of LWEC, with a dioxin TEQ of 140 ppt. This concentration exceeds the health screening level for chronic non-cancer health effects in children (EMEG 57 ppt), but not other screening criteria.

ATSDR's chronic MRL of 0.001 ng/kg/day is based on developmental effects in rhesus monkeys with 2,3,7,8-TCDD exposure. A lowest observed adverse effect level (LOAEL) of 0.12 ng/kg-day corresponded to alterations in peer-group behavior and cognitive deficits in the offspring of monkeys exposed in the diet for 7 months prior to mating and during mating and lactation. Higher exposure doses were associated with lower offspring survival. ATSDR used an uncertainty factor of 90 to derive the chronic MRL for 2,3,7,8-TCDD: 3 for the use of a minimal LOAEL (applied when a no observed adverse effect level, or NOAEL, is not available), 3 for extrapolation from animals to humans, and 10 for human variability [ATSDR 1998].

The EPA RfD for 2,3,7,8-TCDD is based on two different epidemiologic studies. The first study concluded that men exposed to TCDD as boys (age 1-9) had decreased sperm count and motility. The second study found that TCDD exposure in utero was associated with increased levels of thyroid stimulating hormone in newborns, suggesting a possible dysregulation of thyroid hormone metabolism. Thyroid hormone disruption during pregnancy and early childhood can lead to neurological deficiencies, most notably effects on attention and memory. The RfD was derived from a LOAEL of 0.02 ng/kg-day with an uncertainty factor of 30: 10 for use of a LOAEL, and 3 for inter-individual variability.

People may be exposed to CDDs and CDFs through incidentally ingesting and direct skin contact with contaminated soil. For the purpose of this Health Consultation, ATSDR derived exposure doses specific to the L4 property for various age categories. Details are provided in Appendix H.

Non-cancer health risks are quantified by comparing the exposure dose to the health guideline, in this case ATSDR's chronic MRL, using a ratio known as the hazard quotient (HQ). Exposures at or below the reference level (HQ≤1) are not likely to be associated with adverse health effects. Exposure doses above the reference level (HQ>1) require further toxicological evaluation to determine the risk for health effects.

ATSDR estimated age-specific exposures and health risks associated with dioxins in soil at the L4 property. Doses for children aged 1-2 indicate that they have the greatest exposures. The resulting HQs for combined ingestion and dermal exposures for this age group are 3.8 at the high end of exposures (RME) and 2.0 for a typical level of exposure (CTE). Complete results are presented in Appendix G on Table 3H. The highest RME was 0.0026 ng/kg-day for the 1-2-year-old exposure group. Despite exceeding the reference level, this exposure dose is several-fold lower than the doses associated with health effects, i.e. the LOAELs that are the basis of the MRL and RfD. The studies referenced to develop the MRL and RfD did not have a reported NOAEL. It should also be noted that ATSDR considers the above-discussed development health impacts to be "less serious" LOAEL effects in the sense that they are not expected to cause significant dysfunction or death.

Upon review of the dioxin concentrations at the L4 property in November 2016, ATSDR recommended that EPA collect more soil samples in southern L'Anse to evaluate potential health effects due to dioxin exposure. At that time, the soil sampling was limited in scope – 16 addresses in a town of about 2,000 people. Samples did not reflect zones of greatest potential exposure, such as children's play areas and gardens. The properties adjacent to Site L4 were not initially sampled, thus it was not known whether this residence was unique in exceeding dioxin HCVs or whether nearby homes had similar or higher concentrations. These and other areas of uncertainty are further discussed in Section 7. ATSDR reviewed the additional soil samples that EPA collected in August 2016 as part of this public health assessment and confirmed that there is not a developmental (non-cancer) health hazard from dioxins in soil at Site L4. Cancer risks are discussion in Section 5.2. The results also showed that adjacent properties had dioxin levels below HCVs and are unlikely to cause health effects.

5.2 Cancer Risk Assessment

As explained in Section 5.2, carcinogenic PAHs and dioxins in soil were above their respective risk screening levels and warranted a more detailed evaluation. In contrast, soil concentrations of PCP were below screening levels. Modeled estimates of cancer-causing pollutants in air – arsenic and dioxins – were also below screening levels, as described in Section 5.1.

The first step in estimating cancer risks associated with soil exposures is to calculate ingestion and dermal contact exposures using the procedures described in Section 6.1 and Appendix H. Next ATSDR derived cancer risk estimates using the oral cancer slope factor (CSF) for each separate pollutant, which is multiplied by the age-specific exposure dose and duration of exposure. As shown on Figure 4H, cancer

risk estimates are expressed as a probability. ATSDR calculates the proportion of a population that may be affected by a carcinogen during a lifetime of exposure (24 hours/day, 365 days/year, for life). For example, an estimated cancer risk of 2 per million (2.0E-06 in scientific notation) represents potentially two excess cancer cases in a population of one million over a lifetime of continuous exposure.

ATSDR calculated cancer risk estimates using the CSF of 1.0 (mg/kg/day)-1 for BaP TE and 1.3E+05 (mg/kg/day)-1 for dioxin TEQ [ATSDR 2017b]. For BaP, ATSDR followed EPA's proposed risk calculations for chemicals that act with a mutagenic mode of action [EPA 2005]. ATSDR calculated separate cancer risks for BaP TE and dioxin TEQ, both for ingestion and dermal contact.

Similar to non-cancer risks, ATSDR evaluated age-specific exposure doses and corresponding health risks. Cancer risks were summed across pollutants, exposure route (ingestion plus dermal), and age groups (children up to age 21 and adults age 21-33) to produce a total soil cancer risk. Detailed results are provided in Appendix H for the eleven sample locations that exceeded screening levels for BaP TE and/or dioxin TEQ.

The highest predicted cancer risk is 3.9E-05, or approximately 4 excess cases per 100,000 people, which is considered to be a low increased risk of cancer, at the L4 site due to dioxin exposure. The highest cancer risk in the East zone is 2.3E-05 (approximately 2 cases per 100,000) at Site E1, due to a combination of PAHs and dioxins. Risks in the North area are somewhat lower: the highest is 7.2E-06 (7 cases per million) at Site N2 mainly because of risks from PAHs exposure.

6. LIMITATIONS AND UNCERTAINTIES

6.1 Air Dispersion Modeling

The dispersion modeling only included estimates of air pollutants exiting the LWEC boiler stack. It did not account for unquantified fugitive emissions from the biomass material conveyors (i.e., dust from non-combusted railroad ties and other fuel). The modeling could not estimate PM from the Fuel Aggregation Facility located about ¾-mile southwest of the boiler; this is an operation where creosote-treated railroad ties are ground up in open air, causing concern among some residents [KBIC 2016]. Also, the stack testing represents optimal operating conditions at LWEC and cannot account for air emissions when the fuel mix is different or when controls are not properly functioning. Thus, EPA's modeling results are likely underestimating particulate matter and associated chemical contaminants leaving the LWEC plant. ATSDR cannot account for what the air contaminant concentrations were in the past, most notably the periods when MDEQ cited LWEC for HCl and PM violations. Finally, the modeling did not factor in existing background concentrations of PM and other pollutants in L'Anse's ambient air.

The stack test resulted in nondetects for chlorine (Cl_2), VOCs, and cresol isomers. This suggests that, at the time of the stack test, these compounds were effectively incinerated by the LWEC boiler, if they were indeed present in the fuel material. The stack test was conducted after the facility stopped accepting PCP-treated wood products. Thus, the EPA modeling cannot answer the question of whether PCP or its byproducts were ever present in ambient air in L'Anse due to LWEC emissions.

Further, as noted in EPA's modeling report (Appendix B), local meteorological data were not available. The modelers selected wind data from the town of Munising, which is about 100 miles east; this community's placement on the lakeshore is comparable to L'Anse and expected to result in a similar north-south wind pattern. EPA used their best judgement in selecting meteorological data for modeling purposes. However, this remains an important area of uncertainty which results in diminished confidence regarding the geographic location(s) where air pollutants from LWEC have the highest concentrations.

6.2 Soil Sampling

EPA conducted limited soil sampling in the areas potentially impacted by LWEC, including 16 properties in a study area with over 2,000 residents. EPA made an effort to collect soil samples in the areas predicted to have the greatest impacts from LWEC based on air dispersion modeling. As noted in the previous section, the areas of maximum impact from air pollutants is an area of significant uncertainty. It is not known whether the highest off-site contamination levels were captured in this study.

EPA collected soil samples following a standard 5-point pattern and did not have information about residents' land use patterns and areas of greatest potential exposure, for example a garden. For follow-up testing in southern L'Anse, ATSDR recommended that this information be considered when choosing sample locations. ATSDR also does not know whether young children or pregnant women live at the sampled properties. ATSDR may be over-estimating potential health risks if these sensitive populations are not present at the tested homes.

7. COMMUNITY CONCERNS

Since LWEC converted to biomass starting in 2007, residents reported odors and fugitive dust to MDEQ and EPA. Citizens also expressed concerns about potential health risks and the possibility that LWEC is not in compliance with environmental regulations [EPA 2017d]. EPA held a public meeting on May 9, 2016. A L'Anse resident commented, "The way this has affected myself and neighbors is we can't generally keep our windows open, outdoor cooking is a no-no (and) the smell is so bad sometimes I have to leave town and stay at my folks' place. We never had this problem prior to the conversion to biomass. This dust is drifting all over town, into the Falls River, into Lake Superior..." Residents were concerned about the health of people at Green Hill Manor senior center, Baraga-Houghton-Keweenaw Child Development Center, and Sacred Heart School. [Gazette 2016]

ATSDR received two petitions from residents in 2013 and 2015 to conduct a Health Consultation to determine whether LWEC was harming human health [ATSDR 2013, 2015a]. ATSDR was unable to fulfill these requests at the time because environmental data and the results of the computer air modeling were not available [ATSDR 2015b]. In 2016 the Keweenaw Bay Indian Community (KBIC) made a joint request to ATSDR, Centers for Disease Control and Prevention (CDC), MDEQ, and EPA for government-to-government consultation. In addition to raising several regulatory issues, KBIC asked for a public health assessment of environmental releases from the LWEC facility [KBIC 2016].

The availability of EPA air modeling and soil sampling results in 2016 made it possible for ATSDR to conduct this Health Consultation. ATSDR has concluded that exposure to dioxins, metals, and semi-

volatile compounds in soil in L'Anse is not expected to harm people's health. Similarly, the air modeling results demonstrate that breathing air contaminants from LWEC are not expected to harm people's health.

In the time that these data have been under review, EPA and MDEQ have moved forward on enforcement actions at LWEC. As noted in Section 3, LWEC was required to install permanent enclosures around fuel conveyors and the fuel receiving hopper, cease operation of their pneumatic conveyor system, and implement other practices to reduce fugitive PM emissions. MDEQ's February 2016 Violation Notice cited citizen complaints, specifically "fugitive dust, black smoke, and foul odors". [MDEQ 2016b] EPA has not received any complaints from residents since the Consent Order was finalized on October 31, 2016 [EPA 2017c]. From October 31, 2016 through July 20, 2017, MDEQ received six complaints from residents: five were regarding odors from the plant and the sixth reported equipment malfunction. This number of complaints may be compared with approximately 30 calls in the same time period of the previous year. The more recent complaints reported odors only, not PM. The odors could not be verified or attributed to LWEC by local inspectors, nor did they rise to the level to warrant a violation notice [MDEQ 2017ab]. Residents' prior concerns that LWEC is not in compliance with environmental regulations have been addressed and the Consent Order is being implemented. The change in the nature and reduction in number of citizen complaints suggests that local residents are not perceiving smoke and dust as a problem and that odor issues are less frequent.

8. CONCLUSIONS

Following its review of the L'Anse surface soil data and air dispersion modeling, based on 2016 operating conditions at LWEC, ATSDR reached two health-based conclusions.

Conclusion 1

Contact with dioxins, metals, the pesticide pentachlorophenol (PCP), and polycyclic aromatic hydrocarbons (PAHs) in soil in L'Anse is not expected to harm people's health.

Basis for Conclusion 1

- ATSDR reviewed soil samples collected at 16 private residences and public facilities in L'Anse and 4 background sites in Zeba, a community 4 miles north of L'Anse. ATSDR evaluated the soil concentrations for dioxins and metals, specifically arsenic, barium, chromium, cobalt, copper, manganese, nickel, vanadium, and zinc. Dioxins exceeded ATSDR's health comparison value at one residence about 700 meters southeast of LWEC. The calculated toxic equivalent (TEQ) for dioxin and dioxin-like compounds was 140 parts per trillion. The origin of the dioxin-like compounds at this residence is not known. Metals concentrations at all sampled properties were below their respective cancer and non-cancer health comparison levels.

- Human and animal studies have shown links between dioxin exposure and non-cancer developmental effects. The amount of dioxin at the property of interest are below the levels that are associated with health effects in research studies, therefore harmful health effects are not expected. After reviewing the results for the initial round of sampling, ATSDR recommended additional soil testing to learn whether higher dioxin levels may exist on the property or at nearby

homes in southern L'Anse. Follow-up testing confirmed that dioxins were present at levels similar to those previously reported at this property and not of health concern. Previously untested homes in the area have dioxin levels below health comparison values and will not cause harmful health effects.

- ATSDR evaluated the initial 20 soil samples for cancer-causing metals, the pesticide pentachlorophenol (PCP), dioxin and dioxin-like compounds, and polycyclic aromatic hydrocarbons (PAHs). Cancer-causing metals, arsenic and chromium, as well as PCP were found at concentrations well below their respective cancer risk screening levels and are not likely to cause health effects.

- PAHs and dioxins levels in soil warranted a more detailed cancer risk assessment. ATSDR determined that, at the home with the highest levels of dioxin, the estimated cancer risk from soil exposure was approximately 4 cases per 100,000 people. The highest estimated cancer risk in the area near LWEC was approximately 2 cases per 100,000 people. This is a low risk for increased cancer in the L'Anse community.

Conclusion 2

ATSDR concludes that breathing the estimated levels of air contaminants emitted by LWEC is not expected to harm people's health. This conclusion is based on 2016 conditions when EPA received emissions data from LWEC. ATSDR cannot characterize potential health effects in the past when certain contaminants were emitted in larger amounts.

Basis for Conclusion 2

- ATSDR reviewed concentrations of air pollutants as estimated by EPA using computer modeling. All of the modeled air contaminant levels were well below their regulatory standards and health comparison values and are unlikely to cause health effects. These findings represent 2016 conditions and cannot address people's previous exposures to PCP, a pesticide used to treat fuel materials that LWEC no longer uses. ATSDR also cannot characterize the potential health effects of hydrochloric acid (HCl) which are known to have been higher in the past.

- EPA provided maximum predicted pollutant levels for the L'Anse area for particulate matter (PM), HCl, dioxins and dioxin-like compounds, and metals: lead, arsenic, manganese, and nickel. PM less than 2.5 microns in diameter ($PM_{2.5}$), PM less than 10 microns (PM_{10}), and lead were compared against their respective National Ambient Air Quality Standards (NAAQS) established by EPA and World Health Organization's Air Quality Guidelines. HCl, dioxin, arsenic, manganese, and nickel were screened against ATSDR's HCVs.

- EPA modeling did not characterize ground-level (fugitive) PM emissions from LWEC operations, only stack emissions from the boiler. Since 2016, LWEC has implemented requirements by Michigan Department of Environmental Quality (MDEQ) to limit air contaminant emissions, most notably HCl and PM. MDEQ and EPA have not received citizen complaints about dust emissions

since these changes were made. ATSDR cannot characterize possible health effects of past exposures to PM and HCl.

Limitations and Uncertainties

ATSDR faced several limitations and uncertainties in the effort to characterize worst-case community exposures to pollutants from LWEC.

- Soil sampling was conducted in areas where EPA predicted the greatest potential exposures to contaminants from LWEC based on air dispersion modeling. Local meteorological data were not available, thus there are significant uncertainties EPA's modeling predictions.

- EPA collected limited soil samples in the areas deemed to be most impacted by LWEC. Not all potentially affected properties were tested. Occupants were not interviewed to identify areas of greatest potential soil exposure based on their activities.

- EPA modeled air emissions based on stack testing conducted by LWEC. EPA modeling likely underestimated the local impacts of emissions from LWEC because only the boiler stack emissions were included. Fugitive dust from fuel storage, processing, and transport were not estimated. These fugitive emissions have been reduced due to enforcement actions taken by MDEQ.

- EPA could not characterize potential exposures when LWEC violated its air permit, as it has in the past. Stack testing represents emissions during optimal operating conditions. The resulting air modeling cannot estimate air pollutant concentrations when emissions controls are not optimized.

- The stack test was performed after LWEC had removed PCP from its fuel stream. Other pollutants were tested but the results were below detection limits: chlorine, cresol isomers, and volatile organic compounds (VOCs). ATSDR cannot estimate past exposures to PCP and current exposures to chlorine, cresol isomers, and VOCs.

9. RECOMMENDATIONS

ATSDR recommends that MDEQ and EPA continue monitoring contaminant emissions at LWEC. Regulators should also confirm that requirements to limit fugitive dust emissions are implemented and maintained. MDEQ and EPA should respond appropriately if any violations causing community exposures to air pollutants occur.

10. NEXT STEPS

In order to achieve the above recommendation, ATSDR will check with MDEQ and EPA on a quarterly basis regarding LWEC's compliance with requirements for HCl stack testing and implementation of the fugitive emissions plan.

11. REFERENCES

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APPENDIX A

EPA EJSCREEN Report

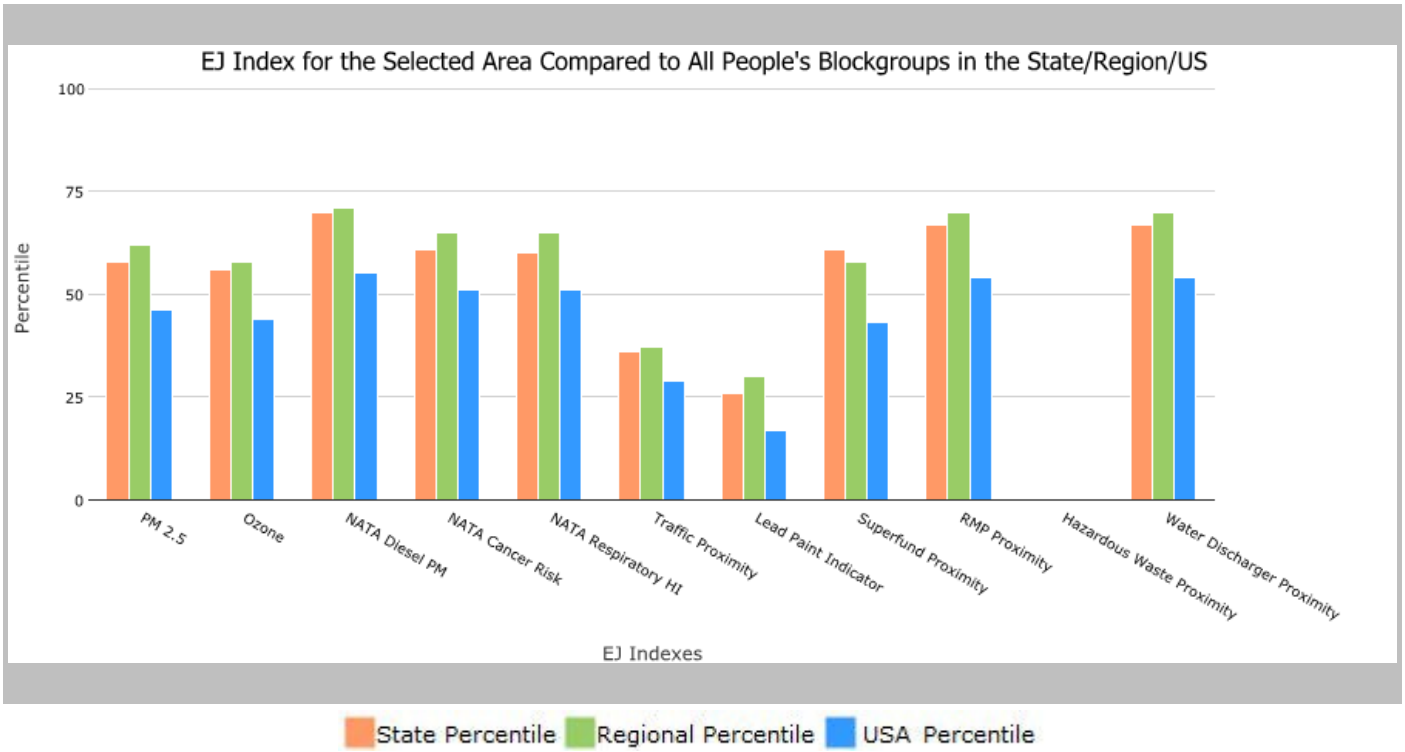
EJSCREEN Report (Version 2016)

the User Specified Area, MICHIGAN, EPA Region 5

Approximate Population: 2,523

Input Area (sq. miles): 8.85

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	58	62	46
EJ Index for Ozone	56	58	44
EJ Index for NATA* Diesel PM	70	71	55
EJ Index for NATA* Air Toxics Cancer Risk	61	65	51
EJ Index for NATA* Respiratory Hazard Index	60	65	51
EJ Index for Traffic Proximity and Volume	36	37	29
EJ Index for Lead Paint Indicator	26	30	17
EJ Index for Superfund Proximity	61	58	43
EJ Index for RMP Proximity	67	70	54
EJ Index for Hazardous Waste Proximity+	N/A	N/A	N/A
EJ Index for Water Discharger Proximity	67	70	54



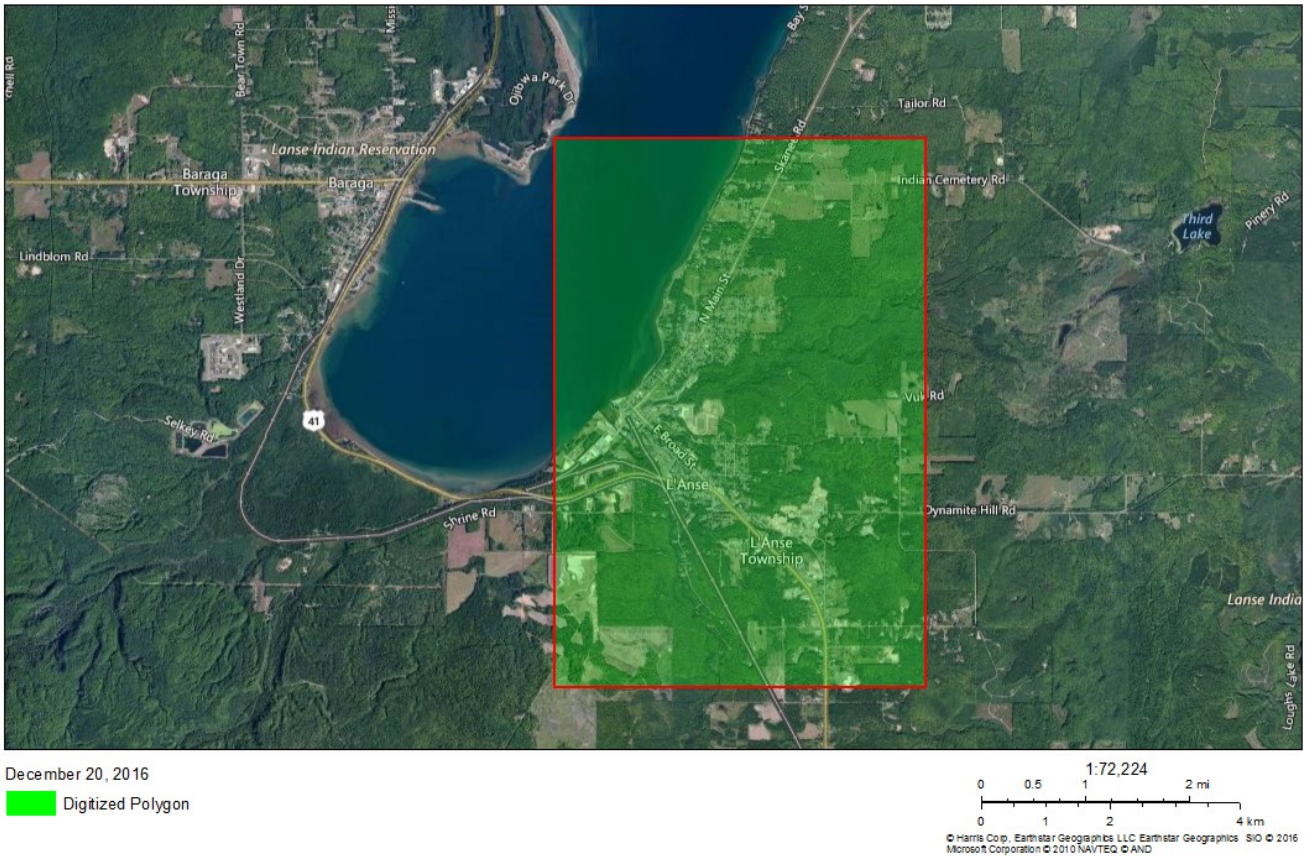
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2016)

the User Specified Area, MICHIGAN, EPA Region 5

Approximate Population: 2,523

Input Area (sq. miles): 8.85



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

EJSCREEN Report (Version 2016)

the User Specified Area, MICHIGAN, EPA Region 5

Approximate Population: 2,523

Input Area (sq. miles): 8.85

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	6.64	9.76	0	10.6	0	9.32	5
Ozone (ppb)	40.4	50.3	0	50.3	1	47.4	16
NATA* Diesel PM (µg/m^3)	0.0755	0.726	0	0.931	<50th	0.937	<50th
NATA* Cancer Risk (lifetime risk per million)	17	31	1	34	<50th	40	<50th
NATA* Respiratory Hazard Index	0.61	1.3	6	1.7	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	78	570	45	370	50	590	47
Lead Paint Indicator (% Pre-1960 Housing)	0.49	0.39	68	0.39	65	0.3	75
Superfund Proximity (site count/km distance)	0.022	0.14	6	0.12	12	0.13	20
RMP Proximity (facility count/km distance)	0.022	0.32	2	0.51	1	0.43	1
Hazardous Waste Proximity+ (facility count/km distance)	N/A	0.1	N/A	0.11	N/A	0.11	N/A
Water Discharger Proximity (facility count/km distance)	0.026	0.25	1	0.31	1	0.31	2
Demographic Indicators							
Demographic Index	23%	30%	48	29%	51	36%	36
Minority Population	10%	24%	42	24%	42	37%	23
Low Income Population	35%	35%	55	33%	60	35%	56
Linguistically Isolated Population	1%	2%	69	2%	65	5%	50
Population With Less Than High School Education	13%	11%	67	11%	67	14%	57
Population Under 5 years of age	7%	6%	65	6%	61	6%	58
Population over 64 years of age	23%	15%	88	14%	89	14%	88

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

+ The hazardous waste environmental indicator and the corresponding EJ index will appear as N/A if there are no hazardous waste facilities within 50 km of a selected location.

For additional information, see: www.epa.gov/environmentaljustice

APPENDIX B

EPA Air Dispersion Modeling Analysis

Air Dispersion Modeling Analysis for Convergen Energy
(L'Anse Warden Electric Company, LLC or LWEC)
157 South Main Street
L'Anse, Michigan 49946
(6/2017)

I. BACKGROUND

EPA Region 5, Air and Radiation Division (ARD), Toxics and Global Atmospheres Section was requested by the Air Enforcement Section to conduct air dispersion modeling of air pollutant emissions from the Convergen Energy facility in L'Anse, Michigan. The air dispersion modeling was used to assist the EPA Region 5 Superfund Division in locating dioxin hotspots for soil sampling purposes. The second purpose was to conduct air dispersion modeling using emissions from a July 2016 stack test. ATSDR will complete a risk assessment analysis for the L'Anse, Michigan community using the results of the dispersion modeling. The purpose of the ATSDR analysis is to evaluate inhalation risks and hazards to the surrounding area from dioxin, metals, and other pollutants (all pollutants tested for during the July 2016 stack testing). This report describes the modeling results and the approaches which were used to conduct the air dispersion modeling.

Convergen Energy is located in L'Anse**,** Michigan, on the shore of Keweenaw Bay, off Lake Superior in Baraga County in Michigan's Upper Peninsula. The L'Anse village has a total area of 2.53 square miles (6.55 km^2) and a population of approximately 2000 people. Weather and climate is moderated by Lake Superior, resulting in warmer winters and cooler summers than areas unaffected by the Lake.

The village's elevation is around 602 feet (183m) above sea level. The terrain surrounding the facility is relatively complex with elevation rising above stack top within a kilometer of the facility. Within 10 kilometers elevation rises a couple hundred meters above the facility in the easterly and southerly direction with more modest increases to the west. See below for Convergen Energy satellite image.

II. MODEL SELECTION and METEOROLOGY

EPA Region 5 used AERMOD version 15181 originally for this dispersion modeling analysis as it was the recommended version at the time for this type of source modeling. However, on January 17, 2017, USEPA promulgated revisions to the Guideline on Air Quality Models, which included a new AERMOD version 16216r. EPA Region 5 therefore; re-ran the entire project with AERMOD version 16216r. Rural dispersion coefficients were used in AERMOD, based on an examination of the surrounding land use. Five years (2008-2012) of surface meteorological data from Munising Lakeshore station (KP53) and Gaylord upper air data was used.

The KP53 (Munising) station was selected because it captures the south-north component wind which is evident at other near lakeshore stations and is likely characteristic of the L'Anse location as well. The nearest meteorological station to L'Anse is Houghton, located to the northwest in the peninsula extending into Lake Superior. Winds at Houghton station are primarily east-west. While it's likely neither Houghton nor Munising are completely representative of the L'Anse location, based on the proximity of L'Anse to Lake Superior and the wind rose information from other similarly located meteorological stations, Munising was chosen as the most representative site. The wind rose of five years (2008-2012) hourly surface observations, and national climatic data center 1-minute surface data

at Munising Lakeshore station in Munising, Michigan depicts the north-south wind component at Munising station (see below). The satellite image below shows Convergen Energy's location relative to the Munising and Sawyer meteorological stations.

AERMET version 15181 was originally used to process the meteorological data. Following the revisions to the Guideline on Air Quality Models on January 17, 2017, EPA Region 5 re-ran AERMET stage 3 with new AERMET version 16216. The meteorological data was processed using the adjusted surface friction velocity option in AERMET version 16216. This option is available to address the concerns regarding potential under prediction of the surface friction velocity (u*) during low-wind, stable conditions that could contribute to over prediction of ambient air impacts by AERMOD. Additionally, a minimum wind speed threshold of 0.5 m/s was used. To reduce the number of hours of calm and missing winds in the surface data, archived 1-minute wind data from the Munising station were used to calculate hourly average wind speeds and directions, using the USEPA 's meteorological data processor AERMINUTE Version 15272

The Munising meteorological data file did not contain cloud cover data. Consequently, cloud cover was taken from Sawyer Air Force Base station just south of Marquette, MI and substituted into the Munising data. Both stations were run through AERMET Stage 1 and the cloud cover from the Sawyer AERMET Stage 1 output file was integrated into the Munising Stage 1 output file for further processing through AERMET.

AERSURFACE version 13061 was used to determine the surface characteristic values for input to AERMET. Additional adjustments were applied to account for local snow cover and precipitation for each month in the years 2008 through 2012. Snow cover data available for Marquette, MI was used to adjust for days with/without at least 1 inch of snow. Precipitation data from Marquette, and drought index parameters, were used to characterize the monthly moisture conditions. The processing of the meteorological data followed the guidance available in the AERMET and AERSURFACE user's guide as well as the recommendations found in the Region 5 "Regional Meteorological Data Processing Protocol", DRAFT, dated October 2014.

III. EMISSIONS DATA and MODELING INPUT PARAMETERS

Stack test data is available for this facility. Initially, a unit emission rate (1g/s) was applied for HCL, dioxin, manganese, arsenic, and nickel in the dispersion modeling. The pollutant specific emissions were applied to the unitized modeled concentrations at each receptor using AERMOD plot file output and spreadsheets. Pollutant specific emission rates for lead, PM2.5, and PM10 were used in separate runs since we used the design values for those pollutants.

The following table was used to determine emissions for this analysis. Several test runs are available for each pollutant. We used the highest of the test runs when applying emissions to the unitized concentration estimates.

The following model source inputs were used for this analysis.
Stack UTM Coordinates from Google Earth Satellite Image = UTMx = 388834.5, UTMy = 5179024.6
Stack Emission Rate for Hazardous Air Pollutants (HAPs) =1.0 g/s
Stack Emission Rate for PM10= 1.045 g/s
Stack Emission Rate for PM2.5= 0.919 g/s
Stack Emission Rate for Lead= 1.499E-4 g/s

Stack Height = 44.81m
Stack Exit Temperature (July 7th Ave. value from stack test report) [1] = 499.48 K
Stack Diameter= 2.29 m
Stack Exit Velocity (July 7th Ave. value from stack test report) [1] = 17.09 m/s

The direction specific building downwash parameters, as output by BPIP-PRIME in the Michigan Department of Environmental Quality (MDEQ) PSD modeling, was used in the modeling. This facility has a single stack of interest so only one source was modeled.

IV. RECEPTOR GRIDS

The receptor grid used in the analysis consists of nested rectangular grids with terrain derived from AERMAP using National Elevation Data. No receptors were removed based on fenced facility property boundaries. This information is the same as in MDEQ PSD modeling.

- 50 meter spacing to 500 meters from the center of the facility
- 100 meter spacing to 1000 meters from the center of the facility
- 200 meter spacing to 3000 meters from the center of the facility
- 1000 meter spacing to 10,000 kilometers from the center of the facility

V. MODELING RESULTS

AERMOD model 16216r was used to calculate the ambient air concentrations for PM10, PM2.5, Lead, and toxic chemicals in micrograms per cubic meter at the receptor locations noted above. Deposition flux values were not generated by AERMOD for this analysis. The output files consisted of plot files (*.PLT) containing peak concentration estimates for each receptor and averaging time. For those pollutants using a unit emission rate, the plot files were imported to a spreadsheet and used to generate pollutant specific concentrations. The plot files were also used to generate graphics showing the distribution of peak concentrations across the modeled domain. The following averaging times were used in the modeling:

Peak 1-hour average concentrations over five year period
Peak 8-hour average concentrations over five year period
Peak 24-hour average concentrations over five year period
Monthly average concentrations over five year period
Period average concentrations over five year period
Design values for PM10, PM2.5 and lead

Table 2 summarizes the maximum 24-hour average and annual average for PM2.5 and PM10. For PM2.5, the 98th percentile value, 24-hr average over five years was 0.86 μg/m³, and the highest annual average over five years was 0.16 μg/m³. For the PM10, the H6H 24-hr average over five years was 1.29 μg/m³, and the highest annual average over five years was 0.18 μg/m³.

Table 3 summarizes the maximum monthly average for lead and 1-hr average, and the 8-hr average, 24-hr average, and annual average for toxic chemicals. For lead, the highest monthly average over five

[1] Boiler number one EPA section 114 information request, L'Anse Warden Electric Company, August, 2016.

years was 0.5 E-4 μg/m³, and the three month rolling average over five years was 0.43 E-4 μg/m³. For toxic chemicals (HCl, Dioxin, Manganese, Arsenic, and Nickel), the highest 1-hr average over five years was 11.70 μg/m³, the highest 8-hr average over five years was 4.15 μg/m³, the highest 24-hr average over five years was 1.84 μg/m³, and the highest annual average over five years was 0.17 μg/m³.

All of the peak concentrations reported below appear to occur at locations not on L'Anse Warden facility property.

VI. UNCERTAINTIES

There are limitations and uncertainties for every modeling analysis. Meteorological conditions influence how pollutants will transport, disperse, and deposit at downwind distance. For this specific situation, the uncertainties of meteorological data are quite important. There is not a meteorological data station located at the facility site. The most representative station had to be selected based on expertise and assumptions about expected wind directions and atmospheric conditions associated with a source near the lake and near complex terrain. The north-south wind direction associated with the Munising meteorological station along with very small number of calm wind and available wind hours in the dataset, were important factors in selecting that station for the modeling. The uncertainty associated with the meteorological data used in this analysis is likely unbiased. In other words, it's difficult to say whether any meteorological data collected at the facility would produce higher or lower concentrations. It is likely, however, that the uncertainty associated with meteorological data used in this modeling assessment impacts the location of the predicted concentrations more than the magnitude of those concentrations.

For this analysis, the AERMOD model was executed with emission data, receptors, meteorological data, and with technical operation options recommended as regulatory defaults in the AERMOD guidance. We have applied the best available data and adjustments at the time this analysis was conducted. Regarding emissions, the modeling only reflects stack test measurements from the stack at the facility. If emissions also occur at other units and locations at the facility, e.g., fugitive emissions, those are not represented in the modeling.

It is important to note that sources do not emit air pollutants at constant rates. Similarly, the meteorological conditions that effect dispersion in the atmosphere vary over time. Thus, the ambient air concentration at a given location can vary over time. The influence of pollutant emissions on ambient concentrations at a particular location depends on the degree of atmospheric dispersion of the emissions as they travel from the sources to the receptor. Dispersion depends on both meteorological conditions, which vary from place to place, and travel distance from source to receptor.

VII. SUMMARY

In summary, the model predicted maximum ambient concentrations for 24-hour, and annual averages for PM2.5, and PM10 and monthly average for lead using pollutant specific emission rates as mentioned in section III. For toxic chemicals, the model predicted maximum concentrations for 1-hour, 8-hour, 24-hour, and annual averages using unit emission rate (1 g/s). Specific emission rates of 0.24 g/s for HCL, 2.60 E-10 g/s, dioxin, 3.63 E-4 g/s for manganese, 1.80E-5 for arsenic, and 1.51 E-4 for nickel were used to calculate specific ambient air concentrations for these toxic chemicals. Contour plots showing ambient concentrations for those pollutants are illustrated in the attachment.

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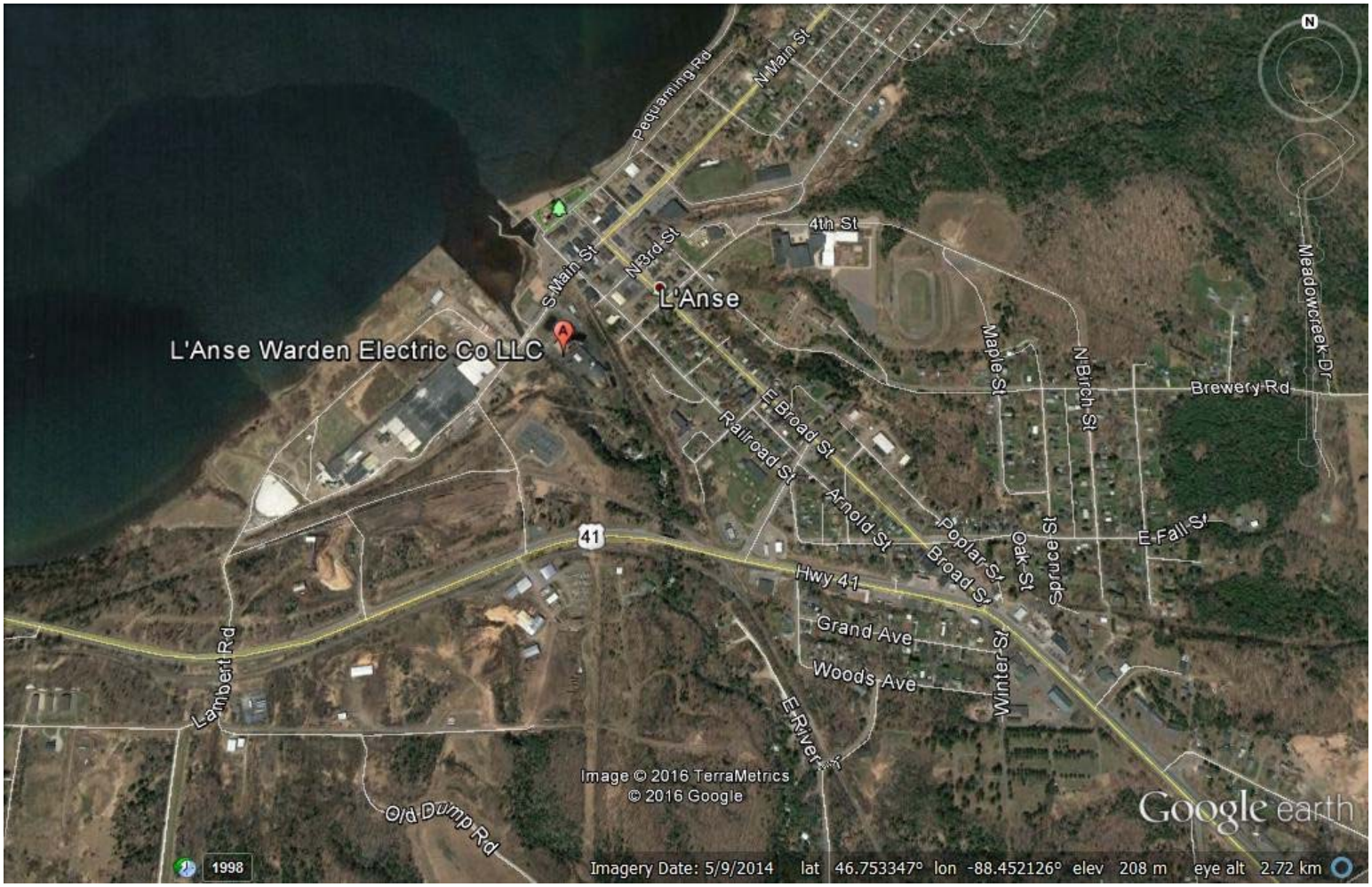
L’Anse Warden Electric co/Convergen Energy Satellite Image

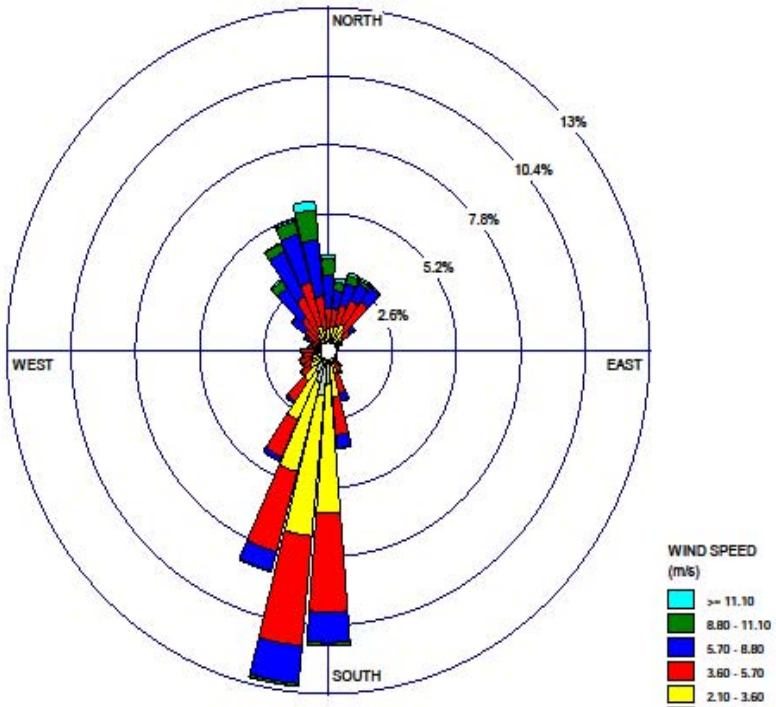


WIND ROSE PLOT:

Munising, MI surface met data (2008-2012)

DISPLAY:

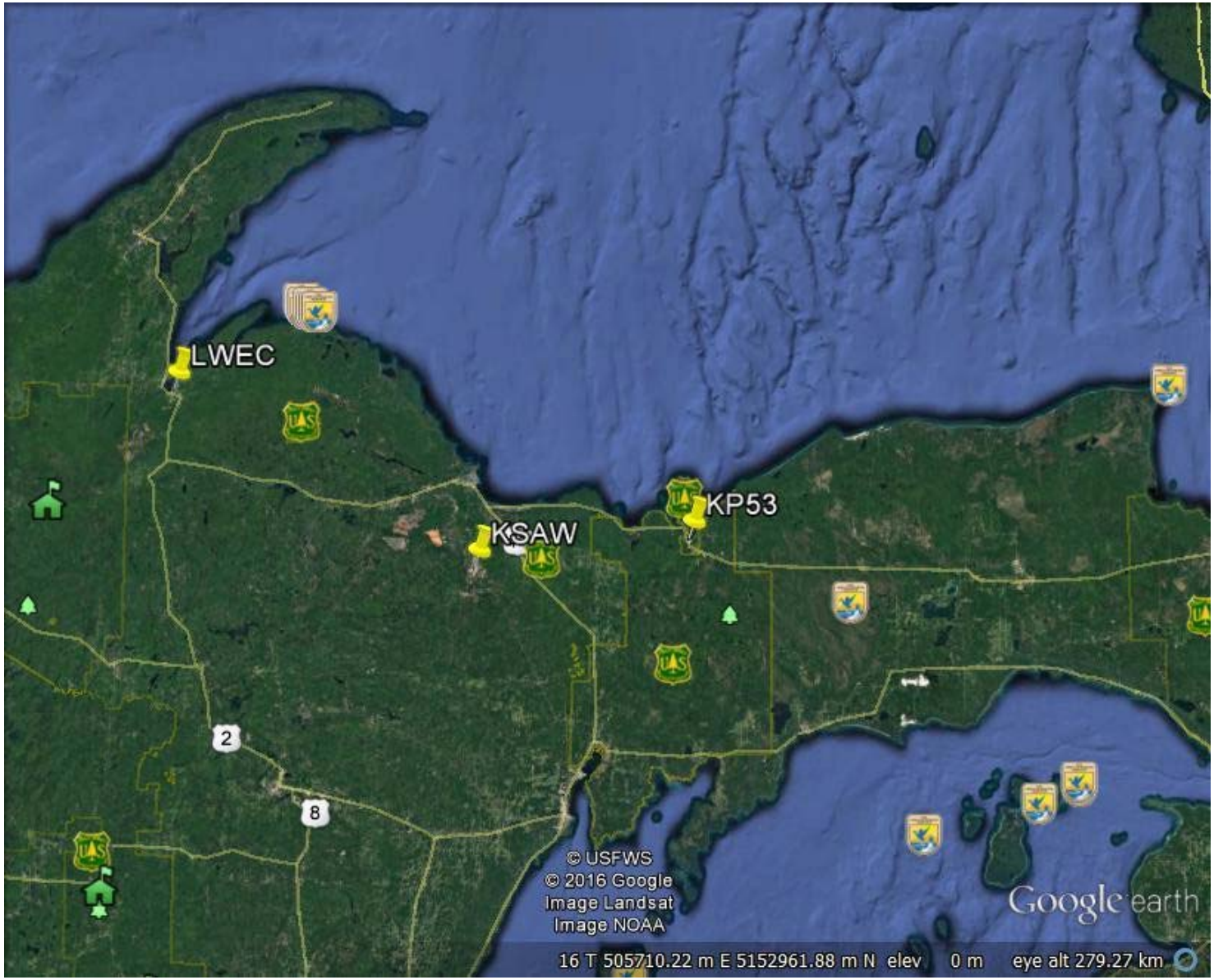
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2008 - 00:00 **End Date: 12/31/2012 - 23:59**	MODELER:	
	CALM WINDS: **3.24%**	TOTAL COUNT: **78439 hrs.**	
	AVG. WIND SPEED: **4.28 m/s**	DATE: **11/1/2016**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Location of Munising Airport (KP53)



Boiler No.1
Summary of Test Results

Pollutant	Test Run Number					PTI 168-07D Emissions Limit
	1	2	3	4	Average	
Particulate Matter (PM) (lb/hr)	0.8	1.9	1.2	---	1.3	19.2 lb/hr
Particulate Matter (PM) (lb/MMBtu)	0.003	0.006	0.004	---	0.004	0.06 lb/MMBtu
Particulate Matter $\leq$ 10 microns (PM_{10}) (lb/hr)	---	5.3	8.0	8.3	7.2	15.4 lb/hr
Particulate Matter $\leq$ 10 microns (PM_{10}) (lb/MMBtu)	---	0.020	0.029	0.030	0.026	---
Particulate Matter $\leq$ 2.5 microns ($PM_{2.5}$) (lb/hr)	---	4.7	7.3	7.1	6.3	---
Particulate Matter $\leq$ 2.5 microns ($PM_{2.5}$) (lb/MMBtu)	---	0.018	0.027	0.026	0.023	---
Lead (Pb) (lb/hr)	1.19E-03	1.00E-03	1.13E-03	---	1.10E-03	0.02 lb/hr
Arsenic (As) (lb/hr)	< 1.24E-04	1.41E-04	1.43E-04	---	$\leq$ 1.36E-04	---
Manganese (Mn) (lb/hr)	1.51E-03	2.88E-03	2.87E-03	---	2.42E-03	---
Nickel (Ni) (lb/hr)	1.20E-03	4.70E-04	6.04E-04	---	7.60E-04	---
Hydrogen Chloride (HCl) (lb/hr)	1.73	1.91	1.61	---	1.75	2.17 lb/hr
Chlorine (Cl_2) (lb/hr)	< 0.25	< 0.26	< 0.26	---	< 0.26	---
2,3,7,8-TCDD Toxic Equivalent (µg/dscm @ 7% O_2)	7.72E-06	6.35E-06	5.70E-06	---	6.59E-06	---
2,3,7,8-TCDD Toxic Equivalent (lb/hr)	2.06E-09	1.66E-09	1.54E-09	---	1.75E-09	---
Volatile Organic Compounds (ppmvd @ 7% O_2) as methane	< 0.12	< 0.12	< 0.12	---	< 0.12	50 ppmvd @ 7% O_2
Volatile Organic Compounds (lb/hr) as methane	< 0.02	< 0.02	< 0.02	---	< 0.02	9.1 lb/hr
Cresol Isomers (lb/hr)	< 7.77E-04	< 8.44E-04	< 8.15E-04	---	< 8.12E-04	---
Opacity	0	0	0	---	0	---
Average Stack Exit Velocity, 6 July (ft/s)[1]	57.6					---
Average Stack Exit Velocity, 7 July (ft/s)[1]	56.1					---
Average Stack Inlet Duct Temp, 6 July (°F)[1]	442.3					---
Average Stack Inlet Duct Temp, 7 July (°F)[1]	439.4					---

Table 1.
Summary of Stack Test Results from "Page 5 of 2016 Stack Test Report"

Table 2. Modeled PM2.5 and PM10 Ambient Concentrations

PM2.5	**µg/m³**
Annual	0.16
PM10	**µg/m³**
Annual	0.18

Table 3. Modeled Lead and Toxic Chemicals Ambient Concentrations

Lead	**µg/m³**
Toxic chemicals (HCL, Dioxin, Manganese, Arsenic, Nickel)	**µg/m³**
8 Hr. Ave.	4.15
Annual Ave.	0.17

APPENDIX C

Derivation and Intended Use of Comparison Values

ATSDR, in cooperation with the U.S. Environmental Protection Agency (US EPA), has developed a priority list of hazardous substances found at hazardous waste sites, as directed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA). For those substances most commonly found, ATSDR has prepared Toxicological Profiles that include an examination, summary, and interpretation of available toxicologic and epidemiologic data. Using those data, ATSDR has derived health and environmental guidelines.

- ATSDR ***health guidelines*** are substance-specific doses or concentrations derived using toxicologic information. Where adequate dose-response data exist, health guidelines are derived for both the ingestion or inhalation routes of exposure. Health guidelines include ATSDR's minimal risk levels (MRLs). No health guidelines have been developed by ATSDR for dermal exposures.
- ATSDR ***environmental guidelines*** are media-specific substance concentrations derived from health guidelines using default exposure assumptions. ATSDR environmental guidelines include environmental media evaluation guides (EMEGs) and cancer risk evaluation guides (CREGs) that are available for contact with substances in water, soil, and air. No environmental guidelines have been developed by ATSDR for contact with contaminants in food or biota.

ATSDR health and environmental guidelines discussed in this appendix are MRLs, EMEGs, and CREGs. For each guideline discussed, a definition and description of the derivation and applicability or intended use are provided.

1. Minimal Risk Levels (MRLs)

ATSDR's minimal risk levels (MRLs) are an estimate of the daily human exposure to a substance that is likely to be without appreciable risk of adverse health effects during a specified duration of exposure. MRLs are based only on noncarcinogenic effects. MRLs are screening values only and are not indicators of health effects. Exposures to substances at doses above MRLs will not necessarily cause adverse health effects and should be further evaluated.

ATSDR derives MRLs when reliable and sufficient data can identify the target organ(s) of effect or the most sensitive health effects(s) for a specific duration for a given route of exposure. MRLs are set below levels that might cause adverse health effects in most people, including sensitive populations. MRLs are derived for acute (1–14 days), intermediate (15–364 days), and chronic (365 days and longer) durations. MRLs are generally based on the most sensitive chemical-induced endpoint considered relevant to humans. ATSDR does not use serious health endpoints (e.g., irreparable damage to the liver or kidneys, birth defects) as bases for establishing MRLs.

ATSDR derives MRLs for substances by factoring the most relevant documented no-observed-adverse-effects level (NOAEL) or lowest-observed-adverse-effects level (LOAEL) and an uncertainty factor. The specific approach used to derive MRLs for individual substances are detailed in ATSDR's Toxicological Profile for each substance available at http://www.atsdr.cdc.gov/toxprofiles/index.asp.

MRL Derivation

MRL = NOAEL (or LOAEL) / UF

where,

MRL	=	minimal risk level (mg/kg/day)
NOAEL	=	no-observed-adverse-effect level (mg/kg/day)
LOAEL	=	lowest-observed-adverse-effect level (mg/kg/day)
UF	=	uncertainty factor (unitless)

Most MRLs contain a degree of uncertainty because of the lack of precise toxicologic information about the people who might be most sensitive to the effects of environmental contamination (e.g., children, elderly, those with pre-existing illnesses). ATSDR uses a conservative (i.e., protective) approach to address this uncertainty. This approach is consistent with the public health principle of prevention.

Although human data are preferred, when relevant human studies are unavailable, ATSDR bases MRLs on animal studies. In the absence of evidence to the contrary, ATSDR assumes that humans are more sensitive to the effects of hazardous substances than are animals and that certain persons might be particularly sensitive. Uncertainties are taken into account by applying "uncertainty factors" to the NOAEL. For example, an uncertainty factor of between 1 and 10 might apply for extrapolation from animal doses to human doses or to account for sensitive persons. When more than one uncertainty factor is applied, the uncertainty factors are multiplied. For example, the combined uncertainty factor of 100 could be accounted for by an uncertainty factor of 10 for the extrapolation of animals to humans and another factor of 10 to account for sensitive persons.

ATSDR derives MRLs on the assumption that exposures occur to a single substance and that only noncarcinogenic health effects might result. But hazardous waste sites might expose people to a mixture of substances. MRLs are intended to serve only as a screening tool to help ATSDR staff decide whether to evaluate more closely exposures to a substance found at a site. MRLs are not intended to define cleanup or action levels. And exposure doses above the MRL do not necessarily mean that adverse health effects will occur.

2. Environmental Media Evaluation Guides (EMEGs)

ATSDR's environmental media evaluation guides (EMEGs) represent concentrations of substances in water, soil, and air to which humans might be exposed during a specified period of time (acute, intermediate, or chronic) without experiencing adverse health effects. EMEGs have been calculated for substances for which ATSDR has developed Toxicological Profiles. ATSDR uses information about the substance toxicity (MRLs) and default exposure assumptions.

ATSDR uses EMEGs during a screening analysis, particularly when conducting an environmental guideline comparison. Substances found at concentrations below EMEGs are not expected to pose public health hazards. Substances found at concentrations above EMEGs require further evaluation before arriving at a public health conclusion. EMEGs are screening values only—they are not indicators of adverse public health effects. Substances found at concentrations above EMEGs will not necessarily cause adverse health effects, but will require further evaluation.

ATSDR makes three assumptions when deriving EMEGs: 1) exposures occur through contact with a single medium (e.g., water or soil) via a single route (e.g., ingestion or inhalation), 2) exposures involve single substance, and 3) from the exposure, only noncarcinogenic health effects might result.

EMEGs are based on toxicity information (MRLs), which consider noncarcinogenic toxic effects of chemicals, including their developmental and reproductive toxicity. MRLs do not consider potential genotoxic or carcinogenic effects of a substance. Because some substances have both noncarcinogenic and carcinogenic effects, ATSDR has derived cancer risk evaluation guides (CREGs) to consider potential carcinogenic effects of a substance.

To derive the soil EMEGs, ATSDR uses the chronic oral MRLs from its Toxicological Profiles. Many chemicals bind tightly to organic matter or silicates in the soil. Therefore, the bioavailability of a chemical is dependent on the media in which it is administered. Ideally, an MRL for deriving a soil EMEG should be based on an experiment in which the chemical was administered in soil. However, data from this type of study is seldom available. Therefore, often ATSDR derives soil EMEGs from MRLs based on studies in which the chemical was administered in drinking water, food, or by gavage using oil or water as the vehicle. The Toxicological Profiles for individual substances provide detailed information about the MRL and the experiment on which it was based.

Children are usually assumed to be the most highly exposed segment of the population because their soil ingestion rate is greater than adults' rate. Experimental studies have reported soil ingestion rates for children ranging from approximately 40 to 270 milligrams per day (mg/day), with 100 mg/day representing the best estimate of the average intake rate. ATSDR calculates an EMEG for a child using a daily soil ingestion rate of 200 mg/day for a 11.4-kg child [ATSDR 2005, 2016abcd, 2017abc].

For sites where the only receptors for soil ingestion are adults, an EMEG is calculated using an adult body weight of 80 kilograms and an assumed daily soil ingestion rate of 100 mg/day [ATSDR 2005, 2016abcd, 2017abc]. There are very few data on soil ingestion by adults, but limited experimental studies suggest a soil ingestion rate in adults of up to 100 mg/day, with an average intake of 50 mg/kg. Concentrations of substances in soil are expressed as milligrams per kilogram (mg/kg) or ppm.

3. Cancer Risk Evaluation Guides (CREGs)

ATSDR's cancer risk evaluation guides (CREGs) are media-specific comparison values that are used to identify concentrations of cancer-causing substances that are unlikely to result in an increase of cancer rates in an exposed population. ATSDR develops CREGs using US EPA's cancer slope factor (CSF) or inhalation unit risk (IUR), a target risk level (10–6), and default exposure assumptions. The target risk level of 10–6 represents a possible risk of one excess cancer case in a population of one million. Age dependent adjustment factors are applied, as appropriate for early-life susceptibility to mutagenic chemicals.

To derive soil CREGs, ATSDR uses CSFs developed by US EPA and reported in the Integrated Risk Information System (IRIS). The IRIS summaries, available at http://www.epa.gov/iris/ provide detailed information about the derivation and basis of the CSFs for individual substances. ATSDR derives CREGs for lifetime exposures, assuming a range of intake factors and body weight for each of the ATSDR age groups [ATSDR 2005, 2013, 2016abcd, 2017abc].

In developing the CREGs, ATSDR assumes that 1) exposures occur through contact to a single medium, (2) exposures occur to a single substance, and 3) from the exposure only cancer health effects will result. CREGs serve as a screening tool for evaluating concentrations of carcinogens during an environmental guideline comparison.

4. References

[ATSDR] Agency for Toxic Substances and Disease Registry. 2005. Public health assessment guidance manual (update). Atlanta: US Department of Health and Human Services.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2016a. Exposure Dose Guidance: Determining Life Expectancy and Exposure Factor to Estimate Exposure Doses. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. October 2016.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2016b. Exposure Dose Guidance for Body Weight. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. October 2016.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2016c. Exposure Dose Guidance for Soil and Sediment Dermal Absorption. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. October 2016.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2016d. Exposure Dose Guidance for Soil and Sediment Ingestion. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. October 2016.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2017a. Air Comparison Values. Atlanta, GA. [updated February 2017; accessed March 2017]. Available from ATSDR's Sequoia Database.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2017b. Oral Health Guidelines and Cancer Potency Table. Atlanta, GA. [updated February 2017; accessed March 2017]. Available from ATSDR's Sequoia Database.

[ATSDR] Agency for Toxic Substances and Disease Registry. 2017c. Soil Comparison Values. Atlanta, GA. [updated February 2017; accessed March 2017]. Available from ATSDR's Sequoia Database.

APPENDIX D

Air Modeling Results

Attachment

1. **Plots for PM2.5**
   Figure 1. PM2.5 - 24 Hr. Ave. 98th Percentile Modeled Ambient Air Concentrations, ug/m^3
   Figure 2. PM2.5 - Annual Ave. Modeled Ambient Air Concentrations, ug/m^3
2. **Plots for PM10**
   Figure 3. PM10 - 24 Hr. Ave. 6th Highest Modeled Ambient Air Concentrations, ug/m^3
   Figure 4. PM10 - Annual Ave. Modeled Ambient Air Concentrations, ug/m^3
3. **Plots for Lead**
   Figure 5. Lead – Maximum Monthly Ave. Modeled Ambient Air Concentrations, ug/m^3
4. **Plots for** Generic Hazardous Air Pollutant (HAP)
   Figure 6. Generic Hazardous Air Pollutant (HAP) – Maximum 1 Hr. Ave Modeled Ambient Air Concentrations, ug/m^3
   Figure 7. Generic Hazardous Air Pollutant (HAP) – Maximum 8 Hr. Ave Modeled Ambient Air Concentrations, ug/m^3
   Figure 8. Generic Hazardous Air Pollutant (HAP) – Maximum 24 Hr. Ave Modeled Ambient Air Concentrations, ug/m^3
   Figure 9. Generic Hazardous Air Pollutant (HAP) – 5-Year Ave. Modeled Ambient Air Concentrations, ug/m^3

Figure 1. PM2.5 - 24-Hour Average 98th Percentile Modeled Ambient Air Concentrations, ug/m^3

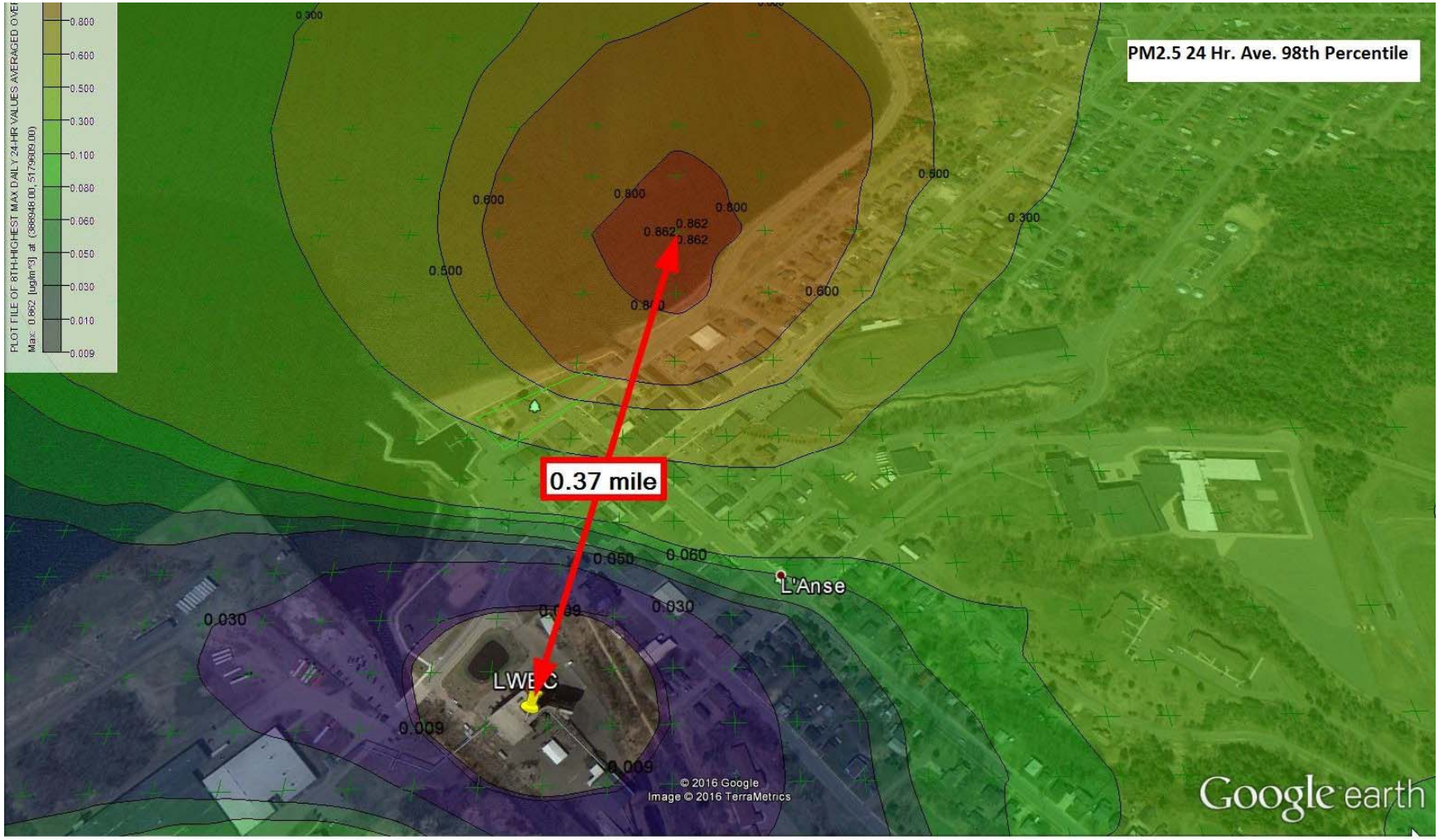


Figure 2. PM2.5 - Annual Average Modeled Ambient Air Concentrations, ug/m^3

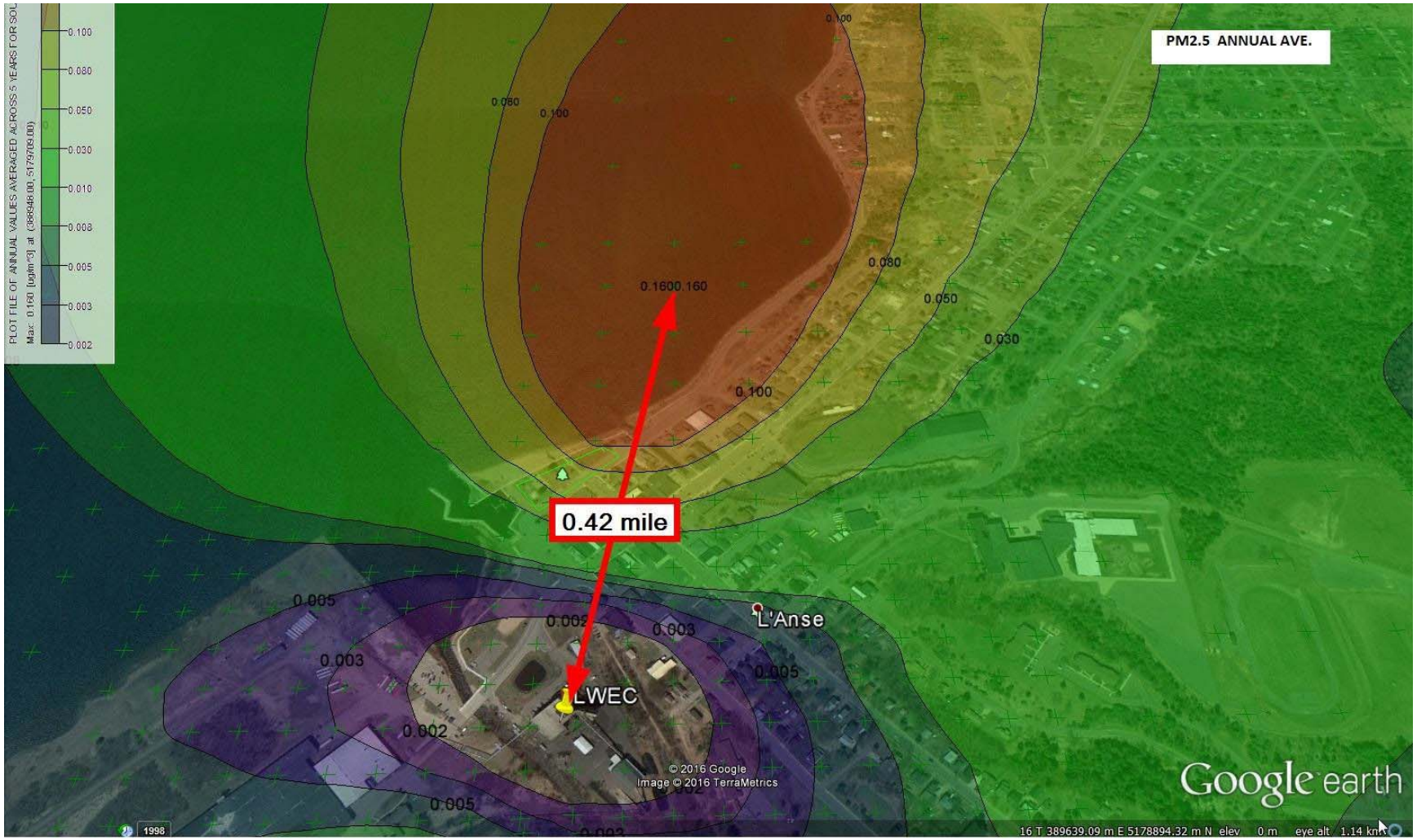


Figure 3. PM10 - 24-Hour Average 6th Highest Modeled Ambient Air Concentrations, ug/m3

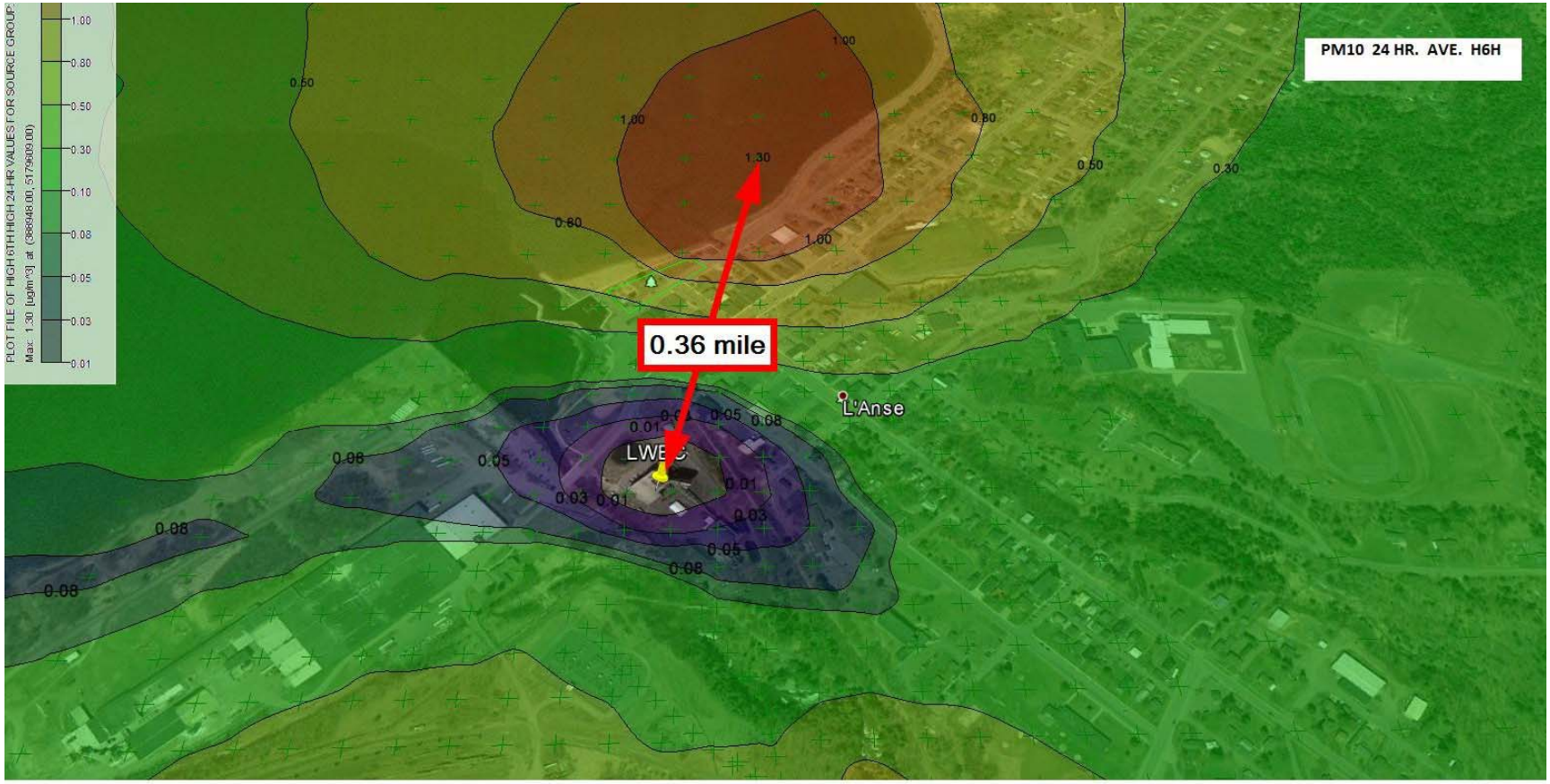


Figure 4. PM10 - Annual Average Modeled Ambient Air Concentrations, ug/m^3

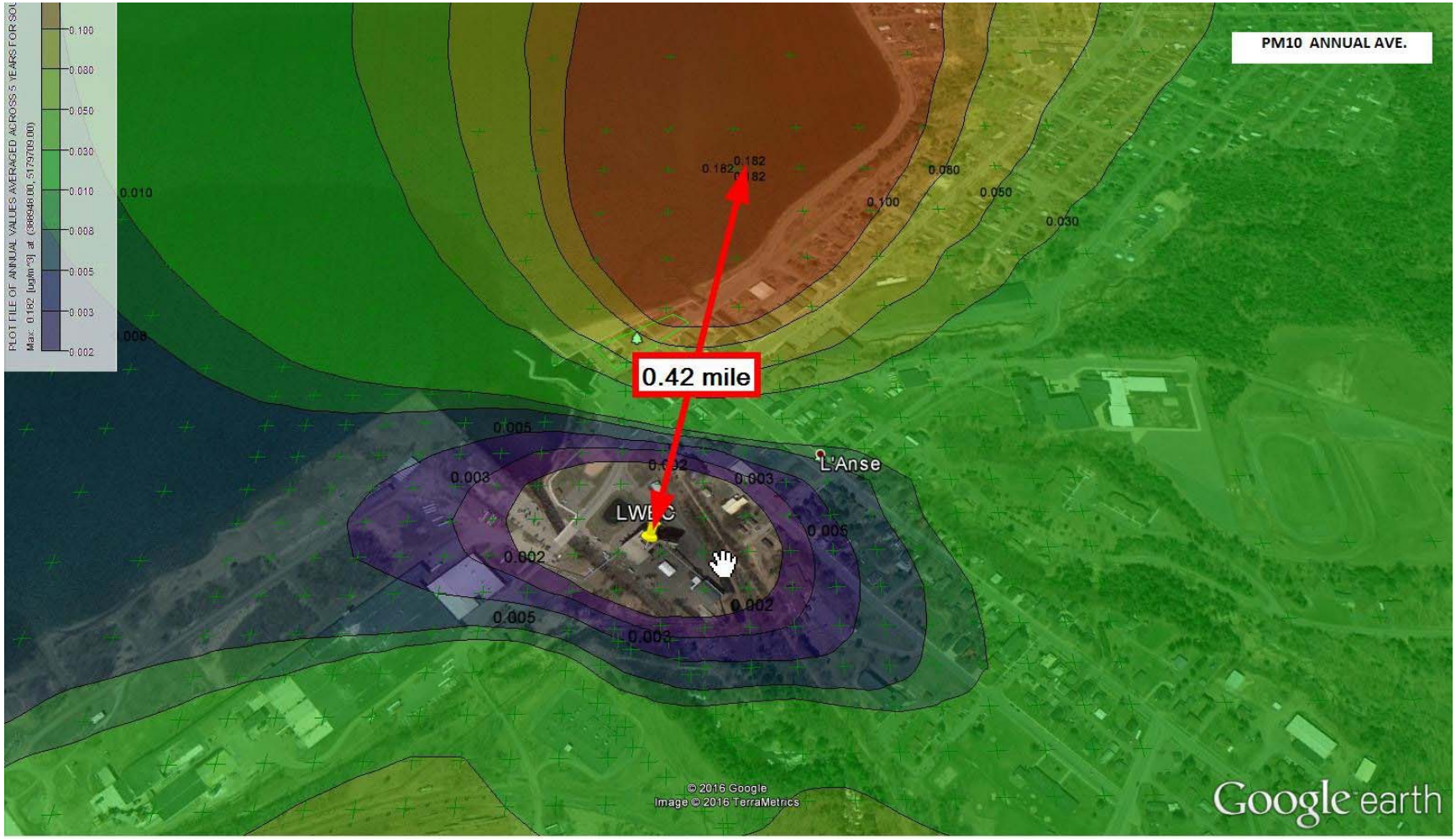


Figure 5. Lead – Maximum Monthly Average Modeled Ambient Air Concentrations, ug/m^3

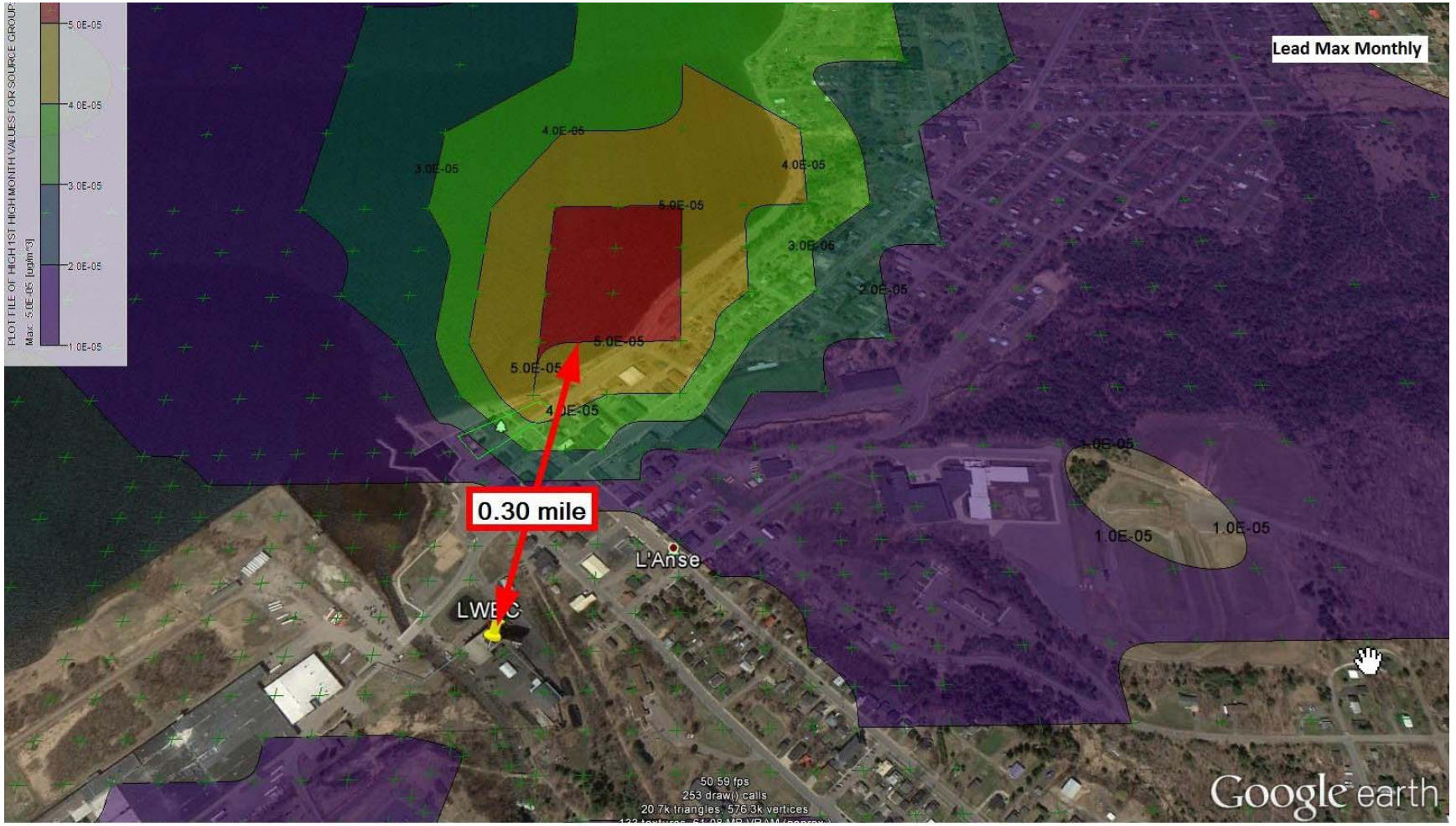


Figure 6. Generic Hazardous Air Pollutant (HAP) – Maximum 1-Hour Average Modeled Ambient Air Concentrations, ug/m^3

Figure is based on modeling 1-gram-per-second emissions of a generic HAP. EPA modelers substituted pollutant-specific emissions rate, per the stack test results shown in Appendix B, to estimate maximum modeled air concentration for hydrochloric acid, dioxins, arsenic, lead, and nickel as shown on Table 1 in Section 4.1.

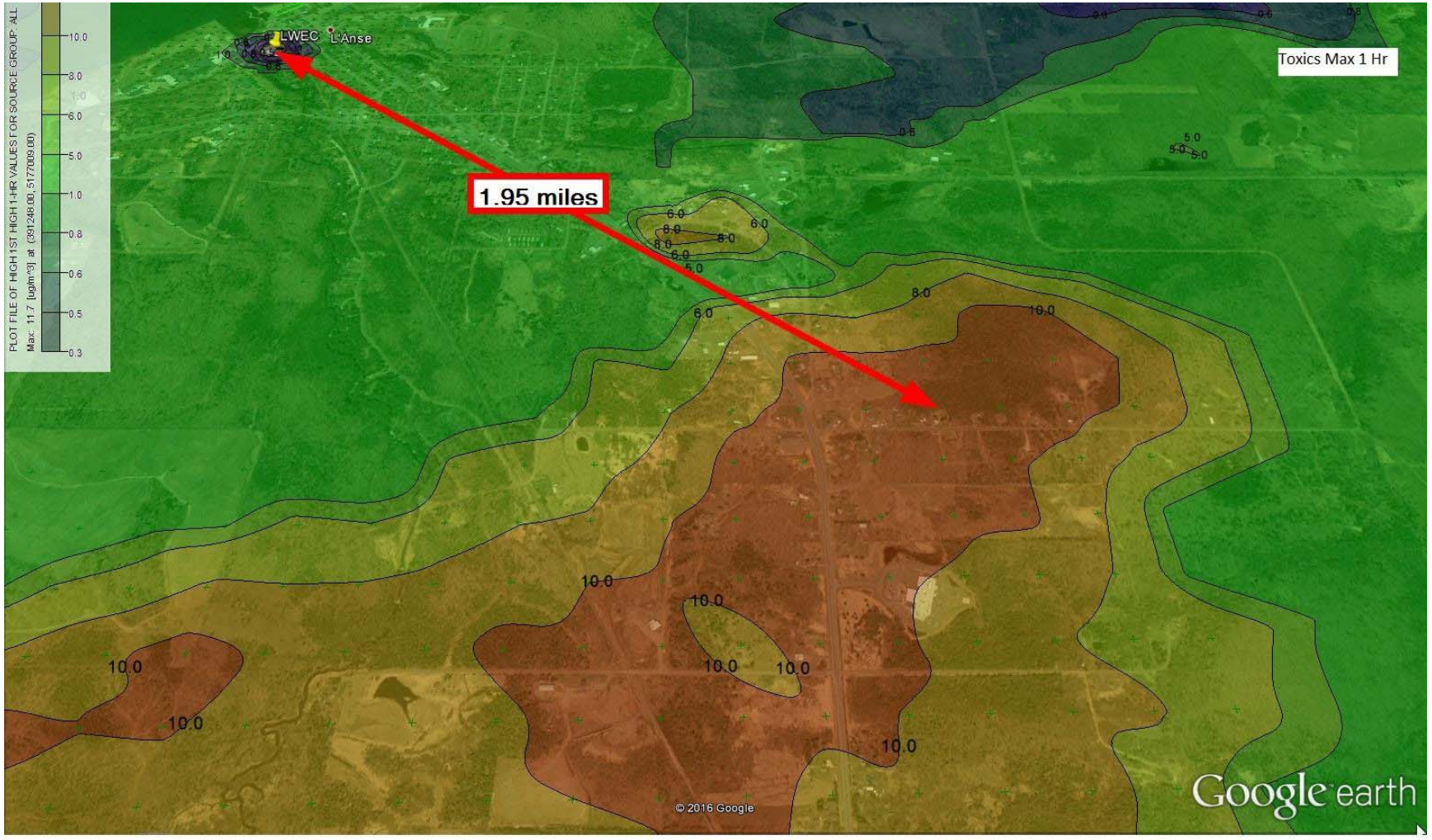


Figure 7. Generic Hazardous Air Pollutant (HAP) – Maximum 8-Hour Average Modeled Ambient Air Concentrations, ug/m^3

Figure is based on modeling 1-gram-per-second emissions of a generic HAP. EPA modelers substituted pollutant-specific emissions rate, per the stack test results shown in Appendix B, to estimate maximum modeled air concentration for hydrochloric acid, dioxins, arsenic, lead, and nickel as shown on Table 1 in Section 4.1.

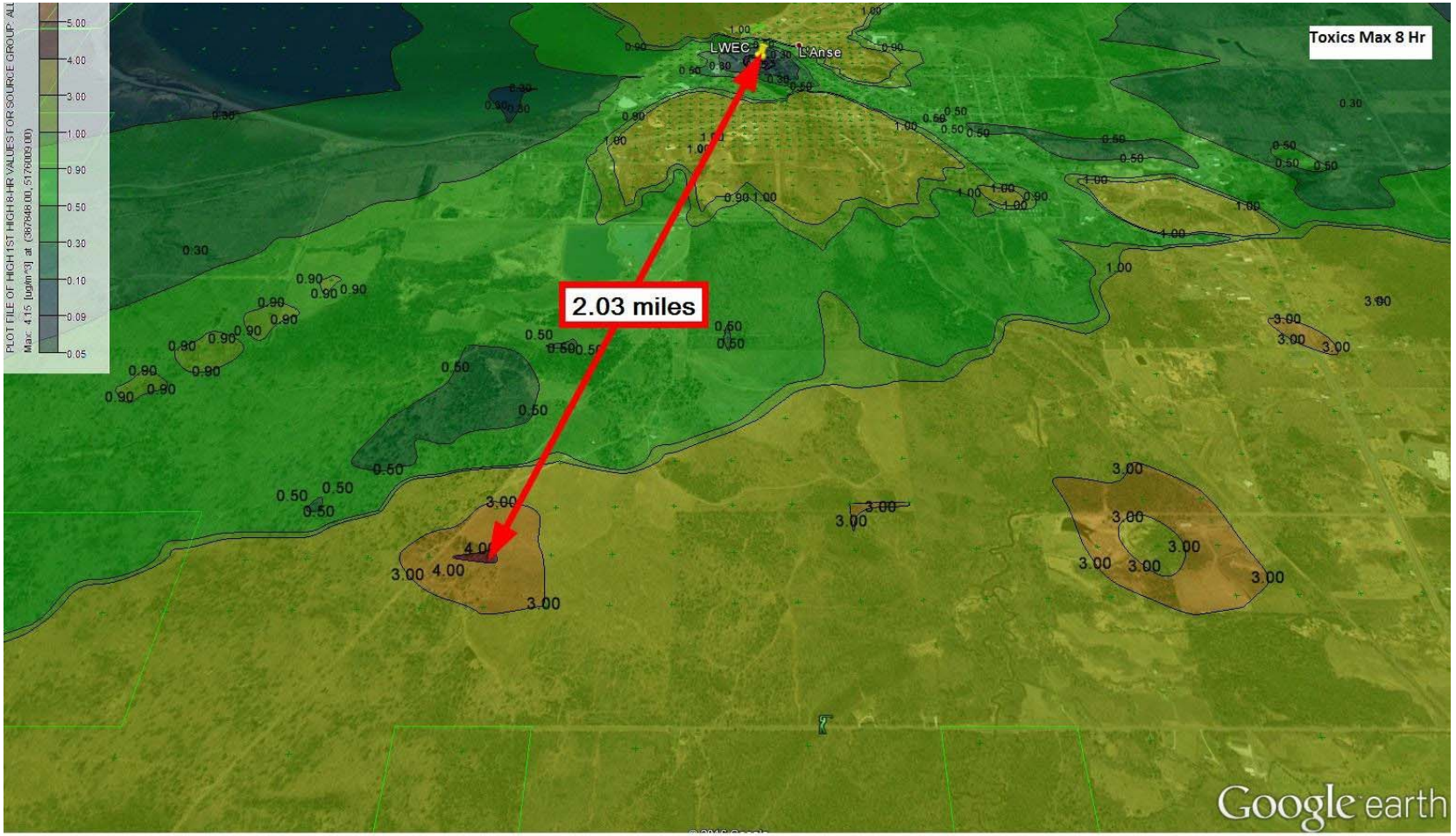


Figure 8. Generic Hazardous Air Pollutant (HAP) – Maximum 24-Hour Average Modeled Ambient Air Concentrations, ug/m^3

Figure is based on modeling 1-gram-per-second emissions of a generic HAP. EPA modelers substituted pollutant-specific emissions rate, per the stack test results shown in Appendix B, to estimate maximum modeled air concentration for hydrochloric acid, dioxins, arsenic, lead, and nickel as shown on Table 1 in Section 4.1.

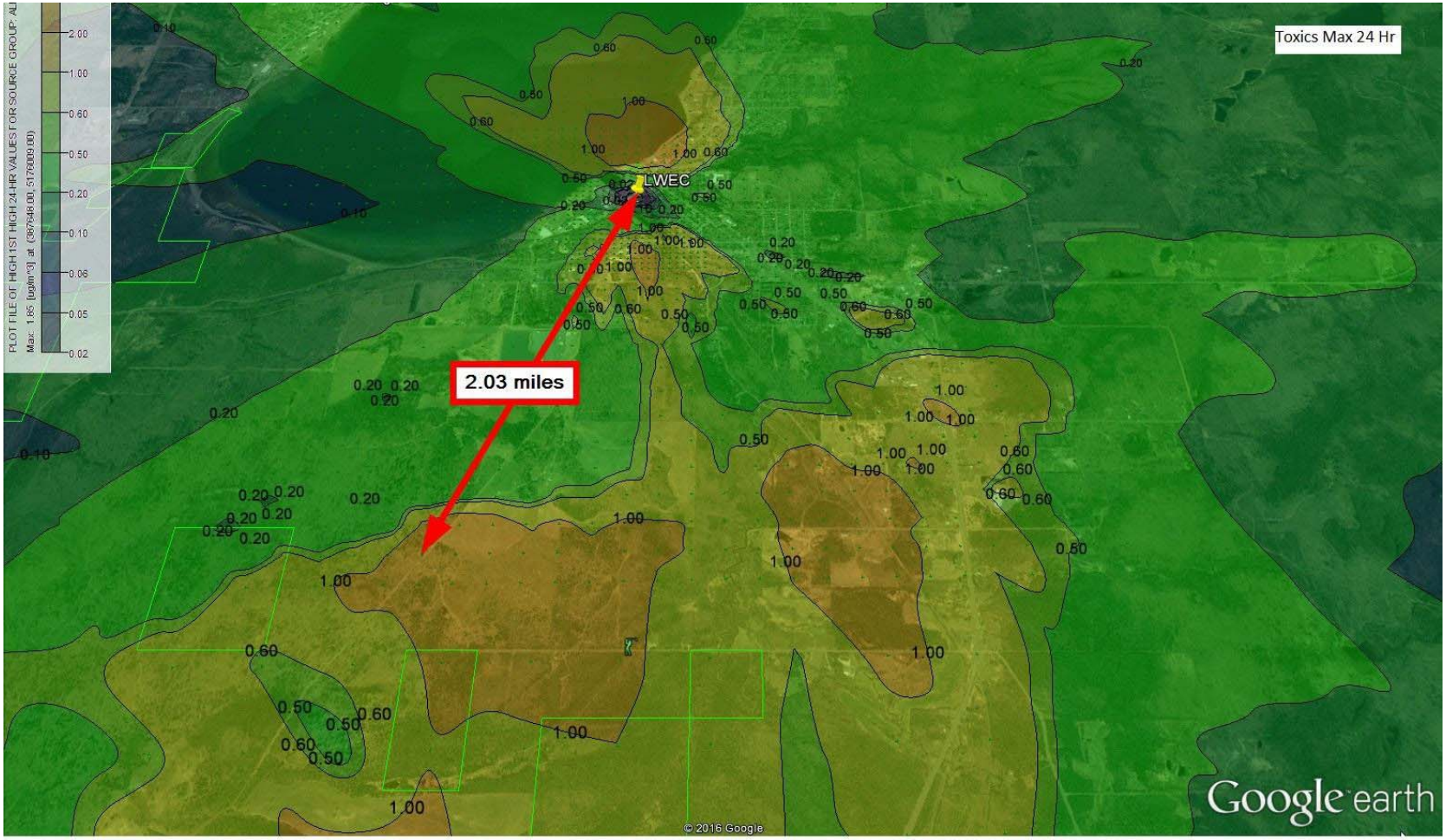
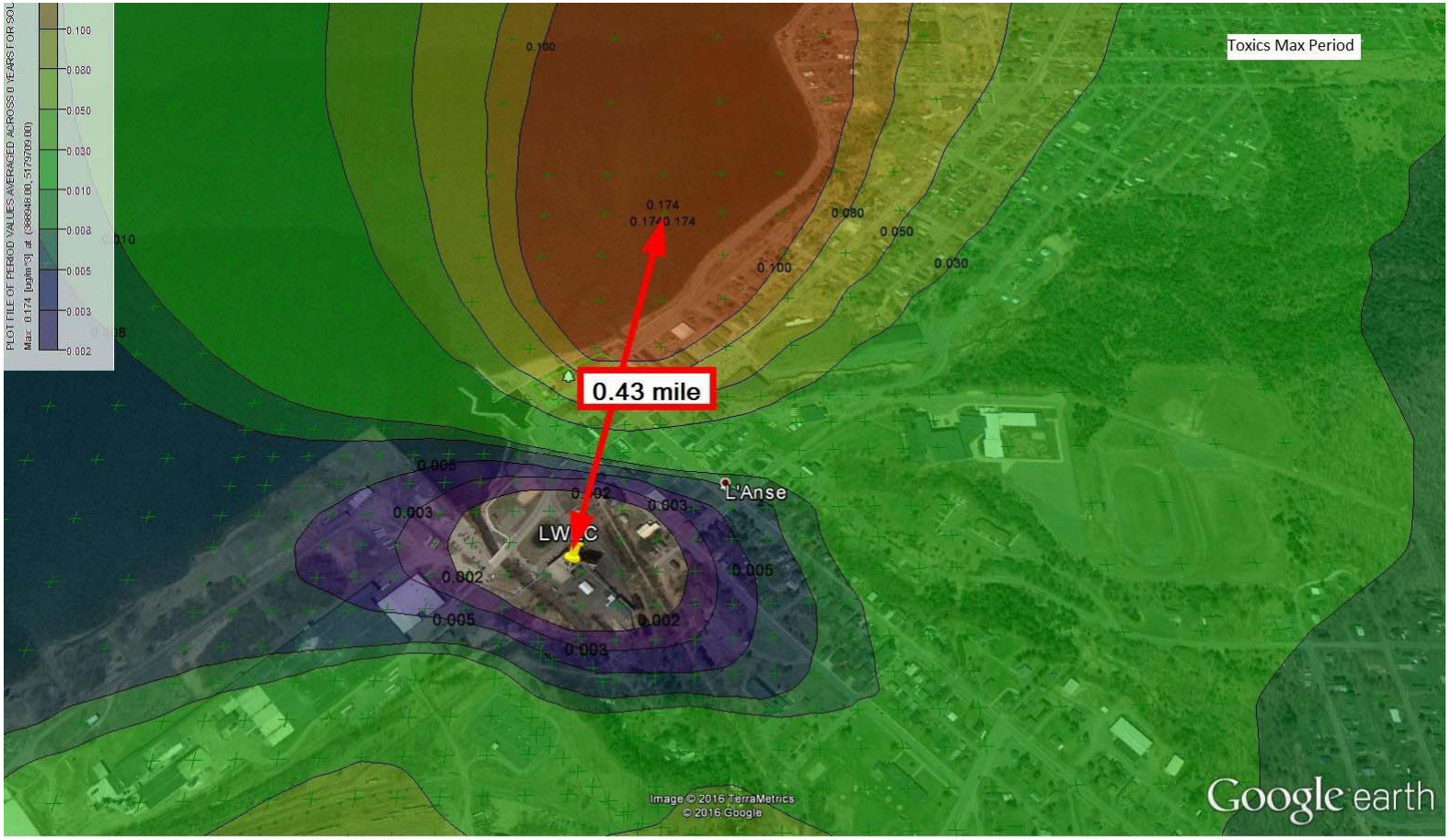


Figure 9. Generic Hazardous Air Pollutant (HAP) – 5-Year Average Modeled Ambient Air Concentrations, ug/m^3

Figure is based on modeling 1-gram-per-second emissions of a generic HAP. EPA modelers substituted pollutant-specific emissions rate, per the stack test results shown in Appendix B, to estimate maximum modeled air concentration for hydrochloric acid, dioxins, arsenic, lead, and nickel as shown on Table 1 in Section 4.1.



APPENDIX E

EPA Soil Sampling and Analysis Plan

DRAFT SAMPLING AND ANALYSIS PLAN
RESIDENTIAL AND OFFSITE SOIL SAMPLING; WARDEN POWER PLANT, L'ANSE, MI

SITE NAME:	Warden Power Plant and Residential	
SITE LOCATION:	L'Anse Michigan	
SAMPLING ACTIVITIES:	Investigative Soil Sampling	
SAMPLING DATES:	November 8-10, 2016	
SAP PREPARER:	Charles Roth	
SIGNATUREill ATE	Charles Roth	10/26/2016
PROJECT REVIEWER:	Sarah Marshall	
SIGNATUREillATE:		10/27/16

OBJECTIVE OF SAMPLING

The L'Anse Warden Electric Company, LLC (LWEC) is a biomass boiler that bums railroad ties soaked in creosote and pentachlorophenol, tires, and wood chips as fuel since 2008 (LWEC ceased burning pentachlorophenol ties in 2015).

EPA Region 5 has been receiving complaints of fugitive dust from the residences of L'Anse, Michigan for over a year. EPA required LWEC to conduct stack testing in July 2016. The results showed the presence of particulate matter, metals, dioxins, cresols, hydrogen chloride, and volatile organic compounds. EPA believes the dioxin levels were higher when the pentachlorophenol ties were burned at LWEC and may have settled in the soils in the L'Anse area.

Since there has not been soil sampling to determine if there is significant deposition of chemical of concern in the vicinity of the power plant, soil samples will be taken in the top 3 inches of residential yards, schools and public areas in the potentially affected town of L'Anse, MI and the nearby town of Zeba, MI, 3 miles to the North. This soil sampling will provide a better nnderstanding of the magnitude and extent of dioxin/furan soil concentrations along with other chemicals of concern (SVOCs and Metals). T11is Sampling and Analysis Plan (SAP) provides the details of the sampling plan and laboratory analysis. Site background infonnation, sampling methods, and analytical methods proposed in this Sampling and Analysis Plan [SAP] were provided by the U.S. Environmental Protection Agency (EPA)Region 5.

SAMPLING METHODS

This SAP will cover the scope for soil sampling to be completed in November 2016, directed by EPA Field Environmental Division Support (FIELDS). General sampling locations (residences, schools, and public areas in L'Anse, **MI** and Zeba, **MI)** have been predete1mined and are shown in the attached FIELDS Warden Power Plant Sample Design. Approximately twenty locations will be sampled with the specific property/location determined in the field from the access agreements.

SOIL SAMPLING

FIELDS will collect a total of 20 soil samples, including two duplicate samples and one MS/MSDS. Sixteen soil samples will be collected from residences and public areas in L'Anse and 4 soil samples from residences in Zeba. All soil samples will be collected using a hand corer or auger from the top 3 inches of

soil (grass and debris removed). The sample will be a composite of 5 locations in a front yard or back yard. School and park samples composites will be taken from an area equal to the average residential yard. All composites will be placed in a gallon plastic bag and thoroughly mixed before filling sample jars. The remaining soil wiJI be returned into the sampling holes. For additional infonnation see attached FIELDS Warden Power Plant Sample Design. All soil samples will be analyzed for Dioxins and Furans, SVOCs and Metals (see Tables I & 2 for analytical summary).

SAMPLE HANDLING

Sampling locations will be noted in the site logbook and all locations recorded with GPS. Samples will be assigned a unique sampling identification number. The identifier will be composed of the following information:

- Site name (WPP= Warden Power Plant)
- Section (N=North of Site, S=South of Site, A=Near Site, Z=Zeba)
- Matrix (S = Soil)
- Sample number
- Sampling date

An example sampling identification numbers would be: WPP-ZSO1-20161107.

Samples will be immediately placed in an iced cooler and maintained at a temperature of 4 ± 2°C until they are delivered to the laboratory under standard Chain of Custody protocol.

The collected samples will be labeled, packaged, and shipped in accordance with CLP and CRL procedures. Splits from all samples will be sent to a CLP lab for dioxin/furans analysis and to the USEPA Region 05 CRL (Chicago) for SVOC and Metals analysis. Samples will be submitted under standard turnaround time, unless otherwise directed.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Field Quality Assurance/Quality Control (QA/QC) measures include the collection of one duplicate sample for every IO samples and one MS/MSDS sample for every 20 samples. The FIELDS team leader will be responsible for ensuring that sample quality and integrity are maintained and that sample label and documentation procedures are in accordance with the CLP and CLR Lab.

5.0 DECONTAMINATION

The sampling team will decontaminate all equipment used to collect samples using Liquinox in spray bottles, scrub brushes, and distilled rinse water.

TABLE 1: SAMPLE SUMMARY

Matrix	**Parameter**	Number of Investigative Samples	Number of Quality Control (QC) Samples				Number of **Investigative** and QC Samples
			Field Duplicate	MS/MSD	Equipment Blank	Trip Blank	
Soil	Dioxins/Furans and SVOCs	20	2	1	0	0	22

Notes:

MS/MSD Matrix spike/ matrix spike duplicate
QC Quality Control
SVOC Semivolatile organic compounds

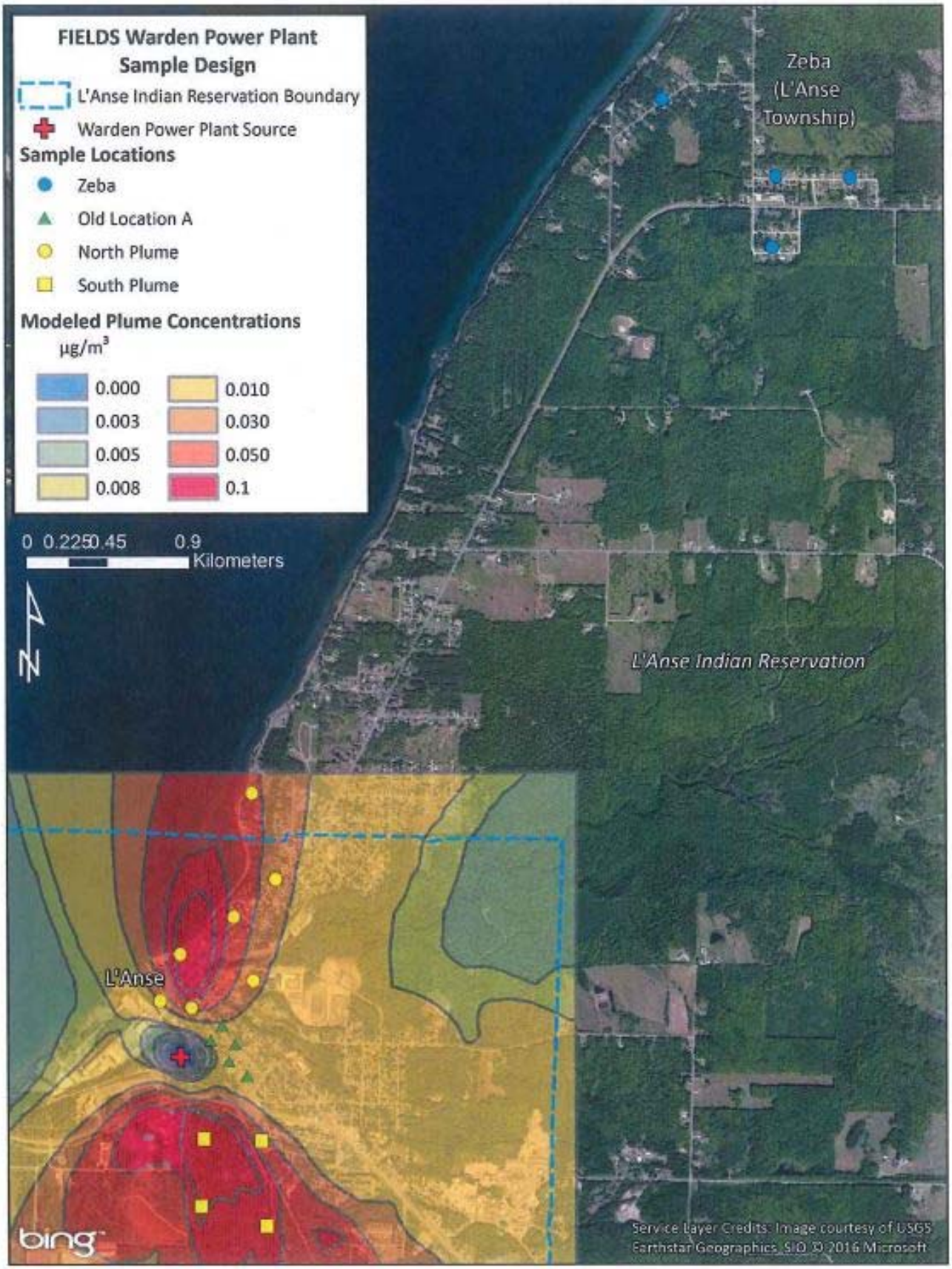
TABLE 2: ANALYTICAL PARAMETERS AND METHODS

Matrix	Parameter	Concentration Level'	Analytical Method	Volumes and Containers	Preservation	Holding Timeb
Soil	Dioxin/Foran (CLP)	Unknown	SW-846 82904 &1613B	One4-**ounce** amber glass jar with Teflon®-lined cap	Cool to 4° C ±2° C	30 days
Soil	**SVOCO** (CRL)	Unknown	SW-846 8270D	One4-ounce glass jar with Teflon®-lined cap	Cool to 4° C ±2° C	14 days
Soil	TALMetals (CRL)	Unknown	SW-846 6010C&200.7 60204&200.8	One4-ounce glass jar with Teflon®-lined cap	Cool to 4° C ±2° C	6 months

Notes:

See Tetra Tech QAPP Worksheet #15 for reporting limits
Holding time is measured from the time of sample collection to the time of sample extraction and analysis.
SVOC Semivolatile organic compounds

Attachment – Site Map


FIELDS Warden Power Plant
Sample Design
L'Anse Indian Reservation Boundary
Warden Power Plant Source
Sample Locations
Zeba
Old Location A
North Plume
South Plume
Modeled Plume Concentrations
µg/m³
0.000
0.003
0.005
0.008
0.010
0.030
0.050
0.1
0 0.225 0.45 0.9
Kilometers
N
Zeba
(L'Anse
Township)
L'Anse Indian Reservation
L'Anse
bing
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APPENDIX F

Soil Sampling Results

Soil Results Summary Tables

Table 1F. Soil Sampling Site Key

EPA Sample Location	Sampling Zone	New Sample Location Name	New Sampling Zone Name
A1	Near Site	E4	East of Site
A2	Near Site	E5	East of Site
A3	Near Site	E6	East of Site
A4	Near Site	E2	East of Site
A5	Near Site	E3	East of Site
N1	North of Site	E1	East of Site
N2	North of Site	N2	North Plume
N3	North of Site	N3	North Plume
N4	North of Site	L2	L'Anse Other
N5	North of Site	L3	L'Anse Other
N6	North of Site	N1	North Plume
N7	North of Site	L1	L'Anse Other
S1	South of Site	L6	L'Anse Other
S2	South of Site	L4	L'Anse Other
S3	South of Site	L7	L'Anse Other
S4	South of Site	L5	L'Anse Other
Z1	Zeba	Z1	Zeba
Z2	Zeba	Z2	Zeba
Z3	Zeba	Z3	Zeba
Z4	Zeba	Z4	Zeba

Table 2F. SVOC Concentrations in Soil and Cancer Risk Evaluation Guide (CREG), parts per billion (ppb)

Site/ PAH	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Chrysene	Indeno-(1,2,3-cd)-pyrene	BaP TE	Dibenz(ah)-anthracene	PCP
PEF[1]	0.1	1	0.1	0.1	0.01	0.1	-	-	-
CREG[2]	1,200	120	1,200	1,200	12,000	1,200	120	na	940
E1[4]	1,000	1,100[3]	1,800	540	1,200	610	1507	170	100
E2	140	150	400	130	250	120	232	66	22
E3	270	260	470	120	350	160	366	42	15
E4	290	330	670	210	410	260	477	66	8
E5	210	250	570	160	320	190	366	43	13
E6	390	370	625	190	430	220	517	58	4
N1	200	200	400	120	230	140	288	29	7
N2	350	400	730	250	440	280	565	70	3
N3	150	170	280	85	250	110	235	25	3
L1	11	12	42	9	22	10	19	3	3
L2	51	65	135	24	83	54	92	10	4
L3	16	18	49	11	25	13	27	3	1
L4	27	43	82	17	46	23	58	6	1
L5	30	47	110	23	55	41	68	8	2
L6	17	16	44	9	19	11	24	3	1
L7	5	8	16	6	10	28	14	22	1
Z1	56	58	94	26	58	28	79	7	1
Z2	1	1	3	1	2	1	2	1	1
Z3	4	3	4	3	4	3	5	2	1
Z4	17	14	24	8	17	9	20	2	1

1. Potency Equivalency Factor (PEF)
2. The BaP Cancer Risk Evaluation Guide (CREG) was divided by each respective PAH's PEF to generate a pollutant-specific HCV.
3. Concentrations shaded gray exceed CREG

Table 3F. Example Soil Sample (Site L4) Chlorinated Dibenzo-p-dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Toxic Equivalence Factors (TEFs)[1], TEF-Adjusted Concentrations, and Toxic Equivalent (TEQ) Calculation, parts per trillion (ppt)

Target Analyte	Concentration	TEF Mammal	TEF-Adj. Conc.
2,3,7,8-TCDD		x 1 =	
1,2,3,7,8-PeCDD	0.63	x 1 =	.63
1,2,3,4,7,8-HxCDD	0.99	x 0.1 =	.099
1,2,3,6,7,8-HxCDD	6.1	x 0.1 =	.61
1,2,3,7,8,9-HxCDD	1.4	x 0.1 =	.14
1,2,3,4,6,7,8-HpCDD	88	x 0.01 =	.88
OCDD	350	x 0.0003 =	.105
2,3,7,8-TCDF		x 0.1 =	
1,2,3,7,8-PeCDF	3.8	x 0.03 =	.114
2,3,4,7,8-PeCDF	9.5	x 0.3 =	2.85
1,2,3,4,7,8-HxCDF	31	x 0.1 =	3.1
1,2,3,6,7,8-HxCDF	47	x 0.1 =	4.7
1,2,3,7,8,9-HxCDF	12	x 0.1 =	1.2
2,3,4,6,7,8-HxCDF	44	x 0.1 =	4.4
1,2,3,4,6,7,8-HpCDF	12000	x 0.01 =	120
1,2,3,4,7,8,9-HpCDF	15	x 0.01 =	.15
OCDF	4100	x 0.0003 =	1.23
		Total TEQ =	140

1. Van den Berg et al. 2006. The 2005 World Health Organization Re-Evaluation of Human and Mammalian Toxic Equivalence Factors for Dioxin and Dioxin-like Compounds. Toxicological Sciences 2006 93(2):223-241.

Table 4F. Chlorinated Dibenzo-p-dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) in Soil: Concentrations, Toxic Equivalence Factors (TEFs), TEF-Adjusted Concentrations, and Toxic Equivalent (TEQ), parts per trillion (ppt)

EMEG[1] = 57 CREG[2] = 2.9		1,2,3,4,6,7,8-HpCDD		1,2,3,6,7,8-HxCDD		1,2,3,7,8-PeCDD		2,3,7,8-TCDD		1,2,3,4,6,7,8-HpCDF		1,2,3,4,7,8-HxCDF	
TEF		0.01		0.1		1.0		1.0		0.01		0.1	
Site	TEQ[3]	Conc.	TEF-Adj. Conc.	Conc.	TEF-Adj. Conc.	Conc.	TEF-Adj. Conc.	Conc.	TEF-Adj. Conc.	Conc.	TEF-Adj. Conc.	Conc.	TEF-Adj. Conc.
E1	23	870	8.7	28	2.8	2.4	2.4	0.2	0.20	190	1.9	6.1	0.61
E2	10	440	4.4	13	1.3	1.1	1.1	0.18	0.18	86	0.86	2.3	0.23
E3	14	410	4.1	14	1.4	2.7	2.7	0.2	0.20	120	1.2	4.5	0.45
E4	7.3	200	2.0	7.1	0.71	0.97	0.97	0.91	0.91	48	0.48	3.4	0.34
E5	5	180	1.8	5.7	0.57	0.9	0.9	0.19	0.19	31	0.31	1.1	0.11
E6	1.9	43	0.43	1.8	0.18	0.53	0.53	0.21	0.21	10.8	0.11	0.78	0.078
N1	7.2	280	2.8	8.3	0.83	0.94	0.94	0.26	0.26	52	0.52	1.1	0.11
N2	3.6	100	1.0	3.5	0.35	0.55	0.55	0.17	0.17	26	0.26	2.1	0.21
N3	3	64	0.64	2.7	0.27	0.87	0.87	0.22	0.22	14	0.14	1.1	0.11
L1	0.7	30	0.30	0.9	0.09	0.33	0.33	0.16	0.16	6.6	0.066	0.48	0.048
L2	0.83	39.5	0.395	1.65	0.165	0.94	0.94	0.35	0.35	8.55	0.0855	1.16	0.12
L3	0.32	14	0.14	0.65	0.065	0.29	0.29	0.17	0.17	3.4	0.034	0.25	0.025
L4	**140**	88	0.88	6.1	0.61	0.63	0.63	0.2	0.20	13,000	**130**	31	3.1
L5	3.4	47	0.47	1.7	0.17	0.32	0.32	0.21	0.21	32	0.32	10	1.0
L6	0.48	20	0.20	0.59	0.059	0.29	0.29	0.13	0.13	3	0.03	0.25	0.025
L7	0.53	20	0.20	1.2	0.12	0.35	0.35	0.22	0.22	4.1	0.041	0.29	0.029
Z1	0.095	6.5	0.065	0.24	0.024	0.29	0.29	0.12	0.12	1.6	0.016	0.25	0.025
Z2	0.076	3.4	0.034	0.26	0.026	0.32	0.32	0.14	0.14	1.2	0.012	0.27	0.027
Z3	0.05	3.3	0.033	0.34	0.034	0.3	0.30	0.25	0.25	0.92	0.0092	0.25	0.025
Z4	1.3	59	0.59	1.9	0.19	0.31	0.31	0.24	0.24	7.8	0.078	0.44	0.044

1. Environmental Media Evaluation Guide (EMEG)
2. Cancer Risk Evaluation Guide (CREG)
3. Concentrations that exceed CREG shaded gray; samples that exceed CREG and EMEG in bold and shaded.

Laboratory Results for Soil Metals Analysis

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 CHICAGO REGIONAL LABORATORY

536 SOUTH CLARK STREET

CHICAGO, ILLINOIS 60605

LABORATORY ACCREDITATION BUREAU ACCREDITED ISO/IEC 17025
Certificate # L2280 Testing

Date: **2/2/2017**

Subject: **Review of Region 5 Data for L'Anse, Michigan Biomass Utility Soil Sampling**

To: **Air Division, US EPA Region 5**
77 West Jackson Boulevard
Chicago, IL 60605

From: **Amanda Wroble, Chemist**
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with the EPA QA/G-8 *Guidance on Environmental Data Verification and Data Validation* and the U.S. EPA Region 5 RMD QMP, CRL performs data verification on all the data generated internally. CRL does not perform data validation or quality assessment procedures.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X_____

Please contact the analyst with any technical report issues, Robert Thompson at (312)-353-9078 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: L'Anse, Michigan Biomass Utility Soil Sampling

_____ / /

Data Coordinator and Date Transmitted

Analyses included in this report:

Metals ICP-MS (s)

ANALYSIS CASE NARRATIVE

GENERAL INFORMATION

CRL received 22 soil samples for trace metals analysis by inductively coupled plasma-mass spectrometry (ICP-MS) on November 15, 2016. The assigned work order(s) and sample numbers to which this narrative applies are listed below:

Work Order (number of samples)	Batch Number
1611041 (22)	B16L009

The designated analyst for these samples, Amanda Wroble, can be reached at 312.353.0375. All holding times were met.

The samples were digested using CRL SOP METALS025, Rev. 2 (EPA Method 200.2) and analyzed using CRL SOP METALS001, Rev. 5 (EPA Method 200.8).

SAMPLE ANALYSIS AND RESULTS

The data reported herein meet the requirements referenced in the SOP used for analysis and any laboratory specifications stated in "Sampling and Analysis Plan - Residential and Offsite Soil Sampling; Warden Power Plant, L'Anse, MI" final signature dated October 27, 2016, and email communication with the client with the following exception. The arsenic reporting limit (0.50 mg/kg) was greater than the ATSDR health comparison value (0.25 mg/kg). All arsenic field sample results were greater than the reporting limit; therefore, failure to report down to the health comparison value is of no consequence to the data.

Manganese results for samples 1611041-01, B16L009-DUP1, B16L009-MS1, 1611041-04, and 1611041-20 exceeded the highest calibration standard (500 µg/L). Therefore, manganese results for the listed samples were reported from a 25-fold dilution.

QUALITY CONTROL

All quality control audits that bracketed samples to which this narrative applies and the run in which a specific sample/analyte was reported were within CRL limits for the requested analytes or did not result in qualification of the data except the following:

Duplicate (DUP): Relative Percent Difference Limit ≤ 20%. Cobalt (22.8%), copper (21.9%), nickel (21.9%), and vanadium (27.2%) were outside the duplicate audit limit for B16L009-DUP2. The corresponding results in the source sample 1611041-11 were flagged "J" for imprecision.

Matrix Spike (MS): Recovery Limit = 100 ± 25%. Manganese was outside the matrix spike audit limits for B16L009-MS1 (516%), -MS2 (461%), and -MS3 (71.6%). The added spike concentration was less than 30% of the native manganese results in the source samples 1611041-01, -11, and -21. Therefore, the blank spikes were used as the accuracy audit. No flag was applied to the results based on the blank spike audit, as the blank spike recoveries were within the audit limit.

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N007	1611041-01	Soil	Nov-08-16 10:11	Nov-15-16 11:30
N004	1611041-02	Soil	Nov-08-16 10:36	Nov-15-16 11:30
N004-D	1611041-03	Soil	Nov-08-16 10:36	Nov-15-16 11:30
N003	1611041-04	Soil	Nov-08-16 10:58	Nov-15-16 11:30
Z004	1611041-05	Soil	Nov-08-16 11:22	Nov-15-16 11:30
Z002	1611041-06	Soil	Nov-08-16 11:44	Nov-15-16 11:30
Z003	1611041-07	Soil	Nov-08-16 12:04	Nov-15-16 11:30
Z001	1611041-08	Soil	Nov-08-16 12:27	Nov-15-16 11:30
A002	1611041-09	Soil	Nov-08-16 13:40	Nov-15-16 11:30
N001	1611041-10	Soil	Nov-08-16 13:59	Nov-15-16 11:30
A004	1611041-11	Soil	Nov-08-16 14:23	Nov-15-16 11:30
A001	1611041-12	Soil	Nov-08-16 14:43	Nov-15-16 11:30
A005	1611041-13	Soil	Nov-08-16 15:00	Nov-15-16 11:30
A003	1611041-14	Soil	Nov-09-16 09:38	Nov-15-16 11:30
A003-D	1611041-15	Soil	Nov-09-16 09:38	Nov-15-16 11:30
N005	1611041-16	Soil	Nov-09-16 10:00	Nov-15-16 11:30
N006	1611041-17	Soil	Nov-09-16 10:29	Nov-15-16 11:30
N002	1611041-18	Soil	Nov-09-16 10:50	Nov-15-16 11:30
S003	1611041-19	Soil	Nov-09-16 11:14	Nov-15-16 11:30
S001	1611041-20	Soil	Nov-09-16 11:30	Nov-15-16 11:30
S002	1611041-21	Soil	Nov-09-16 11:56	Nov-15-16 11:30
S004	1611041-22	Soil	Nov-09-16 12:33	Nov-15-16 11:30

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

N007 (1611041-01) **Matrix: Soil** **Sampled: Nov-08-16 10:11** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.53	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**3.3**			0.53	"	"	"	"	"
Barium	**43**			5.3	"	"	"	"	"
Beryllium	**U**			0.53	"	"	"	"	"
Cadmium	**U**			0.53	"	"	"	"	"
Chromium	**11**			0.27	"	"	"	"	"
Cobalt	**4.3**			0.27	"	"	"	"	"
Copper	**15**			0.53	"	"	"	"	"
Lead	**6.8**			0.27	"	"	"	"	"
Manganese	**530**			2.7	"	25	"	"	Jan-30-17
Molybdenum	**U**			0.53	"	5	"	"	Jan-30-17
Nickel	**10**			0.53	"	"	"	"	"
Selenium	**U**			1.1	"	"	"	"	"
Silver	**U**			0.53	"	"	"	"	"
Thallium	**U**			0.27	"	"	"	"	"
Thorium	**U**			2.7	"	"	"	"	"
Uranium	**0.53**			0.27	"	"	"	"	"
Vanadium	**21**			0.53	"	"	"	"	"
Zinc	**38**			5.3	"	"	"	"	"

N004 (1611041-02) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.53	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.0**			0.53	"	"	"	"	"
Barium	**20**			5.3	"	"	"	"	"
Beryllium	**U**			0.53	"	"	"	"	"
Cadmium	**U**			0.53	"	"	"	"	"
Chromium	**6.9**			0.27	"	"	"	"	"
Cobalt	**2.1**			0.27	"	"	"	"	"
Copper	**11**			0.53	"	"	"	"	"
Lead	**7.3**			0.27	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

N004 (1611041-02) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Manganese	**130**			0.53	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Molybdenum	**U**			0.53	"	"	"	"	"
Nickel	**6.6**			0.53	"	"	"	"	"
Selenium	**U**			1.1	"	"	"	"	"
Silver	**U**			0.53	"	"	"	"	"
Thallium	**U**			0.27	"	"	"	"	"
Thorium	**U**			2.7	"	"	"	"	"
Uranium	**0.33**			0.27	"	"	"	"	"
Vanadium	**13**			0.53	"	"	"	"	"
Zinc	**28**			5.3	"	"	"	"	"

N004-D (1611041-03) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.51	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**1.9**			0.51	"	"	"	"	"
Barium	**16**			5.1	"	"	"	"	"
Beryllium	**U**			0.51	"	"	"	"	"
Cadmium	**U**			0.51	"	"	"	"	"
Chromium	**6.1**			0.26	"	"	"	"	"
Cobalt	**1.9**			0.26	"	"	"	"	"
Copper	**11**			0.51	"	"	"	"	"
Lead	**6.9**			0.26	"	"	"	"	"
Manganese	**110**			0.51	"	"	"	"	"
Molybdenum	**U**			0.51	"	"	"	"	"
Nickel	**6.3**			0.51	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.51	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.30**			0.26	"	"	"	"	"
Vanadium	**10**			0.51	"	"	"	"	"
Zinc	**27**			5.1	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

N003 (1611041-04) **Matrix: Soil** **Sampled: Nov-08-16 10:58** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.48	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**5.0**			0.48	"	"	"	"	"
Barium	**210**			4.8	"	"	"	"	"
Beryllium	**U**			0.48	"	"	"	"	"
Cadmium	**U**			0.48	"	"	"	"	"
Chromium	**11**			0.24	"	"	"	"	"
Cobalt	**3.2**			0.24	"	"	"	"	"
Copper	**29**			0.48	"	"	"	"	"
Lead	**26**			0.24	"	"	"	"	"
Manganese	**480**			2.4	"	25	"	"	Jan-30-17
Molybdenum	**1.1**			0.48	"	5	"	"	Jan-30-17
Nickel	**9.4**			0.48	"	"	"	"	"
Selenium	**U**			0.95	"	"	"	"	"
Silver	**U**			0.48	"	"	"	"	"
Thallium	**U**			0.24	"	"	"	"	"
Thorium	**U**			2.4	"	"	"	"	"
Uranium	**3.6**			0.24	"	"	"	"	"
Vanadium	**25**			0.48	"	"	"	"	"
Zinc	**51**			4.8	"	"	"	"	"

Z004 (1611041-05) **Matrix: Soil** **Sampled: Nov-08-16 11:22** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.51	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.2**			0.51	"	"	"	"	"
Barium	**40**			5.1	"	"	"	"	"
Beryllium	**U**			0.51	"	"	"	"	"
Cadmium	**U**			0.51	"	"	"	"	"
Chromium	**10**			0.26	"	"	"	"	"
Cobalt	**3.1**			0.26	"	"	"	"	"
Copper	**13**			0.51	"	"	"	"	"
Lead	**10**			0.26	"	"	"	"	"
Manganese	**180**			0.51	"	"	"	"	"
Molybdenum	**U**			0.51	"	"	"	"	"
Nickel	**8.9**			0.51	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

Z004 (1611041-05) **Matrix: Soil** **Sampled: Nov-08-16 11:22** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Selenium	**U**			1.0	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Silver	**U**			0.51	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.55**			0.26	"	"	"	"	"
Vanadium	**21**			0.51	"	"	"	"	"
Zinc	**37**			5.1	"	"	"	"	"

Z002 (1611041-06) **Matrix: Soil** **Sampled: Nov-08-16 11:44** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.52	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.3**			0.52	"	"	"	"	"
Barium	**33**			5.2	"	"	"	"	"
Beryllium	**U**			0.52	"	"	"	"	"
Cadmium	**U**			0.52	"	"	"	"	"
Chromium	**8.8**			0.26	"	"	"	"	"
Cobalt	**3.1**			0.26	"	"	"	"	"
Copper	**7.4**			0.52	"	"	"	"	"
Lead	**5.3**			0.26	"	"	"	"	"
Manganese	**130**			0.52	"	"	"	"	"
Molybdenum	**U**			0.52	"	"	"	"	"
Nickel	**7.9**			0.52	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.52	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.52**			0.26	"	"	"	"	"
Vanadium	**18**			0.52	"	"	"	"	"
Zinc	**26**			5.2	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

Z003 (1611041-07) **Matrix: Soil** **Sampled: Nov-08-16 12:04** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.48	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**1.7**			0.48	"	"	"	"	"
Barium	**28**			4.8	"	"	"	"	"
Beryllium	**U**			0.48	"	"	"	"	"
Cadmium	**U**			0.48	"	"	"	"	"
Chromium	**6.8**			0.24	"	"	"	"	"
Cobalt	**2.3**			0.24	"	"	"	"	"
Copper	**6.4**			0.48	"	"	"	"	"
Lead	**3.8**			0.24	"	"	"	"	"
Manganese	**120**			0.48	"	"	"	"	"
Molybdenum	**U**			0.48	"	"	"	"	"
Nickel	**5.6**			0.48	"	"	"	"	"
Selenium	**U**			0.96	"	"	"	"	"
Silver	**U**			0.48	"	"	"	"	"
Thallium	**U**			0.24	"	"	"	"	"
Thorium	**U**			2.4	"	"	"	"	"
Uranium	**0.41**			0.24	"	"	"	"	"
Vanadium	**15**			0.48	"	"	"	"	"
Zinc	**18**			4.8	"	"	"	"	"

Z001 (1611041-08) **Matrix: Soil** **Sampled: Nov-08-16 12:27** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.51	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.2**			0.51	"	"	"	"	"
Barium	**32**			5.1	"	"	"	"	"
Beryllium	**U**			0.51	"	"	"	"	"
Cadmium	**U**			0.51	"	"	"	"	"
Chromium	**7.8**			0.26	"	"	"	"	"
Cobalt	**2.7**			0.26	"	"	"	"	"
Copper	**17**			0.51	"	"	"	"	"
Lead	**12**			0.26	"	"	"	"	"
Manganese	**160**			0.51	"	"	"	"	"
Molybdenum	**U**			0.51	"	"	"	"	"
Nickel	**7.7**			0.51	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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Z001 (1611041-08) **Matrix: Soil** **Sampled: Nov-08-16 12:27** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Selenium	**U**			1.0	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Silver	**U**			0.51	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.40**			0.26	"	"	"	"	"
Vanadium	**14**			0.51	"	"	"	"	"
Zinc	**32**			5.1	"	"	"	"	"

A002 (1611041-09) **Matrix: Soil** **Sampled: Nov-08-16 13:40** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.53	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.5**			0.53	"	"	"	"	"
Barium	**26**			5.3	"	"	"	"	"
Beryllium	**U**			0.53	"	"	"	"	"
Cadmium	**U**			0.53	"	"	"	"	"
Chromium	**10**			0.27	"	"	"	"	"
Cobalt	**3.0**			0.27	"	"	"	"	"
Copper	**25**			0.53	"	"	"	"	"
Lead	**11**			0.27	"	"	"	"	"
Manganese	**150**			0.53	"	"	"	"	"
Molybdenum	**U**			0.53	"	"	"	"	"
Nickel	**9.1**			0.53	"	"	"	"	"
Selenium	**U**			1.1	"	"	"	"	"
Silver	**U**			0.53	"	"	"	"	"
Thallium	**U**			0.27	"	"	"	"	"
Thorium	**U**			2.7	"	"	"	"	"
Uranium	**0.63**			0.27	"	"	"	"	"
Vanadium	**17**			0.53	"	"	"	"	"
Zinc	**28**			5.3	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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N001 (1611041-10) **Matrix: Soil** **Sampled: Nov-08-16 13:59** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**0.59**			0.52	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.7**			0.52	"	"	"	"	"
Barium	**57**			5.2	"	"	"	"	"
Beryllium	**U**			0.52	"	"	"	"	"
Cadmium	**U**			0.52	"	"	"	"	"
Chromium	**12**			0.26	"	"	"	"	"
Cobalt	**3.8**			0.26	"	"	"	"	"
Copper	**47**			0.52	"	"	"	"	"
Lead	**70**			0.26	"	"	"	"	"
Manganese	**210**			0.52	"	"	"	"	"
Molybdenum	**U**			0.52	"	"	"	"	"
Nickel	**9.4**			0.52	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.52	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.41**			0.26	"	"	"	"	"
Vanadium	**18**			0.52	"	"	"	"	"
Zinc	**110**			5.2	"	"	"	"	"

A004 (1611041-11) **Matrix: Soil** **Sampled: Nov-08-16 14:23** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.48	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**4.7**			0.48	"	"	"	"	"
Barium	**29**			4.8	"	"	"	"	"
Beryllium	**U**			0.48	"	"	"	"	"
Cadmium	**U**			0.48	"	"	"	"	"
Chromium	**6.8**			0.24	"	"	"	"	"
Cobalt	**2.2**	J		0.24	"	"	"	"	"
Copper	**9.3**	J		0.48	"	"	"	"	"
Lead	**8.6**			0.24	"	"	"	"	"
Manganese	**190**			0.48	"	"	"	"	"
Molybdenum	**U**			0.48	"	"	"	"	"
Nickel	**5.9**	J		0.48	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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A004 (1611041-11) **Matrix: Soil** **Sampled: Nov-08-16 14:23** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Selenium	**U**			0.95	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Silver	**U**			0.48	"	"	"	"	"
Thallium	**U**			0.24	"	"	"	"	"
Thorium	**U**			2.4	"	"	"	"	"
Uranium	**0.34**			0.24	"	"	"	"	"
Vanadium	**13**	J		0.48	"	"	"	"	"
Zinc	**23**			4.8	"	"	"	"	"

A001 (1611041-12) **Matrix: Soil** **Sampled: Nov-08-16 14:43** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.52	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.3**			0.52	"	"	"	"	"
Barium	**56**			5.2	"	"	"	"	"
Beryllium	**U**			0.52	"	"	"	"	"
Cadmium	**U**			0.52	"	"	"	"	"
Chromium	**13**			0.26	"	"	"	"	"
Cobalt	**3.6**			0.26	"	"	"	"	"
Copper	**30**			0.52	"	"	"	"	"
Lead	**68**			0.26	"	"	"	"	"
Manganese	**190**			0.52	"	"	"	"	"
Molybdenum	**U**			0.52	"	"	"	"	"
Nickel	**9.3**			0.52	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.52	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.50**			0.26	"	"	"	"	"
Vanadium	**18**			0.52	"	"	"	"	"
Zinc	**81**			5.2	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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A005 (1611041-13) **Matrix: Soil** **Sampled: Nov-08-16 15:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.55	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.5**			0.55	"	"	"	"	"
Barium	**53**			5.5	"	"	"	"	"
Beryllium	**U**			0.55	"	"	"	"	"
Cadmium	**U**			0.55	"	"	"	"	"
Chromium	**14**			0.28	"	"	"	"	"
Cobalt	**3.9**			0.28	"	"	"	"	"
Copper	**46**			0.55	"	"	"	"	"
Lead	**65**			0.28	"	"	"	"	"
Manganese	**250**			0.55	"	"	"	"	"
Molybdenum	**U**			0.55	"	"	"	"	"
Nickel	**11**			0.55	"	"	"	"	"
Selenium	**U**			1.1	"	"	"	"	"
Silver	**U**			0.55	"	"	"	"	"
Thallium	**U**			0.28	"	"	"	"	"
Thorium	**U**			2.8	"	"	"	"	"
Uranium	**0.42**			0.28	"	"	"	"	"
Vanadium	**18**			0.55	"	"	"	"	"
Zinc	**90**			5.5	"	"	"	"	"

A003 (1611041-14) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.53	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.4**			0.53	"	"	"	"	"
Barium	**46**			5.3	"	"	"	"	"
Beryllium	**U**			0.53	"	"	"	"	"
Cadmium	**U**			0.53	"	"	"	"	"
Chromium	**10**			0.26	"	"	"	"	"
Cobalt	**3.4**			0.26	"	"	"	"	"
Copper	**19**			0.53	"	"	"	"	"
Lead	**14**			0.26	"	"	"	"	"
Manganese	**140**			0.53	"	"	"	"	"
Molybdenum	**U**			0.53	"	"	"	"	"
Nickel	**10**			0.53	"	"	"	"	"

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A003 (1611041-14) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Selenium	**U**			1.1	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Silver	**U**			0.53	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.47**			0.26	"	"	"	"	"
Vanadium	**18**			0.53	"	"	"	"	"
Zinc	**54**			5.3	"	"	"	"	"

A003-D (1611041-15) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.49	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.2**			0.49	"	"	"	"	"
Barium	**36**			4.9	"	"	"	"	"
Beryllium	**U**			0.49	"	"	"	"	"
Cadmium	**U**			0.49	"	"	"	"	"
Chromium	**9.5**			0.25	"	"	"	"	"
Cobalt	**3.0**			0.25	"	"	"	"	"
Copper	**17**			0.49	"	"	"	"	"
Lead	**13**			0.25	"	"	"	"	"
Manganese	**120**			0.49	"	"	"	"	"
Molybdenum	**U**			0.49	"	"	"	"	"
Nickel	**8.7**			0.49	"	"	"	"	"
Selenium	**U**			0.99	"	"	"	"	"
Silver	**U**			0.49	"	"	"	"	"
Thallium	**U**			0.25	"	"	"	"	"
Thorium	**U**			2.5	"	"	"	"	"
Uranium	**0.44**			0.25	"	"	"	"	"
Vanadium	**17**			0.49	"	"	"	"	"
Zinc	**47**			4.9	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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N005 (1611041-16) **Matrix: Soil** **Sampled: Nov-09-16 10:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.50	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**1.8**			0.50	"	"	"	"	"
Barium	**29**			5.0	"	"	"	"	"
Beryllium	**U**			0.50	"	"	"	"	"
Cadmium	**U**			0.50	"	"	"	"	"
Chromium	**7.8**			0.25	"	"	"	"	"
Cobalt	**2.5**			0.25	"	"	"	"	"
Copper	**13**			0.50	"	"	"	"	"
Lead	**7.3**			0.25	"	"	"	"	"
Manganese	**140**			0.50	"	"	"	"	"
Molybdenum	**U**			0.50	"	"	"	"	"
Nickel	**7.1**			0.50	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.50	"	"	"	"	"
Thallium	**U**			0.25	"	"	"	"	"
Thorium	**U**			2.5	"	"	"	"	"
Uranium	**0.42**			0.25	"	"	"	"	"
Vanadium	**15**			0.50	"	"	"	"	"
Zinc	**24**			5.0	"	"	"	"	"

N006 (1611041-17) **Matrix: Soil** **Sampled: Nov-09-16 10:29** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.51	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.8**			0.51	"	"	"	"	"
Barium	**55**			5.1	"	"	"	"	"
Beryllium	**U**			0.51	"	"	"	"	"
Cadmium	**U**			0.51	"	"	"	"	"
Chromium	**14**			0.25	"	"	"	"	"
Cobalt	**7.4**			0.25	"	"	"	"	"
Copper	**29**			0.51	"	"	"	"	"
Lead	**33**			0.25	"	"	"	"	"
Manganese	**150**			0.51	"	"	"	"	"
Molybdenum	**U**			0.51	"	"	"	"	"
Nickel	**8.2**			0.51	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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N006 (1611041-17) **Matrix: Soil** **Sampled: Nov-09-16 10:29** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Selenium	**U**			1.0	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Silver	**U**			0.51	"	"	"	"	"
Thallium	**U**			0.25	"	"	"	"	"
Thorium	**U**			2.5	"	"	"	"	"
Uranium	**0.78**			0.25	"	"	"	"	"
Vanadium	**17**			0.51	"	"	"	"	"
Zinc	**61**			5.1	"	"	"	"	"

N002 (1611041-18) **Matrix: Soil** **Sampled: Nov-09-16 10:50** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.48	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.0**			0.48	"	"	"	"	"
Barium	**54**			4.8	"	"	"	"	"
Beryllium	**U**			0.48	"	"	"	"	"
Cadmium	**U**			0.48	"	"	"	"	"
Chromium	**11**			0.24	"	"	"	"	"
Cobalt	**3.2**			0.24	"	"	"	"	"
Copper	**35**			0.48	"	"	"	"	"
Lead	**21**			0.24	"	"	"	"	"
Manganese	**160**			0.48	"	"	"	"	"
Molybdenum	**U**			0.48	"	"	"	"	"
Nickel	**9.0**			0.48	"	"	"	"	"
Selenium	**U**			0.95	"	"	"	"	"
Silver	**0.87**			0.48	"	"	"	"	"
Thallium	**U**			0.24	"	"	"	"	"
Thorium	**U**			2.4	"	"	"	"	"
Uranium	**0.49**			0.24	"	"	"	"	"
Vanadium	**18**			0.48	"	"	"	"	"
Zinc	**41**			4.8	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

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S003 (1611041-19) **Matrix: Soil** **Sampled: Nov-09-16 11:14** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.51	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.0**			0.51	"	"	"	"	"
Barium	**32**			5.1	"	"	"	"	"
Beryllium	**U**			0.51	"	"	"	"	"
Cadmium	**U**			0.51	"	"	"	"	"
Chromium	**7.9**			0.26	"	"	"	"	"
Cobalt	**1.8**			0.26	"	"	"	"	"
Copper	**9.2**			0.51	"	"	"	"	"
Lead	**7.0**			0.26	"	"	"	"	"
Manganese	**140**			0.51	"	"	"	"	"
Molybdenum	**U**			0.51	"	"	"	"	"
Nickel	**7.5**			0.51	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.51	"	"	"	"	"
Thallium	**U**			0.26	"	"	"	"	"
Thorium	**U**			2.6	"	"	"	"	"
Uranium	**0.34**			0.26	"	"	"	"	"
Vanadium	**14**			0.51	"	"	"	"	"
Zinc	**31**			5.1	"	"	"	"	"

S001 (1611041-20) **Matrix: Soil** **Sampled: Nov-09-16 11:30** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.55	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.5**			0.55	"	"	"	"	"
Barium	**39**			5.5	"	"	"	"	"
Beryllium	**U**			0.55	"	"	"	"	"
Cadmium	**U**			0.55	"	"	"	"	"
Chromium	**12**			0.28	"	"	"	"	"
Cobalt	**3.8**			0.28	"	"	"	"	"
Copper	**8.1**			0.55	"	"	"	"	"
Lead	**7.8**			0.28	"	"	"	"	"
Manganese	**290**			2.8	"	25	"	"	Jan-30-17
Molybdenum	**U**			0.55	"	5	"	"	Jan-30-17
Nickel	**9.4**			0.55	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

S001 (1611041-20) **Matrix: Soil** **Sampled: Nov-09-16 11:30** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Selenium	**U**			1.1	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Silver	**U**			0.55	"	"	"	"	"
Thallium	**U**			0.28	"	"	"	"	"
Thorium	**U**			2.8	"	"	"	"	"
Uranium	**0.49**			0.28	"	"	"	"	"
Vanadium	**21**			0.55	"	"	"	"	"
Zinc	**28**			5.5	"	"	"	"	"

S002 (1611041-21) **Matrix: Soil** **Sampled: Nov-09-16 11:56** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**0.63**	J		0.51	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**1.5**			0.51	"	"	"	"	"
Barium	**31**			5.1	"	"	"	"	"
Beryllium	**U**			0.51	"	"	"	"	"
Cadmium	**U**			0.51	"	"	"	"	"
Chromium	**4.6**			0.25	"	"	"	"	"
Cobalt	**1.0**			0.25	"	"	"	"	"
Copper	**6.3**			0.51	"	"	"	"	"
Lead	**8.2**			0.25	"	"	"	"	"
Manganese	**98**			0.51	"	"	"	"	"
Molybdenum	**U**			0.51	"	"	"	"	"
Nickel	**2.9**			0.51	"	"	"	"	"
Selenium	**U**			1.0	"	"	"	"	"
Silver	**U**			0.51	"	"	"	"	"
Thallium	**U**			0.25	"	"	"	"	"
Thorium	**U**			2.5	"	"	"	"	"
Uranium	**0.25**			0.25	"	"	"	"	"
Vanadium	**11**			0.51	"	"	"	"	"
Zinc	**16**			5.1	"	"	"	"	"

Metals by ICP-MS using EPA 6020 (modified)

US EPA Region 5 Chicago Regional Laboratory

S004 (1611041-22) **Matrix: Soil** **Sampled: Nov-09-16 12:33** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Antimony	**U**			0.54	mg/kg	5	B16L009	Jan-30-17	Jan-30-17
Arsenic	**2.4**			0.54	"	"	"	"	"
Barium	**96**			5.4	"	"	"	"	"
Beryllium	**U**			0.54	"	"	"	"	"
Cadmium	**U**			0.54	"	"	"	"	"
Chromium	**9.6**			0.27	"	"	"	"	"
Cobalt	**2.5**			0.27	"	"	"	"	"
Copper	**46**			0.54	"	"	"	"	"
Lead	**11**			0.27	"	"	"	"	"
Manganese	**150**			0.54	"	"	"	"	"
Molybdenum	**U**			0.54	"	"	"	"	"
Nickel	**6.7**			0.54	"	"	"	"	"
Selenium	**U**			1.1	"	"	"	"	"
Silver	**2.7**			0.54	"	"	"	"	"
Thallium	**U**			0.27	"	"	"	"	"
Thorium	**U**			2.7	"	"	"	"	"
Uranium	**0.46**			0.27	"	"	"	"	"
Vanadium	**16**			0.54	"	"	"	"	"
Zinc	**67**			5.4	"	"	"	"	"

Notes and Definitions

J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Not Detected
NR	Not Reported
Q	QC limit Exceeded

Laboratory Results for Soil Semi-Volatile Organic Chemicals Analysis

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5 CHICAGO REGIONAL LABORATORY
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605

Date: 2/17/2017

Subject: **Review of Region 5 Data for L'Anse, Michigan Biomass Utility Soil Sampling**

To: **Air Division, US EPA Region 5**
77 **West Jackson Boulevard**
Chicago, IL 60605

From: **Troy Strock, Chemist**
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the cu;Tent Quality Management Plan and applicable Standard Operating Procedures. In accordance with the EPA QA/G-8 *Guidance on Environmental Data Verification and Data Validation* and the U.S. EPA Region 5 RMD QMP, CRL perfonns data verification on all the data generated internally. CRL does not perform data validation or quality assessment procedures.

This report was reviewed and the if tion provided herein accurately represents the analysis performed.

X

Please contact ff1e analyst with any technical report issues, Robert Thompson at (312)-353-9078 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data h·ansmittal quest ions. Thank you.

Attached are Results for: L'Anse, Michigan Biomass Utility Soil Sampling

/ /

Data Coordinator and Date Transmitted

Analyses included in this report:

SVOA solids by pressurized fluid extraction

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

ANALYSIS CASE NARRATIVE

General Information

22 soil samples were received by the Chicago Regional Laboratory (CRL) on 11/15/2016 for preparation and analysis of a subset of semivolatile organic chemicals by CRL Standard Operating Procedure (SOP) MS026 V2. The preparation and analysis procedures are based on SW-846 reference methods 3545 A and 8270D. Data was reviewed according to the guidelines in SOP GEN010 V2. Data for all target semivolatile organic chemicals (SVOCs) listed in Table 5 of the analytical SOP that are present in the Supelco target compounds mix are provided in this report (chemicals designated 'S1' in Table 1 of the SOP). Samples were also analyzed for low level PAHs and pentachlorophenol in the same field samples, and that data is provided in a separate report. Samples were extracted in two separate batches, but the extracts in both batches were concentrated, dried and analyzed together. Holding times were met for preparation and analysis. All sample preparation and analysis was performed by Troy Strock, at phone number 312.353.8362.

Sample Analysis and Results

Bis(2-ethylhexyl)phthalate was measured above the reporting limit (RL) in all field samples, and one or more polycyclic aromatic hydrocarbons (PAHs) was measured above the RL in most samples. A few other target analytes were also measured above the RL in at least one field sample, including carbazole, dibenzofuran, and butyl benzyl phthalate. Please refer to the report for more details.

Quality Controls

The data reported herein meets the requirements referenced in the SOP used for analysis and any laboratory specifications stated in the sampling and analysis plan entitled "Residential and offsite soil sampling; Warden Power Plant, L'Anse, MI", dated 10/26/2016. Please refer to the report for qualifiers added by analyte; if an explanation of each qualifier is not provided in this narrative, the key at the end of the report will contains a description of each data qualifier added as well as the expected impact on the data. All other quality controls not mentioned below met SOP criteria or did not otherwise result in qualification of any data.

NOTE: Samples were extracted in two separate batches, but because all drying, concentration and analysis steps were performed on both preparation batches together, all batch quality control samples (including method blanks, reporting limit verification QC samples, and LCS samples) were considered to apply to all field samples.

Continuing calibration verification:

Target analytes whose concentrations are reported from analysis of extracts bracketed by CCVs that did not both

meet the acceptance criteria (≤±25% difference from expected concentration) are qualified as estimated. Following the guidelines in the data review SOP, any target analytes with measured concentrations above the upper control limit in a bracketing CCV that were not found in the field samples were not qualified. The calculated concentration of pentachlorophenol in the CCVs bracketing analysis of laboratory sample IDs 1611041-05, -06, -07, -08, and -15 and QC sample IDs B16K043-MS2 and –MSD2 were 33% and 38% of their expected concentrations, indicating the potential for more than a factor of two low bias measurement for the indicated samples. Pentachlorophenol was recovered at 40-50% in the affected matrix spikes, which met the SOP criteria despite exceeding the CCV QC criteria.

Method blanks:

Sample concentrations <5x the highest method blank concentration are qualified as potentially high bias measurements. Benzophenone interfered with low level measurement of azobenzene in the clean matrix QC samples (method blanks, reporting limit verification), but this intereference was not present in chromatograms of the field samples. In order to make a more direct comparison of method blank contamination to concentrations reported in field samples, the concentrations in method blank extracts are compared to those of the field sample extracts directly rather than comparing concentrations normalized to dry weight corrected sample mass, because method blanks and field samples do not have the same dry mass, and normalizing background contamination to different dry masses can skew this evaluation of measurement bias. Raw method blank data used for this evaluation is available in the full data package archived at the laboratory and will be made available to the client for this project.

Reporting Limit (RL) verification:

RL verification QC samples are blank spikes prepared at concentrations of 33 and 170 ug/kg (nominal) in each preparation batch, which are the two target analyte RLs listed in Table 5 of the SOP, and these QC samples are used to evaluate performance by analyte at their nominal RL. Data is only reported for target analytes in the RL verification sample at the (nominal) RL listed in the report.

4-nitroaniline and azobenzene were recovered slightly below their lower control limits in the 170 ug/kg RL verification QC samples B16K043-MRL4. These target analytes were not found in any field samples, so their RLs are qualified as estimated in the field samples.

Hexachloroethane, hexachlorobutadiene, and the dichlorobenzene isomers were not consistently recovered in the calibration range in the RL verification QC samples at their nominal RL of 33 ug/kg. None of these chemicals was measured above the RL in any field samples, therefore, the RL for these chemicals was raised to 170 ug/kg (nominal), at which level they are expected to be recovered in the calibration range if they were present in the field samples.

Blank spike (LCS):

Recovery of 4,6-dinitro-2-methylphenol was slightly below the lower control limit in both blank spikes in the first preparation batch, B16K042-BS2 and –BSD2. This chemical was not found in any field samples in either preparation batch, and the RL is qualified in all field samples to indicate it may not be accurate.

Matrix spike / matrix spike duplicate (MS/MSD):

MS/MSD QC samples were prepared using replicate subsamples of laboratory sample IDs 1611041-11 and -22, which are reported as B16K042-MS2/-MSD21 and B16K043-MS2/-MSD2, respectively. The same control limits are used for LCS and MS/MSD recovery, but only the field sample used to prepare the MS/MSD is qualified based on MS/MSD performance.

In B16K042-MS2/-MSD2, recovery of 3-nitroaniline, 4-nitroaniline, 2,4-dinitrophenol, and 4,6-dinitro-2-methylphenol were below their respective lower control limits, but they were all recovered in the calibration range, and the peaks were all qualitatively identifiable. These chemicals were not found in 1611042-11, so the RLs are qualified in the report to indicate they may not be accurate.

In B16K043-MS2/-MSD2, recovery of 3+4-methylphenol, 2,4-dimethylphenol, 3-nitroaniline, 4-nitroaniline, and 4,6-dinitro-2-methylphenol were below their respective lower control limits. All chemicals except 3-nitroaniline were qualitatively identifiable and recovered in the calibration range. None of these chemicals was found in 1611042-22, so the RLs are qualified in the report to indicate they may not be accurate except for 3-nitroaniline, which was qualified as rejected in this field sample.

Surrogates:

Recovery of 2 of 3 neutral surrogates was slightly low in field samples 1611041-11 and -12 and in QC sample ID B16K043-MRL4. All target analytes associated with these surrogates are qualified in the report.

Internal standards:

The response of the first internal standard in the chromatogram of laboratory sample ID 1611041-18 was slightly below the acceptance limit in the SOP. All target analytes corresponding to this internal standard are qualified in the report.

Qualitative identification:

Di-n-octyl phthalate was measured slightly above the RL in a few samples, but this peak did not meet the qualitative identification criteria in the SOP. The concentration of this chemical is already qualified in the report

to indicate it may be a high bias measurement due observed concentrations in the method blanks, so no additional qualifiers were added due to poor qualitative identification, but the data user is advised that the reported concentrations of this chemical may be false positives. This was also the case for butyl benzyl phthalate in all field samples except 1611041-17; the peak was measured above the RL in this sample at a concentration >5x the highest method blank, and the mass spectrum meets the qualitative identification criteria in the SOP, but in the other field samples the reported concentration of this chemical may be a false positive.

Chromatographic peaks corresponding to benzo(b)fluoranthene and benzo(k)fluoranthene did not meet the 50% resolution criteria in the field samples, so the reported concentrations of these chemicals are qualified.

LIMS report and Electronic Data Deliverable (EDD):

The 'method detection limit' listed in the EDD is set at the lowest calibration standard used for initial calibration, which is at one half or one tenth of the (nominal) RL, depending on the target analyte.

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N007	1611041-01	Soil	Nov-08-16 10:11	Nov-15-16 11:30
N004	1611041-02	Soil	Nov-08-16 10:36	Nov-15-16 11:30
N004-D	1611041-03	Soil	Nov-08-16 10:36	Nov-15-16 11:30
N003	1611041-04	Soil	Nov-08-16 10:58	Nov-15-16 11:30
Z004	1611041-05	Soil	Nov-08-16 11:22	Nov-15-16 11:30
Z002	1611041-06	Soil	Nov-08-16 11:44	Nov-15-16 11:30
Z003	1611041-07	Soil	Nov-08-16 12:04	Nov-15-16 11:30
Z001	1611041-08	Soil	Nov-08-16 12:27	Nov-15-16 11:30
A002	1611041-09	Soil	Nov-08-16 13:40	Nov-15-16 11:30
N001	1611041-10	Soil	Nov-08-16 13:59	Nov-15-16 11:30
A004	1611041-11	Soil	Nov-08-16 14:23	Nov-15-16 11:30
A001	1611041-12	Soil	Nov-08-16 14:43	Nov-15-16 11:30
A005	1611041-13	Soil	Nov-08-16 15:00	Nov-15-16 11:30
A003	1611041-14	Soil	Nov-09-16 09:38	Nov-15-16 11:30
A003-D	1611041-15	Soil	Nov-09-16 09:38	Nov-15-16 11:30
N005	1611041-16	Soil	Nov-09-16 10:00	Nov-15-16 11:30
N006	1611041-17	Soil	Nov-09-16 10:29	Nov-15-16 11:30
N002	1611041-18	Soil	Nov-09-16 10:50	Nov-15-16 11:30
S003	1611041-19	Soil	Nov-09-16 11:14	Nov-15-16 11:30
S001	1611041-20	Soil	Nov-09-16 11:30	Nov-15-16 11:30
S002	1611041-21	Soil	Nov-09-16 11:56	Nov-15-16 11:30
S004	1611041-22	Soil	Nov-09-16 12:33	Nov-15-16 11:30

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N007 (1611041-01) **Matrix: Soil** **Sampled: Nov-08-16 10:11** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			200	"	"	"	"	"
1,4-Dichlorobenzene	**U**			200	"	"	"	"	"
1,2-Dichlorobenzene	**U**			200	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		200	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			200	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			200	"	"	"	"	"

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N007 (1611041-01) **Matrix: Soil** **Sampled: Nov-08-16 10:11** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Dibenzofuran	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"
Phenanthrene	**U**			40	"	"	"	"	"
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			200	"	"	"	"	"
Fluoranthene	**U**			40	"	"	"	"	"
Pyrene	**U**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**U**			40	"	"	"	"	"
Chrysene	**U**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**160**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**42**	(RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**U**			40	"	"	"	"	"
Benzo(a)pyrene	**U**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	740	*73.8%*	*38.2-115*	"	"	"
Phenol-d5	880	*87.8%*	*44.5-111*	"	"	"
Nitrobenzene-d5	580	*57.8%*	*50-94.9*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N007 (1611041-01) **Matrix: Soil** **Sampled: Nov-08-16 10:11** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorobiphenyl	600	*59.8%*	*48.1-108*	*B16K042*	*Nov-17-16*	*Dec-07-16*
2,4,6-Tribromophenol	900	*90.1%*	*26.1-119*	"	"	"
Terphenyl-d14	890	*89.5%*	*59.4-127*	"	"	"

N004 (1611041-02) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			38	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			38	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			38	"	"	"	"	"
2-Chlorophenol	**U**			38	"	"	"	"	"
1,3-Dichlorobenzene	**U**			200	"	"	"	"	"
1,4-Dichlorobenzene	**U**			200	"	"	"	"	"
1,2-Dichlorobenzene	**U**			200	"	"	"	"	"
2-Methylphenol	**U**			38	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			38	"	"	"	"	"
3+4-Methylphenol	**U**			38	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			38	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		200	"	"	"	"	"
Nitrobenzene	**U**			38	"	"	"	"	"
Isophorone	**U**			38	"	"	"	"	"
2-Nitrophenol	**U**			38	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			38	"	"	"	"	"
2,4-Dichlorophenol	**U**			38	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			38	"	"	"	"	"
Naphthalene	**U**			38	"	"	"	"	"
Hexachlorobutadiene	**U**			200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			38	"	"	"	"	"
2-Methylnaphthalene	**U**			38	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			38	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			38	"	"	"	"	"
2-Chloronaphthalene	**U**			38	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N004 (1611041-02) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
2-Nitroaniline	**U**			38	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Acenaphthylene	**U**			38	"	"	"	"	"
Dimethylphthalate	**U**			38	"	"	"	"	"
2,6-Dinitrotoluene	**U**			38	"	"	"	"	"
3-Nitroaniline	**U**			200	"	"	"	"	"
Acenaphthene	**U**			38	"	"	"	"	"
2,4-Dinitrophenol	**U**			200	"	"	"	"	"
Dibenzofuran	**U**			38	"	"	"	"	"
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**			38	"	"	"	"	"
Fluorene	**U**			38	"	"	"	"	"
Diethylphthalate	**U**			38	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			38	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		38	"	"	"	"	"
Azobenzene	**U**	(RL), J		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			38	"	"	"	"	"
Hexachlorobenzene	**U**			38	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"
Phenanthrene	**U**			38	"	"	"	"	"
Anthracene	**U**			38	"	"	"	"	"
Carbazole	**U**			38	"	"	"	"	"
Di-n-butylphthalate	**U**			200	"	"	"	"	"
Fluoranthene	**94**			38	"	"	"	"	"
Pyrene	**98**			38	"	"	"	"	"
Butylbenzylphthalate	**58**	B		38	"	"	"	"	"
Benzo (a) anthracene	**53**			38	"	"	"	"	"
Chrysene	**87**			38	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**70**	B		38	"	"	"	"	"
Di-n-octylphthalate	**U**			38	"	"	"	"	"
Benzo(b)fluoranthene	**140**	(RES), J		38	"	"	"	"	"
Benzo(k)fluoranthene	**U**			38	"	"	"	"	"
Benzo(a)pyrene	**63**			38	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**54**			38	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N004 (1611041-02) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Dibenz(a,h)anthracene	**U**			38	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Benzo(g,h,i)perylene	**70**			38	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	750	*78.1%*	*38.2-115*	"	"	"
Phenol-d5	880	*92.4%*	*44.5-111*	"	"	"
Nitrobenzene-d5	600	*62.9%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	630	*66.1%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	920	*95.9%*	*26.1-119*	"	"	"
Terphenyl-d14	880	*91.6%*	*59.4-127*	"	"	"

N004-D (1611041-03) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			37	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			37	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			37	"	"	"	"	"
2-Chlorophenol	**U**			37	"	"	"	"	"
1,3-Dichlorobenzene	**U**			190	"	"	"	"	"
1,4-Dichlorobenzene	**U**			190	"	"	"	"	"
1,2-Dichlorobenzene	**U**			190	"	"	"	"	"
2-Methylphenol	**U**			37	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			37	"	"	"	"	"
3+4-Methylphenol	**U**			37	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			37	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		190	"	"	"	"	"
Nitrobenzene	**U**			37	"	"	"	"	"
Isophorone	**U**			37	"	"	"	"	"
2-Nitrophenol	**U**			37	"	"	"	"	"
2,4-Dimethylphenol	**U**			190	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			37	"	"	"	"	"
2,4-Dichlorophenol	**U**			37	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			37	"	"	"	"	"
Naphthalene	**U**			37	"	"	"	"	"
Hexachlorobutadiene	**U**			190	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N004-D (1611041-03) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
4-Chloro-3-methylphenol	**U**			37	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
2-Methylnaphthalene	**U**			37	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			37	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			37	"	"	"	"	"
2-Chloronaphthalene	**U**			37	"	"	"	"	"
2-Nitroaniline	**U**			37	"	"	"	"	"
Acenaphthylene	**U**			37	"	"	"	"	"
Dimethylphthalate	**U**			37	"	"	"	"	"
2,6-Dinitrotoluene	**U**			37	"	"	"	"	"
3-Nitroaniline	**U**			190	"	"	"	"	"
Acenaphthene	**U**			37	"	"	"	"	"
2,4-Dinitrophenol	**U**			190	"	"	"	"	"
Dibenzofuran	**U**			37	"	"	"	"	"
4-Nitrophenol	**U**			190	"	"	"	"	"
2,4-Dinitrotoluene	**U**			37	"	"	"	"	"
Fluorene	**U**			37	"	"	"	"	"
Diethylphthalate	**U**			37	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			37	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		190	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		37	"	"	"	"	"
Azobenzene	**U**	(RL), J		190	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			37	"	"	"	"	"
Hexachlorobenzene	**U**			37	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		190	"	"	"	"	"
Phenanthrene	**U**			37	"	"	"	"	"
Anthracene	**U**			37	"	"	"	"	"
Carbazole	**U**			37	"	"	"	"	"
Di-n-butylphthalate	**U**			190	"	"	"	"	"
Fluoranthene	**84**			37	"	"	"	"	"
Pyrene	**93**			37	"	"	"	"	"
Butylbenzylphthalate	**49**	B		37	"	"	"	"	"
Benzo (a) anthracene	**48**			37	"	"	"	"	"
Chrysene	**78**			37	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**72**	B		37	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N004-D (1611041-03) **Matrix: Soil** **Sampled: Nov-08-16 10:36** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Di-n-octylphthalate	**U**			37	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Benzo(b)fluoranthene	**130**	(RES), J		37	"	"	"	"	"
Benzo(k)fluoranthene	**38**	(RES), J		37	"	"	"	"	"
Benzo(a)pyrene	**66**			37	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**54**			37	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			37	"	"	"	"	"
Benzo(g,h,i)perylene	**69**			37	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	660	*70.5%*	*38.2-115*	"	"	"
Phenol-d5	790	*83.8%*	*44.5-111*	"	"	"
Nitrobenzene-d5	520	*55.3%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	550	*58.0%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	900	*95.1%*	*26.1-119*	"	"	"
Terphenyl-d14	850	*90.6%*	*59.4-127*	"	"	"

N003 (1611041-04) **Matrix: Soil** **Sampled: Nov-08-16 10:58** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			41	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			41	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			41	"	"	"	"	"
2-Chlorophenol	**U**			41	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			41	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			41	"	"	"	"	"
3+4-Methylphenol	**U**			41	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			41	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		210	"	"	"	"	"
Nitrobenzene	**U**			41	"	"	"	"	"
Isophorone	**U**			41	"	"	"	"	"
2-Nitrophenol	**U**			41	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N003 (1611041-04) **Matrix: Soil** **Sampled: Nov-08-16 10:58** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Bis(2-chloroethoxy)methane	**U**			41	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
2,4-Dichlorophenol	**U**			41	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			41	"	"	"	"	"
Naphthalene	**U**			41	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			41	"	"	"	"	"
2-Methylnaphthalene	**U**			41	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			41	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			41	"	"	"	"	"
2-Chloronaphthalene	**U**			41	"	"	"	"	"
2-Nitroaniline	**U**			41	"	"	"	"	"
Acenaphthylene	**110**			41	"	"	"	"	"
Dimethylphthalate	**U**			41	"	"	"	"	"
2,6-Dinitrotoluene	**U**			41	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			41	"	"	"	"	"
2,4-Dinitrophenol	**U**			210	"	"	"	"	"
Dibenzofuran	**U**			41	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			41	"	"	"	"	"
Fluorene	**U**			41	"	"	"	"	"
Diethylphthalate	**U**			41	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			41	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		41	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			41	"	"	"	"	"
Hexachlorobenzene	**U**			41	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**240**			41	"	"	"	"	"
Anthracene	**95**			41	"	"	"	"	"
Carbazole	**U**			41	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**330**			41	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N003 (1611041-04) **Matrix: Soil** **Sampled: Nov-08-16 10:58** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Pyrene	**410**			41	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Butylbenzylphthalate	**U**			41	"	"	"	"	"
Benzo (a) anthracene	**150**			41	"	"	"	"	"
Chrysene	**250**			41	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**53**	B		41	"	"	"	"	"
Di-n-octylphthalate	**U**			41	"	"	"	"	"
Benzo(b)fluoranthene	**280**	(RES), J		41	"	"	"	"	"
Benzo(k)fluoranthene	**85**	(RES), J		41	"	"	"	"	"
Benzo(a)pyrene	**170**			41	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**110**			41	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			41	"	"	"	"	"
Benzo(g,h,i)perylene	**140**			41	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	660	*62.6%*	*38.2-115*	"	"	"
Phenol-d5	790	*75.9%*	*44.5-111*	"	"	"
Nitrobenzene-d5	540	*51.4%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	570	*54.4%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	950	*91.2%*	*26.1-119*	"	"	"
Terphenyl-d14	930	*89.1%*	*59.4-127*	"	"	"

Z004 (1611041-05) **Matrix: Soil** **Sampled: Nov-08-16 11:22** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			200	"	"	"	"	"
1,4-Dichlorobenzene	**U**			200	"	"	"	"	"
1,2-Dichlorobenzene	**U**			200	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z004 (1611041-05) **Matrix: Soil** **Sampled: Nov-08-16 11:22** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Hexachloroethane	**U**			200	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**	(CCV), J		200	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		200	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	J, (RL)		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z004 (1611041-05) **Matrix: Soil** **Sampled: Nov-08-16 11:22** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Phenanthrene	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			200	"	"	"	"	"
Fluoranthene	**U**			40	"	"	"	"	"
Pyrene	**U**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**U**			40	"	"	"	"	"
Chrysene	**U**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**78**	B		40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**U**			40	"	"	"	"	"
Benzo(k)fluoranthene	**U**			40	"	"	"	"	"
Benzo(a)pyrene	**U**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	680	*68.0%*	*38.2-115*	"	"	"
Phenol-d5	860	*86.5%*	*44.5-111*	"	"	"
Nitrobenzene-d5	530	*53.0%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	570	*56.6%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	870	*86.8%*	*26.1-119*	"	"	"
Terphenyl-d14	900	*89.7%*	*59.4-127*	"	"	"

Z002 (1611041-06) **Matrix: Soil** **Sampled: Nov-08-16 11:44** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			41	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
Phenol	**U**			41	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			41	"	"	"	"	"
2-Chlorophenol	**U**			41	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z002 (1611041-06) **Matrix: Soil** **Sampled: Nov-08-16 11:44** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
1,2-Dichlorobenzene	**U**			210	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
2-Methylphenol	**U**			41	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			41	"	"	"	"	"
3+4-Methylphenol	**U**			41	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			41	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			41	"	"	"	"	"
Isophorone	**U**			41	"	"	"	"	"
2-Nitrophenol	**U**			41	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			41	"	"	"	"	"
2,4-Dichlorophenol	**U**			41	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			41	"	"	"	"	"
Naphthalene	**U**			41	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			41	"	"	"	"	"
2-Methylnaphthalene	**U**			41	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			41	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			41	"	"	"	"	"
2-Chloronaphthalene	**U**			41	"	"	"	"	"
2-Nitroaniline	**U**			41	"	"	"	"	"
Acenaphthylene	**U**			41	"	"	"	"	"
Dimethylphthalate	**U**			41	"	"	"	"	"
2,6-Dinitrotoluene	**U**			41	"	"	"	"	"
3-Nitroaniline	**U**	(CCV), J		210	"	"	"	"	"
Acenaphthene	**U**			41	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**U**			41	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			41	"	"	"	"	"
Fluorene	**U**			41	"	"	"	"	"
Diethylphthalate	**U**			41	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			41	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z002 (1611041-06) **Matrix: Soil** **Sampled: Nov-08-16 11:44** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		41	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			41	"	"	"	"	"
Hexachlorobenzene	**U**			41	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			41	"	"	"	"	"
Anthracene	**U**			41	"	"	"	"	"
Carbazole	**U**			41	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**U**			41	"	"	"	"	"
Pyrene	**U**			41	"	"	"	"	"
Butylbenzylphthalate	**U**			41	"	"	"	"	"
Benzo (a) anthracene	**U**			41	"	"	"	"	"
Chrysene	**U**			41	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**100**	B		41	"	"	"	"	"
Di-n-octylphthalate	**U**			41	"	"	"	"	"
Benzo(b)fluoranthene	**U**			41	"	"	"	"	"
Benzo(k)fluoranthene	**U**			41	"	"	"	"	"
Benzo(a)pyrene	**U**			41	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			41	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			41	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			41	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	710	*68.1%*	*38.2-115*	"	"	"
Phenol-d5	870	*83.7%*	*44.5-111*	"	"	"
Nitrobenzene-d5	550	*52.5%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	590	*56.8%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	910	*87.6%*	*26.1-119*	"	"	"
Terphenyl-d14	920	*87.8%*	*59.4-127*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z003 (1611041-07) **Matrix: Soil** **Sampled: Nov-08-16 12:04** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			41	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
Phenol	**U**			41	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			41	"	"	"	"	"
2-Chlorophenol	**U**			41	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			41	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			41	"	"	"	"	"
3+4-Methylphenol	**U**			41	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			41	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			41	"	"	"	"	"
Isophorone	**U**			41	"	"	"	"	"
2-Nitrophenol	**U**			41	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			41	"	"	"	"	"
2,4-Dichlorophenol	**U**			41	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			41	"	"	"	"	"
Naphthalene	**U**			41	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			41	"	"	"	"	"
2-Methylnaphthalene	**U**			41	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			41	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			41	"	"	"	"	"
2-Chloronaphthalene	**U**			41	"	"	"	"	"
2-Nitroaniline	**U**			41	"	"	"	"	"
Acenaphthylene	**U**			41	"	"	"	"	"
Dimethylphthalate	**U**			41	"	"	"	"	"
2,6-Dinitrotoluene	**U**			41	"	"	"	"	"
3-Nitroaniline	**U**	(CCV), J		210	"	"	"	"	"
Acenaphthene	**U**			41	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**U**			41	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z003 (1611041-07) **Matrix: Soil** **Sampled: Nov-08-16 12:04** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
4-Nitrophenol	**U**			210	ug/kg dry	1	B16K042	Nov-17-16	Dec-12-16
2,4-Dinitrotoluene	**U**			41	"	"	"	"	"
Fluorene	**U**			41	"	"	"	"	"
Diethylphthalate	**U**			41	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			41	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		41	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			41	"	"	"	"	"
Hexachlorobenzene	**U**			41	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			41	"	"	"	"	"
Anthracene	**U**			41	"	"	"	"	"
Carbazole	**U**			41	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**U**			41	"	"	"	"	"
Pyrene	**U**			41	"	"	"	"	"
Butylbenzylphthalate	**U**			41	"	"	"	"	"
Benzo (a) anthracene	**U**			41	"	"	"	"	"
Chrysene	**U**			41	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**48**	B		41	"	"	"	"	"
Di-n-octylphthalate	**U**			41	"	"	"	"	"
Benzo(b)fluoranthene	**U**			41	"	"	"	"	"
Benzo(k)fluoranthene	**U**			41	"	"	"	"	"
Benzo(a)pyrene	**U**			41	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			41	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			41	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			41	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	630		*61.4%*	*38.2-115*	"	"	"
Phenol-d5	790		*76.9%*	*44.5-111*	"	"	"
Nitrobenzene-d5	480	Q	*46.6%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	520		*50.4%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	930		*90.9%*	*26.1-119*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z003 (1611041-07) **Matrix: Soil** **Sampled: Nov-08-16 12:04** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
Terphenyl-d14	930	*91.0%*	*59.4-127*	*B16K042*	*Nov-17-16*	*Dec-12-16*

Z001 (1611041-08) **Matrix: Soil** **Sampled: Nov-08-16 12:27** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

Z001 (1611041-08) **Matrix: Soil** **Sampled: Nov-08-16 12:27** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Dimethylphthalate	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			40	"	"	"	"	"
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**110**			40	"	"	"	"	"
Pyrene	**91**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**56**			40	"	"	"	"	"
Chrysene	**58**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**1300**			40	"	"	"	"	"
Di-n-octylphthalate	**46**	B		40	"	"	"	"	"
Benzo(b)fluoranthene	**94**	(RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**U**			40	"	"	"	"	"
Benzo(a)pyrene	**58**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
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Z001 (1611041-08) **Matrix: Soil** **Sampled: Nov-08-16 12:27** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	600	*60.1%*	*38.2-115*	*B16K042*	*Nov-17-16*	*Dec-07-16*
Phenol-d5	820	*82.0%*	*44.5-111*	"	"	"
Nitrobenzene-d5	560	*55.4%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	590	*58.9%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	970	*96.0%*	*26.1-119*	"	"	"
Terphenyl-d14	920	*91.6%*	*59.4-127*	"	"	"

A002 (1611041-09) **Matrix: Soil** **Sampled: Nov-08-16 13:40** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			39	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			39	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			39	"	"	"	"	"
2-Chlorophenol	**U**			39	"	"	"	"	"
1,3-Dichlorobenzene	**U**			200	"	"	"	"	"
1,4-Dichlorobenzene	**U**			200	"	"	"	"	"
1,2-Dichlorobenzene	**U**			200	"	"	"	"	"
2-Methylphenol	**U**			39	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			39	"	"	"	"	"
3+4-Methylphenol	**U**			39	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			39	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		200	"	"	"	"	"
Nitrobenzene	**U**			39	"	"	"	"	"
Isophorone	**U**			39	"	"	"	"	"
2-Nitrophenol	**U**			39	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			39	"	"	"	"	"
2,4-Dichlorophenol	**U**			39	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			39	"	"	"	"	"
Naphthalene	**U**			39	"	"	"	"	"
Hexachlorobutadiene	**U**			200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			39	"	"	"	"	"
2-Methylnaphthalene	**U**			39	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A002 (1611041-09) **Matrix: Soil** **Sampled: Nov-08-16 13:40** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
2,4,6-Trichlorophenol	**U**			39	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
2,4,5-Trichlorophenol	**U**			39	"	"	"	"	"
2-Chloronaphthalene	**U**			39	"	"	"	"	"
2-Nitroaniline	**U**			39	"	"	"	"	"
Acenaphthylene	**U**			39	"	"	"	"	"
Dimethylphthalate	**U**			39	"	"	"	"	"
2,6-Dinitrotoluene	**U**			39	"	"	"	"	"
3-Nitroaniline	**U**			200	"	"	"	"	"
Acenaphthene	**U**			39	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		200	"	"	"	"	"
Dibenzofuran	**U**			39	"	"	"	"	"
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**			39	"	"	"	"	"
Fluorene	**U**			39	"	"	"	"	"
Diethylphthalate	**U**			39	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			39	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		39	"	"	"	"	"
Azobenzene	**U**	(RL), J		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			39	"	"	"	"	"
Hexachlorobenzene	**U**			39	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"
Phenanthrene	**250**			39	"	"	"	"	"
Anthracene	**50**			39	"	"	"	"	"
Carbazole	**63**			39	"	"	"	"	"
Di-n-butylphthalate	**U**			200	"	"	"	"	"
Fluoranthene	**550**			39	"	"	"	"	"
Pyrene	**410**			39	"	"	"	"	"
Butylbenzylphthalate	**41**	B		39	"	"	"	"	"
Benzo (a) anthracene	**210**			39	"	"	"	"	"
Chrysene	**320**			39	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**150**			39	"	"	"	"	"
Di-n-octylphthalate	**U**			39	"	"	"	"	"
Benzo(b)fluoranthene	**570**	(RES), J		39	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A002 (1611041-09) **Matrix: Soil** **Sampled: Nov-08-16 13:40** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo(k)fluoranthene	**160**	(RES), J		39	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Benzo(a)pyrene	**250**			39	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**190**			39	"	"	"	"	"
Dibenz(a,h)anthracene	**43**			39	"	"	"	"	"
Benzo(g,h,i)perylene	**220**			39	"	"	"	"	"

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	560	*57.5%*	*38.2-115*	"	"	"
Phenol-d5	730	*75.3%*	*44.5-111*	"	"	"
Nitrobenzene-d5	510	*52.4%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	550	*56.2%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	930	*95.7%*	*26.1-119*	"	"	"
Terphenyl-d14	890	*91.5%*	*59.4-127*	"	"	"

N001 (1611041-10) **Matrix: Soil** **Sampled: Nov-08-16 13:59** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N001 (1611041-10) **Matrix: Soil** **Sampled: Nov-08-16 13:59** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
1,2,4-Trichlorobenzene	**U**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Naphthalene	**76**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**83**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**560**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**49**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**66**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**350**			40	"	"	"	"	"
Anthracene	**580**			40	"	"	"	"	"
Carbazole	**100**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**1100**			40	"	"	"	"	"
Pyrene	**1500**			40	"	"	"	"	"
Butylbenzylphthalate	**45**	B		40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N001 (1611041-10) **Matrix: Soil** **Sampled: Nov-08-16 13:59** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo (a) anthracene	**1000**			40	ug/kg dry	1	B16K042	Nov-17-16	Dec-07-16
Chrysene	**1200**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**72**	B		40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**1800**	(RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**540**	(RES), J		40	"	"	"	"	"
Benzo(a)pyrene	**1100**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**610**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**170**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**850**			40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	440		*43.4%*	*38.2-115*	"	"	"
Phenol-d5	740		*72.3%*	*44.5-111*	"	"	"
Nitrobenzene-d5	510	Q	*49.8%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	550		*54.0%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	970		*95.0%*	*26.1-119*	"	"	"
Terphenyl-d14	960		*94.1%*	*59.4-127*	"	"	"

A004 (1611041-11) **Matrix: Soil** **Sampled: Nov-08-16 14:23** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**	(SURR), J		39	ug/kg dry	1	B16K042	Nov-17-16	Dec-08-16
Phenol	**U**			39	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**	(SURR), J		39	"	"	"	"	"
2-Chlorophenol	**U**			39	"	"	"	"	"
1,3-Dichlorobenzene	**U**	(SURR), J		200	"	"	"	"	"
1,4-Dichlorobenzene	**U**	(SURR), J		200	"	"	"	"	"
1,2-Dichlorobenzene	**U**	(SURR), J		200	"	"	"	"	"
2-Methylphenol	**U**			39	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**	(SURR), J		39	"	"	"	"	"
3+4-Methylphenol	**U**			39	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**	(SURR), J		39	"	"	"	"	"
Hexachloroethane	**U**	(CCV), (SURR), J		200	"	"	"	"	"
Nitrobenzene	**U**	(SURR), J		39	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A004 (1611041-11) **Matrix: Soil** **Sampled: Nov-08-16 14:23** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Isophorone	**U**	(SURR), J		39	ug/kg dry	1	B16K042	Nov-17-16	Dec-08-16
2-Nitrophenol	**U**			39	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**	(SURR), J		39	"	"	"	"	"
2,4-Dichlorophenol	**U**			39	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**	(SURR), J		39	"	"	"	"	"
Naphthalene	**U**	(SURR), J		39	"	"	"	"	"
Hexachlorobutadiene	**U**	(SURR), J		200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			39	"	"	"	"	"
2-Methylnaphthalene	**U**	(SURR), J		39	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			39	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			39	"	"	"	"	"
2-Chloronaphthalene	**U**	(SURR), J		39	"	"	"	"	"
2-Nitroaniline	**U**	(SURR), J		39	"	"	"	"	"
Acenaphthylene	**85**	(SURR), L		39	"	"	"	"	"
Dimethylphthalate	**U**	(SURR), J		39	"	"	"	"	"
2,6-Dinitrotoluene	**U**	(SURR), J		39	"	"	"	"	"
3-Nitroaniline	**U**	(MS), (SURR), J		200	"	"	"	"	"
Acenaphthene	**U**	(SURR), J		39	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		200	"	"	"	"	"
Dibenzofuran	**U**	(SURR), J		39	"	"	"	"	"
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**	(SURR), J		39	"	"	"	"	"
Fluorene	**U**	(SURR), J		39	"	"	"	"	"
Diethylphthalate	**U**	(SURR), J		39	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**	(SURR), J		39	"	"	"	"	"
4-Nitroaniline	**U**	(MS), (RL), (SURR), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), (MS), J		39	"	"	"	"	"
Azobenzene	**U**	(RL), (SURR), J		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**	(SURR), J		39	"	"	"	"	"
Hexachlorobenzene	**U**	(SURR), J		39	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"
Phenanthrene	**80**	(SURR), L		39	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A004 (1611041-11) **Matrix: Soil** **Sampled: Nov-08-16 14:23** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Anthracene	**100**	(SURR), L		39	ug/kg dry	1	B16K042	Nov-17-16	Dec-08-16
Carbazole	**U**	(SURR), J		39	"	"	"	"	"
Di-n-butylphthalate	**U**	(SURR), J		200	"	"	"	"	"
Fluoranthene	**200**	(SURR), L		39	"	"	"	"	"
Pyrene	**190**	(SURR), L		39	"	"	"	"	"
Butylbenzylphthalate	**U**	(SURR), J		39	"	"	"	"	"
Benzo (a) anthracene	**140**	(SURR), L		39	"	"	"	"	"
Chrysene	**250**	(SURR), L		39	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**64**	(SURR), B		39	"	"	"	"	"
Di-n-octylphthalate	**U**	(SURR), J		39	"	"	"	"	"
Benzo(b)fluoranthene	**400**	(RES), (SURR), L		39	"	"	"	"	"
Benzo(k)fluoranthene	**130**	(RES), (SURR), L		39	"	"	"	"	"
Benzo(a)pyrene	**150**	(SURR), L		39	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**120**	L, (SURR)		39	"	"	"	"	"
Dibenz(a,h)anthracene	**U**	(SURR), J		39	"	"	"	"	"
Benzo(g,h,i)perylene	**150**	(SURR), L		39	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	340	Q	*34.5%*	*38.2-115*	"	"	"
Phenol-d5	620		*63.3%*	*44.5-111*	"	"	"
Nitrobenzene-d5	400	Q	*41.4%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	440	Q	*45.4%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	850		*87.3%*	*26.1-119*	"	"	"
Terphenyl-d14	840		*86.9%*	*59.4-127*	"	"	"

A001 (1611041-12) **Matrix: Soil** **Sampled: Nov-08-16 14:43** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**	(SURR), J		40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**	(SURR), J		40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**	(SURR), J		210	"	"	"	"	"
1,4-Dichlorobenzene	**U**	J, (SURR)		210	"	"	"	"	"
1,2-Dichlorobenzene	**U**	(SURR), J		210	"	"	"	"	"

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
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A001 (1611041-12) **Matrix: Soil** **Sampled: Nov-08-16 14:43** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
2-Methylphenol	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Bis(1-chloroisopropyl)ether	**U**	(SURR), J		40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**	(SURR), J		40	"	"	"	"	"
Hexachloroethane	**U**	(CCV), (SURR), J		210	"	"	"	"	"
Nitrobenzene	**U**	(SURR), J		40	"	"	"	"	"
Isophorone	**U**	(SURR), J		40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**	(SURR), J		40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**	(SURR), J		40	"	"	"	"	"
Naphthalene	**U**	(SURR), J		40	"	"	"	"	"
Hexachlorobutadiene	**U**	(SURR), J		210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**	(SURR), J		40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**	(SURR), J		40	"	"	"	"	"
2-Nitroaniline	**U**	(SURR), J		40	"	"	"	"	"
Acenaphthylene	**87**	(SURR), L		40	"	"	"	"	"
Dimethylphthalate	**U**	(SURR), J		40	"	"	"	"	"
2,6-Dinitrotoluene	**U**	(SURR), J		40	"	"	"	"	"
3-Nitroaniline	**U**	(SURR), J		210	"	"	"	"	"
Acenaphthene	**U**	(SURR), J		40	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**U**	(SURR), J		40	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**	(SURR), J		40	"	"	"	"	"
Fluorene	**U**	(SURR), J		40	"	"	"	"	"
Diethylphthalate	**U**	(SURR), J		40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**	(SURR), J		40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), (SURR), J		210	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A001 (1611041-12) **Matrix: Soil** **Sampled: Nov-08-16 14:43** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
4,6-Dinitro-2-methylphenol	**U**	(LCS), J, (CCV)		40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Azobenzene	**U**	(RL), (SURR), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**	(SURR), J		40	"	"	"	"	"
Hexachlorobenzene	**U**	(SURR), J		40	"	"	"	"	"
Pentachlorophenol	**U**	J, (CCV)		210	"	"	"	"	"
Phenanthrene	**220**	(SURR), L		40	"	"	"	"	"
Anthracene	**110**	(SURR), L		40	"	"	"	"	"
Carbazole	**52**	(SURR), L		40	"	"	"	"	"
Di-n-butylphthalate	**U**	(SURR), J		210	"	"	"	"	"
Fluoranthene	**640**	(SURR), L		40	"	"	"	"	"
Pyrene	**540**	(SURR), L		40	"	"	"	"	"
Butylbenzylphthalate	**48**	(SURR), B		40	"	"	"	"	"
Benzo (a) anthracene	**290**	(SURR), L		40	"	"	"	"	"
Chrysene	**410**	(SURR), L		40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**160**	(SURR), L		40	"	"	"	"	"
Di-n-octylphthalate	**U**	(SURR), J		40	"	"	"	"	"
Benzo(b)fluoranthene	**670**	(RES), (SURR), L		40	"	"	"	"	"
Benzo(k)fluoranthene	**210**	(RES), (SURR), L		40	"	"	"	"	"
Benzo(a)pyrene	**330**	(SURR), L		40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**260**	(SURR), L		40	"	"	"	"	"
Dibenz(a,h)anthracene	**66**	(SURR), L		40	"	"	"	"	"
Benzo(g,h,i)perylene	**300**	(SURR), L		40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	300	Q	*29.3%*	*38.2-115*	"	"	"
Phenol-d5	600		*58.6%*	*44.5-111*	"	"	"
Nitrobenzene-d5	420	Q	*41.3%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	470	Q	*46.4%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	930		*91.0%*	*26.1-119*	"	"	"
Terphenyl-d14	920		*89.9%*	*59.4-127*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
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A005 (1611041-13) **Matrix: Soil** **Sampled: Nov-08-16 15:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**	(CCV), J		210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**98**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A005 (1611041-13) **Matrix: Soil** **Sampled: Nov-08-16 15:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
4-Nitrophenol	**U**			210	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(CCV), (LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**190**			40	"	"	"	"	"
Anthracene	**120**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**460**			40	"	"	"	"	"
Pyrene	**420**			40	"	"	"	"	"
Butylbenzylphthalate	**50**	B		40	"	"	"	"	"
Benzo (a) anthracene	**270**			40	"	"	"	"	"
Chrysene	**350**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**850**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**470**	(RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**120**	(RES), J		40	"	"	"	"	"
Benzo(a)pyrene	**260**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**160**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**42**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**200**			40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	330	Q	*33.0%*	*38.2-115*	"	"	"
Phenol-d5	620		*61.5%*	*44.5-111*	"	"	"
Nitrobenzene-d5	490	Q	*48.8%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	600		*59.8%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	860		*85.6%*	*26.1-119*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A005 (1611041-13) **Matrix: Soil** **Sampled: Nov-08-16 15:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
Terphenyl-d14	900	*89.6%*	*59.4-127*	*B16K043*	*Nov-17-16*	*Dec-08-16*

A003 (1611041-14) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**59**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**99**	(CCV), J		40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"

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77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A003 (1611041-14) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Dimethylphthalate	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**40**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**41**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**540**			40	"	"	"	"	"
Anthracene	**100**			40	"	"	"	"	"
Carbazole	**72**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**820**			40	"	"	"	"	"
Pyrene	**660**			40	"	"	"	"	"
Butylbenzylphthalate	**40**	B		40	"	"	"	"	"
Benzo (a) anthracene	**330**			40	"	"	"	"	"
Chrysene	**350**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**1100**			40	"	"	"	"	"
Di-n-octylphthalate	**54**	B		40	"	"	"	"	"
Benzo(b)fluoranthene	**540**	(CCV), (RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**130**	(RES), J		40	"	"	"	"	"
Benzo(a)pyrene	**280**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**170**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**42**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**200**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A003 (1611041-14) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	320	Q	*30.9%*	*38.2-115*	*B16K043*	*Nov-17-16*	*Dec-08-16*
Phenol-d5	600		*58.4%*	*44.5-111*	"	"	"
Nitrobenzene-d5	480	Q	*47.4%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	540		*53.0%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	940		*92.3%*	*26.1-119*	"	"	"
Terphenyl-d14	970		*94.5%*	*59.4-127*	"	"	"

A003-D (1611041-15) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			41	ug/kg dry	1	B16K043	Nov-17-16	Dec-12-16
Phenol	**U**			41	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			41	"	"	"	"	"
2-Chlorophenol	**U**			41	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			41	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			41	"	"	"	"	"
3+4-Methylphenol	**U**			41	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			41	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			41	"	"	"	"	"
Isophorone	**U**			41	"	"	"	"	"
2-Nitrophenol	**U**			41	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			41	"	"	"	"	"
2,4-Dichlorophenol	**U**			41	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			41	"	"	"	"	"
Naphthalene	**92**			41	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			41	"	"	"	"	"
2-Methylnaphthalene	**110**	J, (CCV)		41	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A003-D (1611041-15) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
2,4,6-Trichlorophenol	**U**			41	ug/kg dry	1	B16K043	Nov-17-16	Dec-12-16
2,4,5-Trichlorophenol	**U**			41	"	"	"	"	"
2-Chloronaphthalene	**U**			41	"	"	"	"	"
2-Nitroaniline	**U**			41	"	"	"	"	"
Acenaphthylene	**U**			41	"	"	"	"	"
Dimethylphthalate	**U**			41	"	"	"	"	"
2,6-Dinitrotoluene	**U**			41	"	"	"	"	"
3-Nitroaniline	**U**	(CCV), J		210	"	"	"	"	"
Acenaphthene	**120**			41	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), J		210	"	"	"	"	"
Dibenzofuran	**70**			41	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			41	"	"	"	"	"
Fluorene	**110**			41	"	"	"	"	"
Diethylphthalate	**U**			41	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			41	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		41	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			41	"	"	"	"	"
Hexachlorobenzene	**U**			41	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**830**			41	"	"	"	"	"
Anthracene	**180**			41	"	"	"	"	"
Carbazole	**120**			41	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**1100**			41	"	"	"	"	"
Pyrene	**870**			41	"	"	"	"	"
Butylbenzylphthalate	**U**			41	"	"	"	"	"
Benzo (a) anthracene	**450**			41	"	"	"	"	"
Chrysene	**510**			41	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**1200**			41	"	"	"	"	"
Di-n-octylphthalate	**50**	B		41	"	"	"	"	"
Benzo(b)fluoranthene	**710**	(RES), J		41	"	"	"	"	"
Benzo(k)fluoranthene	**250**	(RES), J		41	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

A003-D (1611041-15) **Matrix: Soil** **Sampled: Nov-09-16 09:38** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo(a)pyrene	**460**			41	ug/kg dry	1	B16K043	Nov-17-16	Dec-12-16
Indeno(1,2,3-cd)pyrene	**270**			41	"	"	"	"	"
Dibenz(a,h)anthracene	**74**			41	"	"	"	"	"
Benzo(g,h,i)perylene	**300**			41	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	360	Q	*35.0%*	*38.2-115*	"	"	"
Phenol-d5	700		*68.1%*	*44.5-111*	"	"	"
Nitrobenzene-d5	500	Q	*49.2%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	540		*52.7%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	960		*93.6%*	*26.1-119*	"	"	"
Terphenyl-d14	940		*91.7%*	*59.4-127*	"	"	"

N005 (1611041-16) **Matrix: Soil** **Sampled: Nov-09-16 10:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N005 (1611041-16) **Matrix: Soil** **Sampled: Nov-09-16 10:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			40	"	"	"	"	"
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**56**			40	"	"	"	"	"
Pyrene	**44**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N005 (1611041-16) **Matrix: Soil** **Sampled: Nov-09-16 10:00** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Chrysene	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Bis(2-ethylhexyl)phthalate	**970**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**49**	(CCV), (RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**U**			40	"	"	"	"	"
Benzo(a)pyrene	**U**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	310	Q	*30.3%*	*38.2-115*	"	"	"
Phenol-d5	590		*58.1%*	*44.5-111*	"	"	"
Nitrobenzene-d5	520		*51.0%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	590		*58.8%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	900		*89.0%*	*26.1-119*	"	"	"
Terphenyl-d14	920		*90.9%*	*59.4-127*	"	"	"

N006 (1611041-17) **Matrix: Soil** **Sampled: Nov-09-16 10:29** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			42	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			42	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			42	"	"	"	"	"
2-Chlorophenol	**U**			42	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			42	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			42	"	"	"	"	"
3+4-Methylphenol	**U**			42	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			42	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			42	"	"	"	"	"
Isophorone	**U**			42	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N006 (1611041-17) **Matrix: Soil** **Sampled: Nov-09-16 10:29** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
2-Nitrophenol	**U**			42	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			42	"	"	"	"	"
2,4-Dichlorophenol	**U**			42	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			42	"	"	"	"	"
Naphthalene	**U**			42	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			42	"	"	"	"	"
2-Methylnaphthalene	**U**			42	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			42	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			42	"	"	"	"	"
2-Chloronaphthalene	**U**			42	"	"	"	"	"
2-Nitroaniline	**U**			42	"	"	"	"	"
Acenaphthylene	**42**			42	"	"	"	"	"
Dimethylphthalate	**U**			42	"	"	"	"	"
2,6-Dinitrotoluene	**U**			42	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			42	"	"	"	"	"
2,4-Dinitrophenol	**U**			210	"	"	"	"	"
Dibenzofuran	**U**			42	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			42	"	"	"	"	"
Fluorene	**U**			42	"	"	"	"	"
Diethylphthalate	**U**			42	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			42	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		42	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			42	"	"	"	"	"
Hexachlorobenzene	**U**			42	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**160**			42	"	"	"	"	"
Anthracene	**51**			42	"	"	"	"	"
Carbazole	**U**			42	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N006 (1611041-17) **Matrix: Soil** **Sampled: Nov-09-16 10:29** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Di-n-butylphthalate	**U**			210	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Fluoranthene	**420**			42	"	"	"	"	"
Pyrene	**370**			42	"	"	"	"	"
Butylbenzylphthalate	**130**			42	"	"	"	"	"
Benzo (a) anthracene	**200**			42	"	"	"	"	"
Chrysene	**230**			42	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**750**			42	"	"	"	"	"
Di-n-octylphthalate	**U**			42	"	"	"	"	"
Benzo(b)fluoranthene	**400**	(RES), J, (CCV)		42	"	"	"	"	"
Benzo(k)fluoranthene	**120**	(RES), J		42	"	"	"	"	"
Benzo(a)pyrene	**200**			42	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**140**			42	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			42	"	"	"	"	"
Benzo(g,h,i)perylene	**160**			42	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	300	Q	*28.9%*	*38.2-115*	"	"	"
Phenol-d5	630		*59.9%*	*44.5-111*	"	"	"
Nitrobenzene-d5	470	Q	*44.6%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	530		*50.6%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	960		*91.4%*	*26.1-119*	"	"	"
Terphenyl-d14	960		*91.0%*	*59.4-127*	"	"	"

N002 (1611041-18) **Matrix: Soil** **Sampled: Nov-09-16 10:50** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**	(IS), J		40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**	(IS), J		40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**	(IS), J		40	"	"	"	"	"
2-Chlorophenol	**U**	(IS), J		40	"	"	"	"	"
1,3-Dichlorobenzene	**U**	(IS), J		200	"	"	"	"	"
1,4-Dichlorobenzene	**U**	(IS), J		200	"	"	"	"	"
1,2-Dichlorobenzene	**U**	(IS), J		200	"	"	"	"	"
2-Methylphenol	**U**	(IS), J		40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**	J, (IS)		40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N002 (1611041-18) **Matrix: Soil** **Sampled: Nov-09-16 10:50** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
3+4-Methylphenol	**U**	(IS), J		40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
N-Nitroso-di-n-propylamine	**U**	(IS), J		40	"	"	"	"	"
Hexachloroethane	**U**			200	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			200	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			200	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

N002 (1611041-18) **Matrix: Soil** **Sampled: Nov-09-16 10:50** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Hexachlorobenzene	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"
Phenanthrene	**420**			40	"	"	"	"	"
Anthracene	**72**			40	"	"	"	"	"
Carbazole	**71**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			200	"	"	"	"	"
Fluoranthene	**920**			40	"	"	"	"	"
Pyrene	**740**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**350**			40	"	"	"	"	"
Chrysene	**440**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**1600**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**730**	(CCV), (RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**250**	(RES), J		40	"	"	"	"	"
Benzo(a)pyrene	**400**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**280**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**70**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**340**			40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	380	Q	*37.7%*	*38.2-115*	"	"	"
Phenol-d5	620		*62.1%*	*44.5-111*	"	"	"
Nitrobenzene-d5	470	Q	*47.0%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	500		*50.4%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	900		*90.6%*	*26.1-119*	"	"	"
Terphenyl-d14	930		*92.9%*	*59.4-127*	"	"	"

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S003 (1611041-19) **Matrix: Soil** **Sampled: Nov-09-16 11:14** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S003 (1611041-19) **Matrix: Soil** **Sampled: Nov-09-16 11:14** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
4-Nitrophenol	**U**			210	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	J, (RL)		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			40	"	"	"	"	"
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**U**			40	"	"	"	"	"
Pyrene	**U**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**U**			40	"	"	"	"	"
Chrysene	**U**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**1400**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**U**			40	"	"	"	"	"
Benzo(k)fluoranthene	**U**			40	"	"	"	"	"
Benzo(a)pyrene	**U**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	340	Q	*33.6%*	*38.2-115*	"	"	"
Phenol-d5	640		*62.6%*	*44.5-111*	"	"	"
Nitrobenzene-d5	550		*53.6%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	570		*56.0%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	950		*93.0%*	*26.1-119*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S003 (1611041-19) **Matrix: Soil** **Sampled: Nov-09-16 11:14** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
Terphenyl-d14	940	*92.2%*	*59.4-127*	*B16K043*	*Nov-17-16*	*Dec-08-16*

S001 (1611041-20) **Matrix: Soil** **Sampled: Nov-09-16 11:30** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			40	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S001 (1611041-20) **Matrix: Soil** **Sampled: Nov-09-16 11:30** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Dimethylphthalate	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			210	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			210	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			40	"	"	"	"	"
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**U**			40	"	"	"	"	"
Pyrene	**U**			40	"	"	"	"	"
Butylbenzylphthalate	**U**			40	"	"	"	"	"
Benzo (a) anthracene	**U**			40	"	"	"	"	"
Chrysene	**U**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**2400**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**44**	(CCV), (RES), J		40	"	"	"	"	"
Benzo(k)fluoranthene	**U**			40	"	"	"	"	"
Benzo(a)pyrene	**U**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S001 (1611041-20) **Matrix: Soil** **Sampled: Nov-09-16 11:30** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed

Surogate	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	180	Q	*18.2%*	*38.2-115*	*B16K043*	*Nov-17-16*	*Dec-08-16*
Phenol-d5	570		*56.4%*	*44.5-111*	"	"	"
Nitrobenzene-d5	540		*53.9%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	600		*59.2%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	930		*92.4%*	*26.1-119*	"	"	"
Terphenyl-d14	940		*93.4%*	*59.4-127*	"	"	"

S002 (1611041-21) **Matrix: Soil** **Sampled: Nov-09-16 11:56** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Phenol	**U**			40	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			40	"	"	"	"	"
2-Chlorophenol	**U**			40	"	"	"	"	"
1,3-Dichlorobenzene	**U**			200	"	"	"	"	"
1,4-Dichlorobenzene	**U**			200	"	"	"	"	"
1,2-Dichlorobenzene	**U**			200	"	"	"	"	"
2-Methylphenol	**U**			40	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			40	"	"	"	"	"
3+4-Methylphenol	**U**			40	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			40	"	"	"	"	"
Hexachloroethane	**U**			200	"	"	"	"	"
Nitrobenzene	**U**			40	"	"	"	"	"
Isophorone	**U**			40	"	"	"	"	"
2-Nitrophenol	**U**			40	"	"	"	"	"
2,4-Dimethylphenol	**U**			200	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			40	"	"	"	"	"
2,4-Dichlorophenol	**U**			40	"	"	"	"	"
1,2,4-Trichlorobenzene	**U**			40	"	"	"	"	"
Naphthalene	**U**			40	"	"	"	"	"
Hexachlorobutadiene	**U**			200	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			40	"	"	"	"	"
2-Methylnaphthalene	**U**			40	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S002 (1611041-21) **Matrix: Soil** **Sampled: Nov-09-16 11:56** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
2,4,6-Trichlorophenol	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
2,4,5-Trichlorophenol	**U**			40	"	"	"	"	"
2-Chloronaphthalene	**U**			40	"	"	"	"	"
2-Nitroaniline	**U**			40	"	"	"	"	"
Acenaphthylene	**U**			40	"	"	"	"	"
Dimethylphthalate	**U**			40	"	"	"	"	"
2,6-Dinitrotoluene	**U**			40	"	"	"	"	"
3-Nitroaniline	**U**			200	"	"	"	"	"
Acenaphthene	**U**			40	"	"	"	"	"
2,4-Dinitrophenol	**U**			200	"	"	"	"	"
Dibenzofuran	**U**			40	"	"	"	"	"
4-Nitrophenol	**U**			200	"	"	"	"	"
2,4-Dinitrotoluene	**U**			40	"	"	"	"	"
Fluorene	**U**			40	"	"	"	"	"
Diethylphthalate	**U**			40	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			40	"	"	"	"	"
4-Nitroaniline	**U**	(RL), J		200	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), J		40	"	"	"	"	"
Azobenzene	**U**	(RL), J		200	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			40	"	"	"	"	"
Hexachlorobenzene	**U**			40	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		200	"	"	"	"	"
Phenanthrene	**U**			40	"	"	"	"	"
Anthracene	**U**			40	"	"	"	"	"
Carbazole	**U**			40	"	"	"	"	"
Di-n-butylphthalate	**U**			200	"	"	"	"	"
Fluoranthene	**56**			40	"	"	"	"	"
Pyrene	**46**			40	"	"	"	"	"
Butylbenzylphthalate	**51**	B		40	"	"	"	"	"
Benzo (a) anthracene	**U**			40	"	"	"	"	"
Chrysene	**46**			40	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**290**			40	"	"	"	"	"
Di-n-octylphthalate	**U**			40	"	"	"	"	"
Benzo(b)fluoranthene	**82**	(CCV), (RES), J		40	"	"	"	"	"

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S002 (1611041-21) **Matrix: Soil** **Sampled: Nov-09-16 11:56** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo(k)fluoranthene	**U**			40	ug/kg dry	1	B16K043	Nov-17-16	Dec-08-16
Benzo(a)pyrene	**43**			40	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**U**			40	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			40	"	"	"	"	"
Benzo(g,h,i)perylene	**U**			40	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	320	Q	*31.6%*	*38.2-115*	"	"	"
Phenol-d5	540		*54.0%*	*44.5-111*	"	"	"
Nitrobenzene-d5	530		*53.3%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	580		*58.0%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	860		*86.3%*	*26.1-119*	"	"	"
Terphenyl-d14	920		*92.0%*	*59.4-127*	"	"	"

S004 (1611041-22) **Matrix: Soil** **Sampled: Nov-09-16 12:33** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
N-Nitrosodimethylamine	**U**			41	ug/kg dry	1	B16K043	Nov-17-16	Dec-12-16
Phenol	**U**			41	"	"	"	"	"
Bis(2-chloroethyl)ether	**U**			41	"	"	"	"	"
2-Chlorophenol	**U**			41	"	"	"	"	"
1,3-Dichlorobenzene	**U**			210	"	"	"	"	"
1,4-Dichlorobenzene	**U**			210	"	"	"	"	"
1,2-Dichlorobenzene	**U**			210	"	"	"	"	"
2-Methylphenol	**U**			41	"	"	"	"	"
Bis(1-chloroisopropyl)ether	**U**			41	"	"	"	"	"
3+4-Methylphenol	**U**	(MS), J		41	"	"	"	"	"
N-Nitroso-di-n-propylamine	**U**			41	"	"	"	"	"
Hexachloroethane	**U**			210	"	"	"	"	"
Nitrobenzene	**U**			41	"	"	"	"	"
Isophorone	**U**			41	"	"	"	"	"
2-Nitrophenol	**U**			41	"	"	"	"	"
2,4-Dimethylphenol	**U**	(MS), J		210	"	"	"	"	"
Bis(2-chloroethoxy)methane	**U**			41	"	"	"	"	"
2,4-Dichlorophenol	**U**			41	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S004 (1611041-22) **Matrix: Soil** **Sampled: Nov-09-16 12:33** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
1,2,4-Trichlorobenzene	**U**			41	ug/kg dry	1	B16K043	Nov-17-16	Dec-12-16
Naphthalene	**U**			41	"	"	"	"	"
Hexachlorobutadiene	**U**			210	"	"	"	"	"
4-Chloro-3-methylphenol	**U**			41	"	"	"	"	"
2-Methylnaphthalene	**U**			41	"	"	"	"	"
2,4,6-Trichlorophenol	**U**			41	"	"	"	"	"
2,4,5-Trichlorophenol	**U**			41	"	"	"	"	"
2-Chloronaphthalene	**U**			41	"	"	"	"	"
2-Nitroaniline	**U**			41	"	"	"	"	"
Acenaphthylene	**U**			41	"	"	"	"	"
Dimethylphthalate	**U**			41	"	"	"	"	"
2,6-Dinitrotoluene	**U**			41	"	"	"	"	"
3-Nitroaniline	**Rejected**	(CCV), (MS)		210	"	"	"	"	"
Acenaphthene	**U**			41	"	"	"	"	"
2,4-Dinitrophenol	**U**	(CCV), (MS), J		210	"	"	"	"	"
Dibenzofuran	**U**			41	"	"	"	"	"
4-Nitrophenol	**U**			210	"	"	"	"	"
2,4-Dinitrotoluene	**U**			41	"	"	"	"	"
Fluorene	**U**			41	"	"	"	"	"
Diethylphthalate	**U**			41	"	"	"	"	"
4-Chlorophenylphenyl ether	**U**			41	"	"	"	"	"
4-Nitroaniline	**U**	(MS), (RL), J		210	"	"	"	"	"
4,6-Dinitro-2-methylphenol	**U**	(LCS), (MS), J		41	"	"	"	"	"
Azobenzene	**U**	(RL), J		210	"	"	"	"	"
4-Bromophenyl phenyl ether	**U**			41	"	"	"	"	"
Hexachlorobenzene	**U**			41	"	"	"	"	"
Pentachlorophenol	**U**	(CCV), J		210	"	"	"	"	"
Phenanthrene	**U**			41	"	"	"	"	"
Anthracene	**U**			41	"	"	"	"	"
Carbazole	**U**			41	"	"	"	"	"
Di-n-butylphthalate	**U**			210	"	"	"	"	"
Fluoranthene	**74**			41	"	"	"	"	"
Pyrene	**62**			41	"	"	"	"	"
Butylbenzylphthalate	**47**	B		41	"	"	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified)
US EPA Region 5 Chicago Regional Laboratory

S004 (1611041-22) **Matrix: Soil** **Sampled: Nov-09-16 12:33** **Received: Nov-15-16 11:30**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo (a) anthracene	**U**			41	ug/kg dry	1	B16K043	Nov-17-16	Dec-12-16
Chrysene	**55**			41	"	"	"	"	"
Bis(2-ethylhexyl)phthalate	**2700**			41	"	"	"	"	"
Di-n-octylphthalate	**U**			41	"	"	"	"	"
Benzo(b)fluoranthene	**110**	(RES), J		41	"	"	"	"	"
Benzo(k)fluoranthene	**U**			41	"	"	"	"	"
Benzo(a)pyrene	**47**			41	"	"	"	"	"
Indeno(1,2,3-cd)pyrene	**41**			41	"	"	"	"	"
Dibenz(a,h)anthracene	**U**			41	"	"	"	"	"
Benzo(g,h,i)perylene	**48**			41	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
2-Fluorophenol	300	Q	*29.1%*	*38.2-115*	"	"	"
Phenol-d5	620		*59.6%*	*44.5-111*	"	"	"
Nitrobenzene-d5	540		*52.2%*	*50-94.9*	"	"	"
2-Fluorobiphenyl	580		*56.2%*	*48.1-108*	"	"	"
2,4,6-Tribromophenol	930		*90.2%*	*26.1-119*	"	"	"
Terphenyl-d14	900		*87.6%*	*59.4-127*	"	"	"

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Blank (B16K042-BLK1) **Prepared: Nov-17-16 Analyzed: Dec-06-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	U			32	ug/kg						
Phenol	U			32	"						
Bis(2-chloroethyl)ether	U			32	"						
2-Chlorophenol	U			32	"						
1,3-Dichlorobenzene	U			170	"						
1,4-Dichlorobenzene	U			170	"						
1,2-Dichlorobenzene	U			170	"						
2-Methylphenol	U			32	"						
Bis(1-chloroisopropyl)ether	U			32	"						
3+4-Methylphenol	U			32	"						
N-Nitroso-di-n-propylamine	U			32	"						
Hexachloroethane	U			170	"						
Nitrobenzene	U			32	"						
Isophorone	U			32	"						
2-Nitrophenol	U			32	"						
2,4-Dimethylphenol	U			170	"						
Bis(2-chloroethoxy)methane	U			32	"						
2,4-Dichlorophenol	U			32	"						
1,2,4-Trichlorobenzene	U			32	"						
Naphthalene	U			32	"						
Hexachlorobutadiene	U			170	"						
4-Chloro-3-methylphenol	U			32	"						
2-Methylnaphthalene	U			32	"						
2,4,6-Trichlorophenol	U			32	"						
2,4,5-Trichlorophenol	U			32	"						
2-Chloronaphthalene	U			32	"						
2-Nitroaniline	U			32	"						
Acenaphthylene	U			32	"						
Dimethylphthalate	U			32	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Blank (B16K042-BLK1) **Prepared: Nov-17-16 Analyzed: Dec-06-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
2,6-Dinitrotoluene	U			32	ug/kg						
3-Nitroaniline	U			170	"						
Acenaphthene	U			32	"						
2,4-Dinitrophenol	U			170	"						
Dibenzofuran	U			32	"						
4-Nitrophenol	U			170	"						
2,4-Dinitrotoluene	U			32	"						
Fluorene	U			32	"						
Diethylphthalate	U			32	"						
4-Chlorophenylphenyl ether	U			32	"						
4-Nitroaniline	U			170	"						
4,6-Dinitro-2-methylphenol	U			32	"						
Azobenzene	U			170	"						
4-Bromophenyl phenyl ether	U			32	"						
Hexachlorobenzene	U			32	"						
Pentachlorophenol	U			170	"						
Phenanthrene	U			32	"						
Anthracene	U			32	"						
Carbazole	U			32	"						
Di-n-butylphthalate	U			170	"						
Fluoranthene	U			32	"						
Pyrene	U			32	"						
Butylbenzylphthalate	U			32	"						
Benzo (a) anthracene	U			32	"						
Chrysene	U			32	"						
Bis(2-ethylhexyl)phthalate	U			32	"						
Di-n-octylphthalate	U			32	"						
Benzo(b)fluoranthene	U			32	"						
Benzo(k)fluoranthene	U			32	"						
Benzo(a)pyrene	U			32	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Blank (B16K042-BLK1) **Prepared: Nov-17-16 Analyzed: Dec-06-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Indeno(1,2,3-cd)pyrene	**U**			32	ug/kg						
Dibenz(a,h)anthracene	**U**			32	"						
Benzo(g,h,i)perylene	**U**			32	"						
Surrogate: 2-Fluorophenol	*550*				*"*	*819.4*		*66.8%*	*38.2-115*		
Surrogate: Phenol-d5	*660*				*"*	*819.4*		*81.1%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*450*				*"*	*819.4*		*55.4%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*460*				*"*	*819.4*		*55.6%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*480*				*"*	*819.4*		*58.3%*	*26.1-119*		
Surrogate: Terphenyl-d14	*710*				*"*	*819.4*		*86.1%*	*59.4-127*		

Blank (B16K042-BLK2) **Prepared: Nov-17-16 Analyzed: Dec-06-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**42**	Q		32	ug/kg						
Phenol	**U**			32	"						
Bis(2-chloroethyl)ether	**U**			32	"						
2-Chlorophenol	**U**			32	"						
1,3-Dichlorobenzene	**U**			160	"						
1,4-Dichlorobenzene	**U**			160	"						
1,2-Dichlorobenzene	**U**			160	"						
2-Methylphenol	**U**			32	"						
Bis(1-chloroisopropyl)ether	**U**			32	"						
3+4-Methylphenol	**U**			32	"						
N-Nitroso-di-n-propylamine	**U**			32	"						
Hexachloroethane	**U**			160	"						
Nitrobenzene	**U**			32	"						
Isophorone	**U**			32	"						
2-Nitrophenol	**U**			32	"						
2,4-Dimethylphenol	**U**			160	"						
Bis(2-chloroethoxy)methane	**U**			32	"						
2,4-Dichlorophenol	**U**			32	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Blank (B16K042-BLK2) **Prepared: Nov-17-16 Analyzed: Dec-06-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	U			32	ug/kg						
Naphthalene	U			32	"						
Hexachlorobutadiene	U			160	"						
4-Chloro-3-methylphenol	U			32	"						
2-Methylnaphthalene	U			32	"						
2,4,6-Trichlorophenol	U			32	"						
2,4,5-Trichlorophenol	U			32	"						
2-Chloronaphthalene	U			32	"						
2-Nitroaniline	U			32	"						
Acenaphthylene	U			32	"						
Dimethylphthalate	U			32	"						
2,6-Dinitrotoluene	U			32	"						
3-Nitroaniline	U			160	"						
Acenaphthene	U			32	"						
2,4-Dinitrophenol	U			160	"						
Dibenzofuran	U			32	"						
4-Nitrophenol	U			160	"						
2,4-Dinitrotoluene	U			32	"						
Fluorene	U			32	"						
Diethylphthalate	U			32	"						
4-Chlorophenylphenyl ether	U			32	"						
4-Nitroaniline	U			160	"						
4,6-Dinitro-2-methylphenol	U			32	"						
Azobenzene	U			160	"						
4-Bromophenyl phenyl ether	U			32	"						
Hexachlorobenzene	U			32	"						
Pentachlorophenol	U			160	"						
Phenanthrene	U			32	"						
Anthracene	U			32	"						
Carbazole	U			32	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Blank (B16K042-BLK2) **Prepared: Nov-17-16 Analyzed: Dec-06-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Di-n-butylphthalate	**U**			160	ug/kg						
Fluoranthene	**U**			32	"						
Pyrene	**U**			32	"						
Butylbenzylphthalate	**U**			32	"						
Benzo (a) anthracene	**U**			32	"						
Chrysene	**U**			32	"						
Bis(2-ethylhexyl)phthalate	**U**			32	"						
Di-n-octylphthalate	**U**			32	"						
Benzo(b)fluoranthene	**U**			32	"						
Benzo(k)fluoranthene	**U**			32	"						
Benzo(a)pyrene	**U**			32	"						
Indeno(1,2,3-cd)pyrene	**U**			32	"						
Dibenz(a,h)anthracene	**U**			32	"						
Benzo(g,h,i)perylene	**U**			32	"						
Surrogate: 2-Fluorophenol	*580*				*"*	*803.3*		*72.4%*	*38.2-115*		
Surrogate: Phenol-d5	*690*				*"*	*803.3*		*86.5%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*510*				*"*	*803.3*		*63.2%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*510*				*"*	*803.3*		*63.4%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*460*				*"*	*803.3*		*57.6%*	*26.1-119*		
Surrogate: Terphenyl-d14	*740*				*"*	*803.3*		*92.0%*	*59.4-127*		

LCS (B16K042-BS2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**500**			33	ug/kg	830.3		60.1%	27-98		
Phenol	**750**			33	"	830.3		90.2%	37-128		
Bis(2-chloroethyl)ether	**590**			33	"	830.3		71.4%	34-114		
2-Chlorophenol	**680**			33	"	830.3		82.1%	45-119		
1,3-Dichlorobenzene	**450**			170	"	830.3		53.9%	20-108		
1,4-Dichlorobenzene	**470**			170	"	830.3		56.4%	22-107		
1,2-Dichlorobenzene	**500**			170	"	830.3		59.8%	27-108		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

LCS (B16K042-BS2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
2-Methylphenol	**720**			33	ug/kg	830.3		86.7%	42-129		
Bis(1-chloroisopropyl)ether	**610**			33	"	830.3		73.5%	39-110		
3+4-Methylphenol	**780**			33	"	830.3		93.6%	37-134		
N-Nitroso-di-n-propylamine	**680**			33	"	830.3		82.4%	45-117		
Hexachloroethane	**420**			170	"	830.3		51.0%	20-109		
Nitrobenzene	**610**			33	"	830.3		72.9%	42-113		
Isophorone	**680**			33	"	830.3		81.3%	49-117		
2-Nitrophenol	**520**			33	"	830.3		62.2%	46-118		
2,4-Dimethylphenol	**650**			170	"	830.3		78.8%	29-130		
Bis(2-chloroethoxy)methane	**630**			33	"	830.3		76.2%	47-116		
2,4-Dichlorophenol	**720**			33	"	830.3		87.0%	45-130		
1,2,4-Trichlorobenzene	**570**			33	"	830.3		68.8%	37-109		
Naphthalene	**590**			33	"	830.3		71.5%	43-108		
Hexachlorobutadiene	**540**			170	"	830.3		65.3%	33-110		
4-Chloro-3-methylphenol	**730**			33	"	830.3		88.2%	54-136		
2-Methylnaphthalene	**640**			33	"	830.3		77.0%	46-117		
2,4,6-Trichlorophenol	**630**			33	"	830.3		75.7%	47-122		
2,4,5-Trichlorophenol	**680**			33	"	830.3		81.6%	47-145		
2-Chloronaphthalene	**630**			33	"	830.3		75.8%	47-114		
2-Nitroaniline	**700**			33	"	830.3		84.3%	57-138		
Acenaphthylene	**680**			33	"	830.3		81.5%	53-117		
Dimethylphthalate	**720**			33	"	830.3		87.1%	61-123		
2,6-Dinitrotoluene	**680**			33	"	830.3		82.2%	63-127		
3-Nitroaniline	**660**			170	"	830.3		79.8%	42-136		
Acenaphthene	**660**			33	"	830.3		79.6%	52-116		
2,4-Dinitrophenol	**270**			170	"	830.3		32.4%	20-119		
Dibenzofuran	**680**			33	"	830.3		82.0%	53-119		
4-Nitrophenol	**620**			170	"	830.3		74.6%	49-132		
2,4-Dinitrotoluene	**690**			33	"	830.3		83.4%	63-143		
Fluorene	**710**			33	"	830.3		85.7%	58-120		

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

LCS (B16K042-BS2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Diethylphthalate	**740**			33	ug/kg	830.3		89.0%	67-124		
4-Chlorophenylphenyl ether	**680**			33	"	830.3		81.7%	56-119		
4-Nitroaniline	**640**			170	"	830.3		76.5%	58-139		
4,6-Dinitro-2-methylphenol	**420**	(CCV), J, Q		33	"	830.3		50.5%	51-127		
Azobenzene	**750**			170	"	830.3		90.4%	65-118		
4-Bromophenyl phenyl ether	**710**			33	"	830.3		85.4%	63-118		
Hexachlorobenzene	**690**			33	"	830.3		82.8%	65-113		
Pentachlorophenol	**570**	(CCV), J		170	"	830.3		69.0%	28-151		
Phenanthrene	**710**			33	"	830.3		85.5%	68-114		
Anthracene	**730**			33	"	830.3		88.2%	70-116		
Carbazole	**800**			33	"	830.3		96.9%	74-119		
Di-n-butylphthalate	**820**			170	"	830.3		98.3%	63-173		
Fluoranthene	**760**			33	"	830.3		91.6%	71-122		
Pyrene	**780**			33	"	830.3		93.8%	72-117		
Butylbenzylphthalate	**730**			33	"	830.3		88.5%	70-127		
Benzo (a) anthracene	**730**			33	"	830.3		87.7%	68-115		
Chrysene	**740**			33	"	830.3		88.9%	69-117		
Bis(2-ethylhexyl)phthalate	**740**			33	"	830.3		88.8%	65-143		
Di-n-octylphthalate	**730**			33	"	830.3		87.7%	69-147		
Benzo(b)fluoranthene	**780**			33	"	830.3		94.2%	69-128		
Benzo(k)fluoranthene	**780**			33	"	830.3		93.8%	63-135		
Benzo(a)pyrene	**770**			33	"	830.3		92.3%	69-133		
Indeno(1,2,3-cd)pyrene	**780**			33	"	830.3		93.9%	70-129		
Dibenz(a,h)anthracene	**810**			33	"	830.3		97.2%	69-131		
Benzo(g,h,i)perylene	**790**			33	"	830.3		95.2%	54-139		
Surrogate: 2-Fluorophenol	*640*				"	*830.3*		*76.7%*	*38.2-115*		
Surrogate: Phenol-d5	*700*				"	*830.3*		*84.2%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*490*				"	*830.3*		*59.6%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*530*				"	*830.3*		*63.3%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*580*				"	*830.3*		*69.3%*	*26.1-119*		
Surrogate: Terphenyl-d14	*740*				"	*830.3*		*88.8%*	*59.4-127*		

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

LCS Dup (B16K042-BSD2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**500**			33	ug/kg	825.6		60.8%	27-98	0.694	37
Phenol	**670**			33	"	825.6		80.6%	37-128	11.8	33
Bis(2-chloroethyl)ether	**560**			33	"	825.6		68.1%	34-114	5.21	36
2-Chlorophenol	**630**			33	"	825.6		76.1%	45-119	8.15	33
1,3-Dichlorobenzene	**460**			170	"	825.6		55.6%	20-108	2.51	79
1,4-Dichlorobenzene	**460**			170	"	825.6		56.2%	22-107	0.989	74
1,2-Dichlorobenzene	**500**			170	"	825.6		60.6%	27-108	0.899	57
2-Methylphenol	**650**			33	"	825.6		78.9%	42-129	9.93	27
Bis(1-chloroisopropyl)ether	**560**			33	"	825.6		68.0%	39-110	8.31	32
3+4-Methylphenol	**700**			33	"	825.6		84.6%	37-134	10.7	30
N-Nitroso-di-n-propylamine	**580**			33	"	825.6		69.9%	45-117	16.9	30
Hexachloroethane	**460**			170	"	825.6		55.6%	20-109	8.07	76
Nitrobenzene	**590**			33	"	825.6		71.9%	42-113	1.89	41
Isophorone	**660**			33	"	825.6		80.2%	49-117	1.90	30
2-Nitrophenol	**520**			33	"	825.6		62.5%	46-118	0.0499	34
2,4-Dimethylphenol	**640**			170	"	825.6		77.5%	29-130	2.20	34
Bis(2-chloroethoxy)methane	**620**			33	"	825.6		75.4%	47-116	1.67	30
2,4-Dichlorophenol	**680**			33	"	825.6		81.9%	45-130	6.58	30
1,2,4-Trichlorobenzene	**570**			33	"	825.6		69.0%	37-109	0.157	38
Naphthalene	**580**			33	"	825.6		70.4%	43-108	2.03	30
Hexachlorobutadiene	**540**			170	"	825.6		64.8%	33-110	1.36	48
4-Chloro-3-methylphenol	**680**			33	"	825.6		82.4%	54-136	7.36	30
2-Methylnaphthalene	**620**			33	"	825.6		75.4%	46-117	2.66	36
2,4,6-Trichlorophenol	**600**			33	"	825.6		72.4%	47-122	5.05	30
2,4,5-Trichlorophenol	**660**			33	"	825.6		80.4%	47-145	2.09	30
2-Chloronaphthalene	**620**			33	"	825.6		74.5%	47-114	2.32	37
2-Nitroaniline	**650**			33	"	825.6		79.3%	57-138	6.68	30
Acenaphthylene	**650**			33	"	825.6		78.6%	53-117	4.26	30
Dimethylphthalate	**710**			33	"	825.6		86.0%	61-123	1.86	30
2,6-Dinitrotoluene	**670**			33	"	825.6		81.0%	63-127	2.13	30

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

LCS Dup (B16K042-BSD2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
3-Nitroaniline	**650**			170	ug/kg	825.6		78.6%	42-136	2.13	30
Acenaphthene	**650**			33	"	825.6		78.3%	52-116	2.18	30
2,4-Dinitrophenol	**210**			170	"	825.6		25.0%	20-119	26.3	46
Dibenzofuran	**660**			33	"	825.6		80.4%	53-119	2.48	30
4-Nitrophenol	**570**			170	"	825.6		69.5%	49-132	7.67	30
2,4-Dinitrotoluene	**660**			33	"	825.6		79.8%	63-143	5.02	30
Fluorene	**690**			33	"	825.6		83.6%	58-120	3.07	30
Diethylphthalate	**730**			33	"	825.6		88.1%	67-124	1.65	30
4-Chlorophenylphenyl ether	**670**			33	"	825.6		81.4%	56-119	0.956	30
4-Nitroaniline	**610**			170	"	825.6		74.2%	58-139	3.64	30
4,6-Dinitro-2-methylphenol	**360**	(CCV), J		33	"	825.6		44.0%	51-127	14.4	30
Azobenzene	**730**			170	"	825.6		87.9%	65-118	3.39	30
4-Bromophenyl phenyl ether	**700**			33	"	825.6		84.8%	63-118	1.22	30
Hexachlorobenzene	**680**			33	"	825.6		82.9%	65-113	0.466	30
Pentachlorophenol	**490**	(CCV), J		170	"	825.6		58.8%	28-151	16.5	30
Phenanthrene	**690**			33	"	825.6		83.9%	68-114	2.45	30
Anthracene	**710**			33	"	825.6		85.7%	70-116	3.41	30
Carbazole	**780**			33	"	825.6		94.4%	74-119	3.20	30
Di-n-butylphthalate	**800**			170	"	825.6		96.6%	63-173	2.25	30
Fluoranthene	**760**			33	"	825.6		92.1%	71-122	0.0406	30
Pyrene	**750**			33	"	825.6		91.3%	72-117	3.24	30
Butylbenzylphthalate	**690**			33	"	825.6		84.1%	70-127	5.71	30
Benzo (a) anthracene	**700**			33	"	825.6		85.0%	68-115	3.67	30
Chrysene	**740**			33	"	825.6		89.1%	69-117	0.293	30
Bis(2-ethylhexyl)phthalate	**700**			33	"	825.6		85.3%	65-143	4.61	30
Di-n-octylphthalate	**690**			33	"	825.6		83.6%	69-147	5.28	30
Benzo(b)fluoranthene	**750**			33	"	825.6		90.4%	69-128	4.72	30
Benzo(k)fluoranthene	**780**			33	"	825.6		94.1%	63-135	0.180	30
Benzo(a)pyrene	**730**			33	"	825.6		88.6%	69-133	4.59	30
Indeno(1,2,3-cd)pyrene	**750**			33	"	825.6		91.3%	70-129	3.37	30

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

LCS Dup (B16K042-BSD2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Dibenz(a,h)anthracene	**780**			33	ug/kg	825.6		94.1%	69-131	3.82	30
Benzo(g,h,i)perylene	**760**			33	"	825.6		92.5%	54-139	3.42	30
Surrogate: 2-Fluorophenol	*600*				"	*825.6*		*72.2%*	*38.2-115*		
Surrogate: Phenol-d5	*630*				"	*825.6*		*76.6%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*470*				"	*825.6*		*56.8%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*500*				"	*825.6*		*60.2%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*550*				"	*825.6*		*66.3%*	*26.1-119*		
Surrogate: Terphenyl-d14	*720*				"	*825.6*		*87.6%*	*59.4-127*		

MRL Check (B16K042-MRL3) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**19**	B		33	ug/kg	33.03		58.0%	27-98		
Phenol	**31**			33	"	33.03		94.0%	37-128		
Bis(2-chloroethyl)ether	**23**			33	"	33.03		70.0%	34-114		
2-Chlorophenol	**25**			33	"	33.03		76.0%	45-119		
2-Methylphenol	**23**			33	"	33.03		71.0%	42-129		
Bis(1-chloroisopropyl)ether	**22**			33	"	33.03		66.0%	39-110		
3+4-Methylphenol	**23**			33	"	33.03		71.0%	37-134		
N-Nitroso-di-n-propylamine	**25**			33	"	33.03		77.0%	45-117		
Nitrobenzene	**24**			33	"	33.03		73.0%	42-113		
Isophorone	**25**			33	"	33.03		75.0%	49-117		
2-Nitrophenol	**24**	B		33	"	33.03		72.0%	46-118		
Bis(2-chloroethoxy)methane	**22**			33	"	33.03		67.0%	47-116		
2,4-Dichlorophenol	**22**			33	"	33.03		66.0%	45-130		
1,2,4-Trichlorobenzene	**20**			33	"	33.03		61.0%	37-109		
Naphthalene	**21**			33	"	33.03		65.0%	43-108		
4-Chloro-3-methylphenol	**33**	B		33	"	33.03		99.0%	54-136		
2-Methylnaphthalene	**22**			33	"	33.03		67.0%	46-117		
2,4,6-Trichlorophenol	**17**	Q		33	"	33.03		%	47-122		
2,4,5-Trichlorophenol	**18**			33	"	33.03		53.0%	47-145		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

MRL Check (B16K042-MRL3) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
2-Chloronaphthalene	**23**			33	ug/kg	33.03		70.0%	47-114		
2-Nitroaniline	**31**			33	"	33.03		95.0%	57-138		
Acenaphthylene	**24**			33	"	33.03		72.0%	53-117		
Dimethylphthalate	**25**			33	"	33.03		77.0%	61-123		
2,6-Dinitrotoluene	**36**	B		33	"	33.03		110%	63-127		
Acenaphthene	**23**	B		33	"	33.03		70.0%	52-116		
Dibenzofuran	**25**			33	"	33.03		75.0%	53-119		
2,4-Dinitrotoluene	**31**	B		33	"	33.03		94.0%	63-143		
Fluorene	**25**			33	"	33.03		75.0%	58-120		
Diethylphthalate	**29**			33	"	33.03		89.0%	67-124		
4-Chlorophenylphenyl ether	**28**			33	"	33.03		84.0%	56-119		
4,6-Dinitro-2-methylphenol	**36**	(CCV), J		33	"	33.03		108%	51-127		
4-Bromophenyl phenyl ether	**27**			33	"	33.03		82.0%	63-118		
Hexachlorobenzene	**26**			33	"	33.03		80.0%	65-113		
Phenanthrene	**28**			33	"	33.03		85.0%	68-114		
Anthracene	**26**			33	"	33.03		80.0%	70-116		
Carbazole	**28**			33	"	33.03		86.0%	74-119		
Fluoranthene	**30**			33	"	33.03		90.0%	71-122		
Pyrene	**29**			33	"	33.03		89.0%	72-117		
Butylbenzylphthalate	**39**	B		33	"	33.03		118%	70-127		
Benzo (a) anthracene	**31**	B		33	"	33.03		93.0%	68-115		
Chrysene	**31**			33	"	33.03		93.0%	69-117		
Bis(2-ethylhexyl)phthalate	**38**	B		33	"	33.03		116%	65-143		
Di-n-octylphthalate	**38**	B		33	"	33.03		114%	69-147		
Benzo(b)fluoranthene	**28**			33	"	33.03		84.0%	69-128		
Benzo(k)fluoranthene	**30**			33	"	33.03		90.0%	63-135		
Benzo(a)pyrene	**26**			33	"	33.03		78.0%	69-133		
Indeno(1,2,3-cd)pyrene	**26**			33	"	33.03		79.0%	70-129		
Dibenz(a,h)anthracene	**26**			33	"	33.03		78.0%	69-131		
Benzo(g,h,i)perylene	**25**			33	"	33.03		76.0%	54-139		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

MRL Check (B16K042-MRL3) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Surrogate: 2-Fluorophenol	*600*				*ug/kg*	*825.6*		*72.6%*	*38.2-115*		
Surrogate: Phenol-d5	*680*				*"*	*825.6*		*82.9%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*470*				*"*	*825.6*		*57.4%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*490*				*"*	*825.6*		*59.5%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*450*				*"*	*825.6*		*55.0%*	*26.1-119*		
Surrogate: Terphenyl-d14	*730*				*"*	*825.6*		*88.6%*	*59.4-127*		

MRL Check (B16K042-MRL4) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
1,3-Dichlorobenzene	**69**	L, (SURR)		170	ug/kg	166.1		41.4%	20-108		
1,4-Dichlorobenzene	**74**	(SURR), L		170	"	166.1		44.4%	22-107		
1,2-Dichlorobenzene	**82**	(SURR), L		170	"	166.1		49.4%	27-108		
Hexachloroethane	**70**	(SURR), L		170	"	166.1		42.0%	20-109		
2,4-Dimethylphenol	**80**			170	"	166.1		48.4%	29-130		
Hexachlorobutadiene	**85**	(SURR), L		170	"	166.1		51.0%	33-110		
3-Nitroaniline	**95**	(SURR), L		170	"	166.1		57.4%	42-136		
2,4-Dinitrophenol	**64**	B		170	"	166.1		38.8%	20-119		
4-Nitrophenol	**88**	B		170	"	166.1		53.2%	49-132		
4-Nitroaniline	**82**	(SURR), L, Q		170	"	166.1		49.2%	58-139		
Azobenzene	**110**	(SURR), B, L, Q		170	"	166.1		64.2%	65-118		
Pentachlorophenol	**70**	(CCV), J		170	"	166.1		42.0%	28-151		
Di-n-butylphthalate	**120**	(SURR), L		170	"	166.1		75.0%	63-173		
Surrogate: 2-Fluorophenol	*520*				*"*	*830.6*		*62.1%*	*38.2-115*		
Surrogate: Phenol-d5	*580*				*"*	*830.6*		*69.8%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*370*	Q			*"*	*830.6*		*44.4%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*400*	Q			*"*	*830.6*		*47.8%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*430*				*"*	*830.6*		*52.2%*	*26.1-119*		
Surrogate: Terphenyl-d14	*610*				*"*	*830.6*		*73.0%*	*59.4-127*		

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Matrix Spike (B16K042-MS2) **Source: 1611041-11** **Prepared: Nov-17-16 Analyzed: Dec-08-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**460**			39	ug/kg dry	983.6	U	46.8%	27-98		
Phenol	**870**			39	"	983.6	U	88.6%	37-128		
Bis(2-chloroethyl)ether	**680**			39	"	983.6	U	68.9%	34-114		
2-Chlorophenol	**780**			39	"	983.6	U	79.5%	45-119		
1,3-Dichlorobenzene	**500**			200	"	983.6	U	50.7%	20-108		
1,4-Dichlorobenzene	**520**			200	"	983.6	U	53.2%	22-107		
1,2-Dichlorobenzene	**560**			200	"	983.6	U	56.8%	27-108		
2-Methylphenol	**840**			39	"	983.6	U	85.3%	42-129		
Bis(1-chloroisopropyl)ether	**700**			39	"	983.6	U	70.9%	39-110		
3+4-Methylphenol	**870**			39	"	983.6	U	88.8%	37-134		
N-Nitroso-di-n-propylamine	**860**			39	"	983.6	U	87.4%	45-117		
Hexachloroethane	**400**	(CCV), J		200	"	983.6	U	40.7%	20-109		
Nitrobenzene	**700**			39	"	983.6	U	71.1%	42-113		
Isophorone	**810**			39	"	983.6	U	82.8%	49-117		
2-Nitrophenol	**760**			39	"	983.6	U	76.9%	46-118		
2,4-Dimethylphenol	**870**			200	"	983.6	U	88.9%	29-130		
Bis(2-chloroethoxy)methane	**770**			39	"	983.6	U	78.7%	47-116		
2,4-Dichlorophenol	**880**			39	"	983.6	U	89.9%	45-130		
1,2,4-Trichlorobenzene	**660**			39	"	983.6	U	67.0%	37-109		
Naphthalene	**710**			39	"	983.6	28	69.7%	43-108		
Hexachlorobutadiene	**620**			200	"	983.6	U	63.1%	33-110		
4-Chloro-3-methylphenol	**880**			39	"	983.6	U	89.7%	54-136		
2-Methylnaphthalene	**840**			39	"	983.6	38	81.1%	46-117		
2,4,6-Trichlorophenol	**960**			39	"	983.6	U	97.3%	47-122		
2,4,5-Trichlorophenol	**980**			39	"	983.6	U	99.5%	47-145		
2-Chloronaphthalene	**780**			39	"	983.6	U	78.9%	47-114		
2-Nitroaniline	**840**			39	"	983.6	U	85.1%	57-138		
Acenaphthylene	**870**			39	"	983.6	85	80.3%	53-117		
Dimethylphthalate	**870**			39	"	983.6	U	88.4%	61-123		
2,6-Dinitrotoluene	**790**			39	"	983.6	24	78.1%	63-127		

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Matrix Spike (B16K042-MS2) **Source: 1611041-11** **Prepared: Nov-17-16 Analyzed: Dec-08-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
3-Nitroaniline	**120**	Q		200	ug/kg dry	983.6	U	11.8%	42-136		
Acenaphthene	**800**			39	"	983.6	U	81.5%	52-116		
2,4-Dinitrophenol	**250**	(CCV), J		200	"	983.6	U	25.5%	20-119		
Dibenzofuran	**830**			39	"	983.6	U	84.8%	53-119		
4-Nitrophenol	**740**			200	"	983.6	U	74.9%	49-132		
2,4-Dinitrotoluene	**780**			39	"	983.6	U	79.4%	63-143		
Fluorene	**870**			39	"	983.6	U	88.3%	58-120		
Diethylphthalate	**890**			39	"	983.6	U	90.2%	67-124		
4-Chlorophenylphenyl ether	**830**			39	"	983.6	U	84.7%	56-119		
4-Nitroaniline	**260**	Q		200	"	983.6	U	26.8%	58-139		
4,6-Dinitro-2-methylphenol	**440**	(CCV), J, Q		39	"	983.6	26	41.8%	51-127		
Azobenzene	**830**			200	"	983.6	U	84.2%	65-118		
4-Bromophenyl phenyl ether	**880**			39	"	983.6	U	89.6%	63-118		
Hexachlorobenzene	**840**			39	"	983.6	U	85.4%	65-113		
Pentachlorophenol	**630**	(CCV), J		200	"	983.6	62	57.5%	28-151		
Phenanthrene	**910**			39	"	983.6	80	84.0%	68-114		
Anthracene	**940**			39	"	983.6	100	85.2%	70-116		
Carbazole	**980**			39	"	983.6	35	96.1%	74-119		
Di-n-butylphthalate	**1000**			200	"	983.6	U	101%	63-173		
Fluoranthene	**1100**			39	"	983.6	200	87.3%	71-122		
Pyrene	**1100**			39	"	983.6	190	89.4%	72-117		
Butylbenzylphthalate	**920**			39	"	983.6	22	91.7%	70-127		
Benzo (a) anthracene	**1000**			39	"	983.6	140	88.7%	68-115		
Chrysene	**1000**			39	"	983.6	250	78.7%	69-117		
Bis(2-ethylhexyl)phthalate	**1100**			39	"	983.6	64	100%	65-143		
Di-n-octylphthalate	**1000**			39	"	983.6	26	103%	69-147		
Benzo(b)fluoranthene	**1400**	(RES), J		39	"	983.6	400	101%	69-128		
Benzo(k)fluoranthene	**920**	(RES), J		39	"	983.6	130	80.0%	63-135		
Benzo(a)pyrene	**1000**			39	"	983.6	150	86.8%	69-133		
Indeno(1,2,3-cd)pyrene	**1000**			39	"	983.6	120	94.9%	70-129		

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Matrix Spike (B16K042-MS2) **Source: 1611041-11** **Prepared: Nov-17-16 Analyzed: Dec-08-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Dibenz(a,h)anthracene	**940**			39	ug/kg dry	983.6	31	92.0%	69-131		
Benzo(g,h,i)perylene	**1000**			39	"	983.6	150	88.1%	54-139		
Surrogate: 2-Fluorophenol	*630*				"	*983.6*		*63.7%*	*38.2-115*		
Surrogate: Phenol-d5	*820*				"	*983.6*		*83.6%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*560*				"	*983.6*		*57.2%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*630*				"	*983.6*		*64.1%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*890*				"	*983.6*		*90.7%*	*26.1-119*		
Surrogate: Terphenyl-d14	*900*				"	*983.6*		*91.8%*	*59.4-127*		

Matrix Spike Dup (B16K042-MSD2) **Source: 1611041-11** **Prepared: Nov-17-16 Analyzed: Dec-08-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**480**			39	ug/kg dry	989.2	U	48.2%	27-98	3.43	37
Phenol	**850**			39	"	989.2	U	86.0%	37-128	2.37	33
Bis(2-chloroethyl)ether	**680**			39	"	989.2	U	68.3%	34-114	0.308	36
2-Chlorophenol	**760**			39	"	989.2	U	77.3%	45-119	2.29	33
1,3-Dichlorobenzene	**500**			200	"	989.2	U	50.3%	20-108	0.226	79
1,4-Dichlorobenzene	**520**			200	"	989.2	U	52.8%	22-107	0.188	74
1,2-Dichlorobenzene	**560**			200	"	989.2	U	56.9%	27-108	0.777	57
2-Methylphenol	**790**			39	"	989.2	U	80.3%	42-129	5.52	27
Bis(1-chloroisopropyl)ether	**690**			39	"	989.2	U	70.2%	39-110	0.511	32
3+4-Methylphenol	**920**			39	"	989.2	U	93.4%	37-134	5.66	30
N-Nitroso-di-n-propylamine	**850**			39	"	989.2	U	85.7%	45-117	1.42	30
Hexachloroethane	**390**	(CCV), J		200	"	989.2	U	39.3%	20-109	2.83	76
Nitrobenzene	**680**			39	"	989.2	U	69.2%	42-113	2.17	41
Isophorone	**800**			39	"	989.2	U	81.0%	49-117	1.63	30
2-Nitrophenol	**770**			39	"	989.2	U	77.9%	46-118	1.91	34
2,4-Dimethylphenol	**830**			200	"	989.2	U	83.8%	29-130	5.37	34
Bis(2-chloroethoxy)methane	**770**			39	"	989.2	U	77.4%	47-116	1.18	30
2,4-Dichlorophenol	**900**			39	"	989.2	U	91.0%	45-130	1.80	30
1,2,4-Trichlorobenzene	**660**			39	"	989.2	U	66.4%	37-109	0.453	38

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Matrix Spike Dup (B16K042-MSD2) **Source: 1611041-11** **Prepared: Nov-17-16 Analyzed: Dec-08-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Naphthalene	**730**			39	ug/kg dry	989.2	28	70.7%	43-108	1.94	30
Hexachlorobutadiene	**600**			200	"	989.2	U	60.8%	33-110	3.18	48
4-Chloro-3-methylphenol	**920**			39	"	989.2	U	92.7%	54-136	3.90	30
2-Methylnaphthalene	**860**			39	"	989.2	38	82.8%	46-117	2.57	36
2,4,6-Trichlorophenol	**940**			39	"	989.2	U	94.8%	47-122	1.97	30
2,4,5-Trichlorophenol	**990**			39	"	989.2	U	99.6%	47-145	0.647	30
2-Chloronaphthalene	**760**			39	"	989.2	U	76.7%	47-114	2.31	37
2-Nitroaniline	**820**			39	"	989.2	U	82.7%	57-138	2.30	30
Acenaphthylene	**880**			39	"	989.2	85	80.1%	53-117	0.296	30
Dimethylphthalate	**860**			39	"	989.2	U	87.3%	61-123	0.664	30
2,6-Dinitrotoluene	**790**			39	"	989.2	24	77.4%	63-127	0.332	30
3-Nitroaniline	**160**	Q		200	"	989.2	U	15.8%	42-136	30.1	30
Acenaphthene	**810**			39	"	989.2	U	81.7%	52-116	0.860	30
2,4-Dinitrophenol	**190**	(CCV), J		200	"	989.2	U	18.9%	20-119	29.1	46
Dibenzofuran	**830**			39	"	989.2	U	84.4%	53-119	1.17E-3	30
4-Nitrophenol	**770**			200	"	989.2	U	77.9%	49-132	4.54	30
2,4-Dinitrotoluene	**790**			39	"	989.2	U	79.8%	63-143	1.02	30
Fluorene	**870**			39	"	989.2	U	87.6%	58-120	0.207	30
Diethylphthalate	**890**			39	"	989.2	U	90.0%	67-124	0.300	30
4-Chlorophenylphenyl ether	**830**			39	"	989.2	U	84.3%	56-119	0.0927	30
4-Nitroaniline	**230**			200	"	989.2	U	23.5%	58-139	12.5	30
4,6-Dinitro-2-methylphenol	**410**	(CCV), J		39	"	989.2	26	39.1%	51-127	5.56	30
Azobenzene	**820**			200	"	989.2	U	82.5%	65-118	1.45	30
4-Bromophenyl phenyl ether	**880**			39	"	989.2	U	89.0%	63-118	0.151	30
Hexachlorobenzene	**830**			39	"	989.2	U	83.9%	65-113	1.14	30
Pentachlorophenol	**540**	(CCV), J		200	"	989.2	62	47.9%	28-151	15.8	30
Phenanthrene	**910**			39	"	989.2	80	83.6%	68-114	0.0438	30
Anthracene	**940**			39	"	989.2	100	84.7%	70-116	0.0218	30
Carbazole	**980**			39	"	989.2	35	95.6%	74-119	0.0831	30
Di-n-butylphthalate	**970**			200	"	989.2	U	98.4%	63-173	2.36	30

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K042 - Solvent Extraction

Matrix Spike Dup (B16K042-MSD2) **Source: 1611041-11** **Prepared: Nov-17-16 Analyzed: Dec-08-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Fluoranthene	**1200**			39	ug/kg dry	989.2	200	101%	71-122	12.4	30
Pyrene	**1200**			39	"	989.2	190	101%	72-117	10.4	30
Butylbenzylphthalate	**940**			39	"	989.2	22	92.6%	70-127	1.54	30
Benzo (a) anthracene	**1100**			39	"	989.2	140	92.7%	68-115	4.31	30
Chrysene	**1100**			39	"	989.2	250	83.6%	69-117	5.10	30
Bis(2-ethylhexyl)phthalate	**1100**			39	"	989.2	64	101%	65-143	0.940	30
Di-n-octylphthalate	**1100**			39	"	989.2	26	105%	69-147	2.14	30
Benzo(b)fluoranthene	**1500**	(RES), J		39	"	989.2	400	114%	69-128	9.19	30
Benzo(k)fluoranthene	**1100**	(RES), J		39	"	989.2	130	93.6%	63-135	14.1	30
Benzo(a)pyrene	**1100**			39	"	989.2	150	93.8%	69-133	7.15	30
Indeno(1,2,3-cd)pyrene	**1100**			39	"	989.2	120	96.6%	70-129	2.09	30
Dibenz(a,h)anthracene	**980**			39	"	989.2	31	96.5%	69-131	5.13	30
Benzo(g,h,i)perylene	**1100**			39	"	989.2	150	91.3%	54-139	3.47	30
Surrogate: 2-Fluorophenol	*660*				"	*989.2*		*66.3%*	*38.2-115*		
Surrogate: Phenol-d5	*830*				"	*989.2*		*83.8%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*600*				"	*989.2*		*60.2%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*640*				"	*989.2*		*64.3%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*880*				"	*989.2*		*88.8%*	*26.1-119*		
Surrogate: Terphenyl-d14	*890*				"	*989.2*		*89.9%*	*59.4-127*		

Batch B16K043 - Solvent Extraction

Blank (B16K043-BLK1) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**U**			33	ug/kg						
Phenol	**U**			33	"						
Bis(2-chloroethyl)ether	**U**			33	"						
2-Chlorophenol	**U**			33	"						
1,3-Dichlorobenzene	**U**			170	"						
1,4-Dichlorobenzene	**U**			170	"						
1,2-Dichlorobenzene	**U**			170	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Blank (B16K043-BLK1) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
2-Methylphenol	U			33	ug/kg						
Bis(1-chloroisopropyl)ether	U			33	"						
3+4-Methylphenol	U			33	"						
N-Nitroso-di-n-propylamine	U			33	"						
Hexachloroethane	U			170	"						
Nitrobenzene	U			33	"						
Isophorone	U			33	"						
2-Nitrophenol	U			33	"						
2,4-Dimethylphenol	U			170	"						
Bis(2-chloroethoxy)methane	U			33	"						
2,4-Dichlorophenol	U			33	"						
1,2,4-Trichlorobenzene	U			33	"						
Naphthalene	U			33	"						
Hexachlorobutadiene	U			170	"						
4-Chloro-3-methylphenol	U			33	"						
2-Methylnaphthalene	U			33	"						
2,4,6-Trichlorophenol	U			33	"						
2,4,5-Trichlorophenol	U			33	"						
2-Chloronaphthalene	U			33	"						
2-Nitroaniline	U			33	"						
Acenaphthylene	U			33	"						
Dimethylphthalate	U			33	"						
2,6-Dinitrotoluene	U			33	"						
3-Nitroaniline	U			170	"						
Acenaphthene	U			33	"						
2,4-Dinitrophenol	U			170	"						
Dibenzofuran	U			33	"						
4-Nitrophenol	U			170	"						
2,4-Dinitrotoluene	U			33	"						
Fluorene	U			33	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Blank (B16K043-BLK1) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Diethylphthalate	U			33	ug/kg						
4-Chlorophenylphenyl ether	U			33	"						
4-Nitroaniline	U			170	"						
4,6-Dinitro-2-methylphenol	U			33	"						
Azobenzene	U			170	"						
4-Bromophenyl phenyl ether	U			33	"						
Hexachlorobenzene	U			33	"						
Pentachlorophenol	U			170	"						
Phenanthrene	U			33	"						
Anthracene	U			33	"						
Carbazole	U			33	"						
Di-n-butylphthalate	U			170	"						
Fluoranthene	U			33	"						
Pyrene	U			33	"						
Butylbenzylphthalate	U			33	"						
Benzo (a) anthracene	U			33	"						
Chrysene	U			33	"						
Bis(2-ethylhexyl)phthalate	U			33	"						
Di-n-octylphthalate	U			33	"						
Benzo(b)fluoranthene	U			33	"						
Benzo(k)fluoranthene	U			33	"						
Benzo(a)pyrene	U			33	"						
Indeno(1,2,3-cd)pyrene	U			33	"						
Dibenz(a,h)anthracene	U			33	"						
Benzo(g,h,i)perylene	U			33	"						
Surrogate: 2-Fluorophenol	*800*				"	*843.5*		*94.7%*	*38.2-115*		
Surrogate: Phenol-d5	*820*				"	*843.5*		*97.7%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*660*				"	*843.5*		*78.1%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*670*				"	*843.5*		*79.2%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*500*				"	*843.5*		*59.0%*	*26.1-119*		
Surrogate: Terphenyl-d14	*770*				"	*843.5*		*90.7%*	*59.4-127*		

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Blank (B16K043-BLK2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	U			33	ug/kg						
Phenol	U			33	"						
Bis(2-chloroethyl)ether	U			33	"						
2-Chlorophenol	U			33	"						
1,3-Dichlorobenzene	U			170	"						
1,4-Dichlorobenzene	U			170	"						
1,2-Dichlorobenzene	U			170	"						
2-Methylphenol	U			33	"						
Bis(1-chloroisopropyl)ether	U			33	"						
3+4-Methylphenol	U			33	"						
N-Nitroso-di-n-propylamine	U			33	"						
Hexachloroethane	U			170	"						
Nitrobenzene	U			33	"						
Isophorone	U			33	"						
2-Nitrophenol	U			33	"						
2,4-Dimethylphenol	U			170	"						
Bis(2-chloroethoxy)methane	U			33	"						
2,4-Dichlorophenol	U			33	"						
1,2,4-Trichlorobenzene	U			33	"						
Naphthalene	U			33	"						
Hexachlorobutadiene	U			170	"						
4-Chloro-3-methylphenol	U			33	"						
2-Methylnaphthalene	U			33	"						
2,4,6-Trichlorophenol	U			33	"						
2,4,5-Trichlorophenol	U			33	"						
2-Chloronaphthalene	U			33	"						
2-Nitroaniline	U			33	"						
Acenaphthylene	U			33	"						
Dimethylphthalate	U			33	"						
2,6-Dinitrotoluene	U			33	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Blank (B16K043-BLK2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
3-Nitroaniline	U			170	ug/kg						
Acenaphthene	U			33	"						
2,4-Dinitrophenol	U			170	"						
Dibenzofuran	U			33	"						
4-Nitrophenol	U			170	"						
2,4-Dinitrotoluene	U			33	"						
Fluorene	U			33	"						
Diethylphthalate	U			33	"						
4-Chlorophenylphenyl ether	U			33	"						
4-Nitroaniline	U			170	"						
4,6-Dinitro-2-methylphenol	U	(CCV), J		33	"						
Azobenzene	U			170	"						
4-Bromophenyl phenyl ether	U			33	"						
Hexachlorobenzene	U			33	"						
Pentachlorophenol	U	(CCV), J		170	"						
Phenanthrene	U			33	"						
Anthracene	U			33	"						
Carbazole	U			33	"						
Di-n-butylphthalate	U			170	"						
Fluoranthene	U			33	"						
Pyrene	U			33	"						
Butylbenzylphthalate	U			33	"						
Benzo (a) anthracene	U			33	"						
Chrysene	U			33	"						
Bis(2-ethylhexyl)phthalate	U			33	"						
Di-n-octylphthalate	U			33	"						
Benzo(b)fluoranthene	U			33	"						
Benzo(k)fluoranthene	U			33	"						
Benzo(a)pyrene	U			33	"						
Indeno(1,2,3-cd)pyrene	U			33	"						

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Blank (B16K043-BLK2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Dibenz(a,h)anthracene	**U**			33	ug/kg						
Benzo(g,h,i)perylene	**U**			33	"						
Surrogate: 2-Fluorophenol	*660*				"	*838.4*		*79.0%*	*38.2-115*		
Surrogate: Phenol-d5	*720*				"	*838.4*		*85.7%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*520*				"	*838.4*		*61.5%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*530*				"	*838.4*		*63.2%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*500*				"	*838.4*		*59.4%*	*26.1-119*		
Surrogate: Terphenyl-d14	*770*				"	*838.4*		*91.9%*	*59.4-127*		

LCS (B16K043-BS2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**590**			33	ug/kg	835.6		70.1%	27-98		
Phenol	**730**			33	"	835.6		87.2%	37-128		
Bis(2-chloroethyl)ether	**590**			33	"	835.6		71.1%	34-114		
2-Chlorophenol	**670**			33	"	835.6		80.7%	45-119		
1,3-Dichlorobenzene	**450**			170	"	835.6		54.0%	20-108		
1,4-Dichlorobenzene	**470**			170	"	835.6		56.8%	22-107		
1,2-Dichlorobenzene	**510**			170	"	835.6		60.5%	27-108		
2-Methylphenol	**710**			33	"	835.6		84.4%	42-129		
Bis(1-chloroisopropyl)ether	**600**			33	"	835.6		71.3%	39-110		
3+4-Methylphenol	**750**			33	"	835.6		89.6%	37-134		
N-Nitroso-di-n-propylamine	**680**			33	"	835.6		81.9%	45-117		
Hexachloroethane	**460**			170	"	835.6		55.4%	20-109		
Nitrobenzene	**610**			33	"	835.6		73.0%	42-113		
Isophorone	**680**			33	"	835.6		81.5%	49-117		
2-Nitrophenol	**540**			33	"	835.6		64.3%	46-118		
2,4-Dimethylphenol	**650**			170	"	835.6		77.5%	29-130		
Bis(2-chloroethoxy)methane	**640**			33	"	835.6		76.9%	47-116		
2,4-Dichlorophenol	**720**			33	"	835.6		85.9%	45-130		
1,2,4-Trichlorobenzene	**570**			33	"	835.6		67.7%	37-109		

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

LCS (B16K043-BS2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Naphthalene	**590**			33	ug/kg	835.6		70.9%	43-108		
Hexachlorobutadiene	**540**			170	"	835.6		64.9%	33-110		
4-Chloro-3-methylphenol	**710**			33	"	835.6		84.4%	54-136		
2-Methylnaphthalene	**630**			33	"	835.6		75.6%	46-117		
2,4,6-Trichlorophenol	**640**			33	"	835.6		76.1%	47-122		
2,4,5-Trichlorophenol	**700**			33	"	835.6		84.1%	47-145		
2-Chloronaphthalene	**630**			33	"	835.6		75.9%	47-114		
2-Nitroaniline	**680**			33	"	835.6		81.9%	57-138		
Acenaphthylene	**680**			33	"	835.6		80.8%	53-117		
Dimethylphthalate	**720**			33	"	835.6		85.8%	61-123		
2,6-Dinitrotoluene	**670**			33	"	835.6		80.2%	63-127		
3-Nitroaniline	**640**			170	"	835.6		76.8%	42-136		
Acenaphthene	**670**			33	"	835.6		79.8%	52-116		
2,4-Dinitrophenol	**330**			170	"	835.6		39.5%	20-119		
Dibenzofuran	**680**			33	"	835.6		81.6%	53-119		
4-Nitrophenol	**620**			170	"	835.6		74.3%	49-132		
2,4-Dinitrotoluene	**680**			33	"	835.6		81.5%	63-143		
Fluorene	**700**			33	"	835.6		83.7%	58-120		
Diethylphthalate	**730**			33	"	835.6		87.5%	67-124		
4-Chlorophenylphenyl ether	**670**			33	"	835.6		80.7%	56-119		
4-Nitroaniline	**610**			170	"	835.6		72.7%	58-139		
4,6-Dinitro-2-methylphenol	**440**	(CCV), J		33	"	835.6		52.7%	51-127		
Azobenzene	**730**			170	"	835.6		88.0%	65-118		
4-Bromophenyl phenyl ether	**710**			33	"	835.6		84.9%	63-118		
Hexachlorobenzene	**690**			33	"	835.6		83.1%	65-113		
Pentachlorophenol	**570**	(CCV), J		170	"	835.6		67.7%	28-151		
Phenanthrene	**690**			33	"	835.6		82.9%	68-114		
Anthracene	**720**			33	"	835.6		86.1%	70-116		
Carbazole	**770**			33	"	835.6		92.5%	74-119		
Di-n-butylphthalate	**800**			170	"	835.6		95.8%	63-173		

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

LCS (B16K043-BS2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Fluoranthene	**760**			33	ug/kg	835.6		90.6%	71-122		
Pyrene	**740**			33	"	835.6		88.8%	72-117		
Butylbenzylphthalate	**700**			33	"	835.6		83.2%	70-127		
Benzo (a) anthracene	**710**			33	"	835.6		84.4%	68-115		
Chrysene	**710**			33	"	835.6		84.8%	69-117		
Bis(2-ethylhexyl)phthalate	**700**			33	"	835.6		84.0%	65-143		
Di-n-octylphthalate	**710**			33	"	835.6		84.6%	69-147		
Benzo(b)fluoranthene	**770**			33	"	835.6		91.6%	69-128		
Benzo(k)fluoranthene	**750**			33	"	835.6		89.9%	63-135		
Benzo(a)pyrene	**740**			33	"	835.6		88.6%	69-133		
Indeno(1,2,3-cd)pyrene	**750**			33	"	835.6		90.0%	70-129		
Dibenz(a,h)anthracene	**770**			33	"	835.6		92.2%	69-131		
Benzo(g,h,i)perylene	**760**			33	"	835.6		90.9%	54-139		
Surrogate: 2-Fluorophenol	*660*				"	*835.6*		*78.8%*	*38.2-115*		
Surrogate: Phenol-d5	*690*				"	*835.6*		*82.5%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*520*				"	*835.6*		*62.4%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*550*				"	*835.6*		*66.0%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*580*				"	*835.6*		*69.0%*	*26.1-119*		
Surrogate: Terphenyl-d14	*720*				"	*835.6*		*85.8%*	*59.4-127*		

LCS Dup (B16K043-BSD2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**540**			33	ug/kg	829.5		65.3%	27-98	7.82	37
Phenol	**710**			33	"	829.5		85.5%	37-128	2.77	33
Bis(2-chloroethyl)ether	**570**			33	"	829.5		68.2%	34-114	4.92	36
2-Chlorophenol	**660**			33	"	829.5		79.1%	45-119	2.79	33
1,3-Dichlorobenzene	**430**			170	"	829.5		51.5%	20-108	5.36	79
1,4-Dichlorobenzene	**460**			170	"	829.5		55.0%	22-107	4.10	74
1,2-Dichlorobenzene	**480**			170	"	829.5		57.9%	27-108	5.12	57
2-Methylphenol	**680**			33	"	829.5		82.4%	42-129	3.18	27

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

LCS Dup (B16K043-BSD2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Bis(1-chloroisopropyl)ether	**570**			33	ug/kg	829.5		69.0%	39-110	3.93	32
3+4-Methylphenol	**730**			33	"	829.5		87.6%	37-134	2.99	30
N-Nitroso-di-n-propylamine	**640**			33	"	829.5		76.7%	45-117	7.29	30
Hexachloroethane	**420**			170	"	829.5		50.8%	20-109	9.39	76
Nitrobenzene	**590**			33	"	829.5		71.1%	42-113	3.34	41
Isophorone	**670**			33	"	829.5		80.2%	49-117	2.27	30
2-Nitrophenol	**500**			33	"	829.5		60.4%	46-118	6.96	34
2,4-Dimethylphenol	**640**			170	"	829.5		76.6%	29-130	1.93	34
Bis(2-chloroethoxy)methane	**640**			33	"	829.5		76.9%	47-116	0.681	30
2,4-Dichlorophenol	**710**			33	"	829.5		85.4%	45-130	1.34	30
1,2,4-Trichlorobenzene	**530**			33	"	829.5		64.4%	37-109	5.70	38
Naphthalene	**560**			33	"	829.5		67.7%	43-108	5.35	30
Hexachlorobutadiene	**520**			170	"	829.5		62.4%	33-110	4.75	48
4-Chloro-3-methylphenol	**700**			33	"	829.5		84.0%	54-136	1.16	30
2-Methylnaphthalene	**610**			33	"	829.5		73.4%	46-117	3.58	36
2,4,6-Trichlorophenol	**640**			33	"	829.5		77.5%	47-122	1.09	30
2,4,5-Trichlorophenol	**700**			33	"	829.5		84.2%	47-145	0.685	30
2-Chloronaphthalene	**620**			33	"	829.5		74.9%	47-114	2.01	37
2-Nitroaniline	**700**			33	"	829.5		83.9%	57-138	1.63	30
Acenaphthylene	**670**			33	"	829.5		80.4%	53-117	1.23	30
Dimethylphthalate	**730**			33	"	829.5		88.3%	61-123	2.07	30
2,6-Dinitrotoluene	**670**			33	"	829.5		81.2%	63-127	0.457	30
3-Nitroaniline	**660**			170	"	829.5		80.2%	42-136	3.55	30
Acenaphthene	**650**			33	"	829.5		78.7%	52-116	2.15	30
2,4-Dinitrophenol	**250**			170	"	829.5		30.2%	20-119	27.6	46
Dibenzofuran	**680**			33	"	829.5		82.4%	53-119	0.243	30
4-Nitrophenol	**600**			170	"	829.5		72.5%	49-132	3.24	30
2,4-Dinitrotoluene	**690**			33	"	829.5		83.0%	63-143	1.07	30
Fluorene	**710**			33	"	829.5		85.2%	58-120	1.02	30
Diethylphthalate	**750**			33	"	829.5		90.4%	67-124	2.59	30

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

LCS Dup (B16K043-BSD2) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
4-Chlorophenylphenyl ether	**680**			33	ug/kg	829.5		82.1%	56-119	1.04	30
4-Nitroaniline	**620**			170	"	829.5		74.9%	58-139	2.25	30
4,6-Dinitro-2-methylphenol	**410**	(CCV), J		33	"	829.5		48.9%	51-127	8.13	30
Azobenzene	**730**			170	"	829.5		87.8%	65-118	0.960	30
4-Bromophenyl phenyl ether	**720**			33	"	829.5		86.6%	63-118	1.32	30
Hexachlorobenzene	**700**			33	"	829.5		84.0%	65-113	0.321	30
Pentachlorophenol	**570**	(CCV), J		170	"	829.5		68.2%	28-151	0.0328	30
Phenanthrene	**700**			33	"	829.5		84.7%	68-114	1.46	30
Anthracene	**720**			33	"	829.5		87.1%	70-116	0.468	30
Carbazole	**780**			33	"	829.5		94.4%	74-119	1.32	30
Di-n-butylphthalate	**810**			170	"	829.5		97.8%	63-173	1.33	30
Fluoranthene	**760**			33	"	829.5		91.0%	71-122	0.248	30
Pyrene	**760**			33	"	829.5		91.4%	72-117	2.20	30
Butylbenzylphthalate	**710**			33	"	829.5		85.4%	70-127	1.88	30
Benzo (a) anthracene	**710**			33	"	829.5		86.1%	68-115	1.19	30
Chrysene	**720**			33	"	829.5		87.1%	69-117	1.97	30
Bis(2-ethylhexyl)phthalate	**740**			33	"	829.5		88.6%	65-143	4.69	30
Di-n-octylphthalate	**720**			33	"	829.5		86.3%	69-147	1.28	30
Benzo(b)fluoranthene	**750**			33	"	829.5		90.9%	69-128	1.52	30
Benzo(k)fluoranthene	**820**			33	"	829.5		98.8%	63-135	8.76	30
Benzo(a)pyrene	**760**			33	"	829.5		91.1%	69-133	2.12	30
Indeno(1,2,3-cd)pyrene	**780**			33	"	829.5		93.7%	70-129	3.23	30
Dibenz(a,h)anthracene	**790**			33	"	829.5		95.6%	69-131	2.89	30
Benzo(g,h,i)perylene	**780**			33	"	829.5		94.3%	54-139	2.90	30
Surrogate: 2-Fluorophenol	*600*				"	*829.5*		*72.4%*	*38.2-115*		
Surrogate: Phenol-d5	*650*				"	*829.5*		*78.8%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*460*				"	*829.5*		*55.8%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*510*				"	*829.5*		*61.2%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*570*				"	*829.5*		*68.7%*	*26.1-119*		
Surrogate: Terphenyl-d14	*730*				"	*829.5*		*88.3%*	*59.4-127*		

Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

MRL Check (B16K043-MRL3) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**18**	B		33	ug/kg	33.69		54.0%	27-98		
Phenol	**30**			33	"	33.69		90.0%	37-128		
Bis(2-chloroethyl)ether	**19**			33	"	33.69		57.0%	34-114		
2-Chlorophenol	**25**			33	"	33.69		73.0%	45-119		
2-Methylphenol	**25**			33	"	33.69		75.0%	42-129		
Bis(1-chloroisopropyl)ether	**17**			33	"	33.69		51.0%	39-110		
3+4-Methylphenol	**24**			33	"	33.69		70.0%	37-134		
N-Nitroso-di-n-propylamine	**27**			33	"	33.69		79.0%	45-117		
Nitrobenzene	**22**			33	"	33.69		64.0%	42-113		
Isophorone	**24**			33	"	33.69		70.0%	49-117		
2-Nitrophenol	**24**	B		33	"	33.69		72.0%	46-118		
Bis(2-chloroethoxy)methane	**23**			33	"	33.69		68.0%	47-116		
2,4-Dichlorophenol	**22**			33	"	33.69		65.0%	45-130		
Naphthalene	**19**			33	"	33.69		57.0%	43-108		
4-Chloro-3-methylphenol	**32**	B		33	"	33.69		95.0%	54-136		
2-Methylnaphthalene	**20**			33	"	33.69		58.0%	46-117		
2,4,6-Trichlorophenol	**17**	Q		33	"	33.69		%	47-122		
2,4,5-Trichlorophenol	**20**			33	"	33.69		58.0%	47-145		
2-Chloronaphthalene	**21**			33	"	33.69		61.0%	47-114		
2-Nitroaniline	**34**			33	"	33.69		100%	57-138		
Acenaphthylene	**22**			33	"	33.69		66.0%	53-117		
Dimethylphthalate	**27**			33	"	33.69		80.0%	61-123		
2,6-Dinitrotoluene	**36**	B		33	"	33.69		106%	63-127		
Acenaphthene	**23**	B		33	"	33.69		67.0%	52-116		
Dibenzofuran	**24**			33	"	33.69		70.0%	53-119		
2,4-Dinitrotoluene	**31**	B		33	"	33.69		91.0%	63-143		
Fluorene	**28**			33	"	33.69		82.0%	58-120		
Diethylphthalate	**29**			33	"	33.69		85.0%	67-124		
4-Chlorophenylphenyl ether	**25**			33	"	33.69		74.0%	56-119		
4,6-Dinitro-2-methylphenol	**32**	(CCV), J		33	"	33.69		95.0%	51-127		

Environmental Protection Agency Region 5
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

MRL Check (B16K043-MRL3) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
4-Bromophenyl phenyl ether	**26**			33	ug/kg	33.69		76.0%	63-118		
Hexachlorobenzene	**26**			33	"	33.69		78.0%	65-113		
Phenanthrene	**28**			33	"	33.69		83.0%	68-114		
Anthracene	**27**			33	"	33.69		79.0%	70-116		
Carbazole	**30**			33	"	33.69		88.0%	74-119		
Fluoranthene	**30**			33	"	33.69		88.0%	71-122		
Pyrene	**30**			33	"	33.69		89.0%	72-117		
Butylbenzylphthalate	**40**	B		33	"	33.69		118%	70-127		
Benzo (a) anthracene	**32**			33	"	33.69		95.0%	68-115		
Chrysene	**30**			33	"	33.69		90.0%	69-117		
Bis(2-ethylhexyl)phthalate	**40**	B		33	"	33.69		118%	65-143		
Di-n-octylphthalate	**38**	B		33	"	33.69		113%	69-147		
Benzo(b)fluoranthene	**26**			33	"	33.69		78.0%	69-128		
Benzo(k)fluoranthene	**29**			33	"	33.69		86.0%	63-135		
Benzo(a)pyrene	**25**			33	"	33.69		75.0%	69-133		
Indeno(1,2,3-cd)pyrene	**26**			33	"	33.69		78.0%	70-129		
Dibenz(a,h)anthracene	**27**			33	"	33.69		81.0%	69-131		
Benzo(g,h,i)perylene	**29**			33	"	33.69		85.0%	54-139		
Surrogate: 2-Fluorophenol	*580*				"	*842.3*		*69.4%*	*38.2-115*		
Surrogate: Phenol-d5	*660*				"	*842.3*		*78.3%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*450*				"	*842.3*		*53.6%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*470*				"	*842.3*		*56.2%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*490*				"	*842.3*		*58.3%*	*26.1-119*		
Surrogate: Terphenyl-d14	*720*				"	*842.3*		*86.0%*	*59.4-127*		

MRL Check (B16K043-MRL4) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
1,3-Dichlorobenzene	**69**			170	ug/kg	163.6		42.4%	20-108		
1,4-Dichlorobenzene	**71**			170	"	163.6		43.2%	22-107		
1,2-Dichlorobenzene	**79**			170	"	163.6		48.0%	27-108		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

MRL Check (B16K043-MRL4) **Prepared: Nov-17-16 Analyzed: Dec-07-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Hexachloroethane	**65**			170	ug/kg	163.6		39.8%	20-109		
2,4-Dimethylphenol	**94**			170	"	163.6		57.4%	29-130		
Hexachlorobutadiene	**91**			170	"	163.6		55.8%	33-110		
3-Nitroaniline	**100**			170	"	163.6		63.4%	42-136		
2,4-Dinitrophenol	**57**	B		170	"	163.6		34.8%	20-119		
4-Nitrophenol	**97**	B		170	"	163.6		59.0%	49-132		
4-Nitroaniline	**99**			170	"	163.6		60.6%	58-139		
Azobenzene	**130**	B		170	"	163.6		81.2%	65-118		
Pentachlorophenol	**69**	(CCV), J		170	"	163.6		42.2%	28-151		
Di-n-butylphthalate	**150**			170	"	163.6		88.8%	63-173		
Surrogate: 2-Fluorophenol	*630*				"	*818.1*		*77.5%*	*38.2-115*		
Surrogate: Phenol-d5	*690*				"	*818.1*		*84.2%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*510*				"	*818.1*		*61.9%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*530*				"	*818.1*		*65.1%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*490*				"	*818.1*		*60.4%*	*26.1-119*		
Surrogate: Terphenyl-d14	*720*				"	*818.1*		*88.0%*	*59.4-127*		

Matrix Spike (B16K043-MS2) **Source: 1611041-22** **Prepared: Nov-17-16 Analyzed: Dec-12-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**490**			41	ug/kg dry	1027	U	47.5%	27-98		
Phenol	**820**			41	"	1027	31	76.7%	37-128		
Bis(2-chloroethyl)ether	**630**			41	"	1027	U	61.2%	34-114		
2-Chlorophenol	**710**			41	"	1027	U	68.8%	45-119		
1,3-Dichlorobenzene	**410**			210	"	1027	U	39.8%	20-108		
1,4-Dichlorobenzene	**440**			210	"	1027	U	42.9%	22-107		
1,2-Dichlorobenzene	**490**			210	"	1027	U	48.0%	27-108		
2-Methylphenol	**650**			41	"	1027	U	63.4%	42-129		
Bis(1-chloroisopropyl)ether	**680**			41	"	1027	U	66.0%	39-110		
3+4-Methylphenol	**88**	Q		41	"	1027	U	8.52%	37-134		
N-Nitroso-di-n-propylamine	**880**			41	"	1027	U	86.0%	45-117		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Matrix Spike (B16K043-MS2) **Source: 1611041-22** **Prepared: Nov-17-16 Analyzed: Dec-12-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Hexachloroethane	**330**			210	ug/kg dry	1027	U	32.4%	20-109		
Nitrobenzene	**710**	(CCV), J		41	"	1027	U	69.1%	42-113		
Isophorone	**830**			41	"	1027	U	81.1%	49-117		
2-Nitrophenol	**740**			41	"	1027	U	72.4%	46-118		
2,4-Dimethylphenol	**280**	Q		210	"	1027	U	26.8%	29-130		
Bis(2-chloroethoxy)methane	**770**			41	"	1027	U	75.2%	47-116		
2,4-Dichlorophenol	**970**			41	"	1027	U	94.0%	45-130		
1,2,4-Trichlorobenzene	**630**			41	"	1027	U	61.1%	37-109		
Naphthalene	**680**			41	"	1027	U	66.5%	43-108		
Hexachlorobutadiene	**590**			210	"	1027	U	57.6%	33-110		
4-Chloro-3-methylphenol	**950**			41	"	1027	U	92.2%	54-136		
2-Methylnaphthalene	**1100**	(CCV), J		41	"	1027	U	111%	46-117		
2,4,6-Trichlorophenol	**990**			41	"	1027	U	96.5%	47-122		
2,4,5-Trichlorophenol	**1000**			41	"	1027	U	98.5%	47-145		
2-Chloronaphthalene	**780**			41	"	1027	U	75.8%	47-114		
2-Nitroaniline	**800**			41	"	1027	U	78.4%	57-138		
Acenaphthylene	**790**			41	"	1027	U	76.6%	53-117		
Dimethylphthalate	**900**			41	"	1027	U	88.0%	61-123		
2,6-Dinitrotoluene	**810**			41	"	1027	U	79.2%	63-127		
3-Nitroaniline	**U**	(CCV), J, Q		210	"	1027	Rejected	%	42-136		
Acenaphthene	**830**			41	"	1027	U	81.2%	52-116		
2,4-Dinitrophenol	**220**	(CCV), J, Q		210	"	1027	34	17.7%	20-119		
Dibenzofuran	**860**			41	"	1027	U	84.2%	53-119		
4-Nitrophenol	**800**			210	"	1027	28	75.3%	49-132		
2,4-Dinitrotoluene	**800**			41	"	1027	U	77.5%	63-143		
Fluorene	**890**			41	"	1027	U	86.4%	58-120		
Diethylphthalate	**950**			41	"	1027	37	88.7%	67-124		
4-Chlorophenylphenyl ether	**870**			41	"	1027	U	84.4%	56-119		
4-Nitroaniline	**140**	Q		210	"	1027	U	13.3%	58-139		
4,6-Dinitro-2-methylphenol	**410**	Q		41	"	1027	28	37.3%	51-127		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Matrix Spike (B16K043-MS2) **Source: 1611041-22** **Prepared: Nov-17-16 Analyzed: Dec-12-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Azobenzene	**850**			210	ug/kg dry	1027	U	82.6%	65-118		
4-Bromophenyl phenyl ether	**920**			41	"	1027	U	90.0%	63-118		
Hexachlorobenzene	**870**			41	"	1027	U	85.1%	65-113		
Pentachlorophenol	**510**	(CCV), J		210	"	1027	29	47.1%	28-151		
Phenanthrene	**890**			41	"	1027	31	83.3%	68-114		
Anthracene	**850**			41	"	1027	U	83.2%	70-116		
Carbazole	**950**			41	"	1027	U	92.9%	74-119		
Di-n-butylphthalate	**1000**			210	"	1027	U	99.7%	63-173		
Fluoranthene	**970**			41	"	1027	74	87.7%	71-122		
Pyrene	**1000**			41	"	1027	62	93.5%	72-117		
Butylbenzylphthalate	**1000**			41	"	1027	47	94.0%	70-127		
Benzo (a) anthracene	**970**			41	"	1027	38	90.7%	68-115		
Chrysene	**900**			41	"	1027	55	82.1%	69-117		
Bis(2-ethylhexyl)phthalate	**4000**			41	"	1027	2700	119%	65-143		
Di-n-octylphthalate	**1100**			41	"	1027	24	106%	69-147		
Benzo(b)fluoranthene	**1200**			41	"	1027	110	105%	69-128		
Benzo(k)fluoranthene	**960**			41	"	1027	30	90.1%	63-135		
Benzo(a)pyrene	**970**			41	"	1027	47	90.2%	69-133		
Indeno(1,2,3-cd)pyrene	**1100**			41	"	1027	41	98.7%	70-129		
Dibenz(a,h)anthracene	**1100**			41	"	1027	U	105%	69-131		
Benzo(g,h,i)perylene	**1000**			41	"	1027	48	94.9%	54-139		
Surrogate: 2-Fluorophenol	*530*				"	*1027*		*51.1%*	*38.2-115*		
Surrogate: Phenol-d5	*770*				"	*1027*		*74.9%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*610*				"	*1027*		*59.0%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*690*				"	*1027*		*67.6%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*950*				"	*1027*		*92.2%*	*26.1-119*		
Surrogate: Terphenyl-d14	*940*				"	*1027*		*91.6%*	*59.4-127*		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Matrix Spike Dup (B16K043-MSD2) **Source: 1611041-22** **Prepared: Nov-17-16 Analyzed: Dec-12-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	**510**			40	ug/kg dry	1017	U	50.2%	27-98	4.49	37
Phenol	**840**			40	"	1017	31	80.0%	37-128	3.13	33
Bis(2-chloroethyl)ether	**670**			40	"	1017	U	66.0%	34-114	6.49	36
2-Chlorophenol	**770**			40	"	1017	U	75.8%	45-119	8.69	33
1,3-Dichlorobenzene	**430**			210	"	1017	U	42.0%	20-108	4.47	79
1,4-Dichlorobenzene	**460**			210	"	1017	U	44.8%	22-107	3.38	74
1,2-Dichlorobenzene	**520**			210	"	1017	U	50.8%	27-108	4.67	57
2-Methylphenol	**690**			40	"	1017	U	67.5%	42-129	5.30	27
Bis(1-chloroisopropyl)ether	**700**			40	"	1017	U	68.7%	39-110	3.10	32
3+4-Methylphenol	**64**	Q		40	"	1017	U	6.32%	37-134	30.6	30
N-Nitroso-di-n-propylamine	**940**			40	"	1017	U	92.1%	45-117	5.83	30
Hexachloroethane	**330**			210	"	1017	U	32.0%	20-109	2.37	76
Nitrobenzene	**700**	(CCV), J		40	"	1017	U	69.1%	42-113	1.00	41
Isophorone	**840**			40	"	1017	U	82.4%	49-117	0.663	30
2-Nitrophenol	**760**			40	"	1017	U	74.3%	46-118	1.56	34
2,4-Dimethylphenol	**200**			210	"	1017	U	20.1%	29-130	29.8	34
Bis(2-chloroethoxy)methane	**780**			40	"	1017	U	76.5%	47-116	0.687	30
2,4-Dichlorophenol	**950**			40	"	1017	U	93.9%	45-130	1.17	30
1,2,4-Trichlorobenzene	**620**			40	"	1017	U	60.9%	37-109	1.26	38
Naphthalene	**680**			40	"	1017	U	66.8%	43-108	0.460	30
Hexachlorobutadiene	**580**			210	"	1017	U	57.3%	33-110	1.56	48
4-Chloro-3-methylphenol	**950**			40	"	1017	U	93.1%	54-136	0.0359	30
2-Methylnaphthalene	**1100**	(CCV), J		40	"	1017	U	111%	46-117	0.423	36
2,4,6-Trichlorophenol	**980**			40	"	1017	U	96.4%	47-122	1.12	30
2,4,5-Trichlorophenol	**990**			40	"	1017	U	97.0%	47-145	2.60	30
2-Chloronaphthalene	**780**			40	"	1017	U	76.8%	47-114	0.310	37
2-Nitroaniline	**810**			40	"	1017	U	79.9%	57-138	0.921	30
Acenaphthylene	**780**			40	"	1017	U	76.4%	53-117	1.31	30
Dimethylphthalate	**910**			40	"	1017	U	89.5%	61-123	0.667	30
2,6-Dinitrotoluene	**820**			40	"	1017	U	80.2%	63-127	0.305	30

Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Matrix Spike Dup (B16K043-MSD2) **Source: 1611041-22** **Prepared: Nov-17-16 Analyzed: Dec-12-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
3-Nitroaniline	**37**	(CCV), J, Q		210	ug/kg dry	1017	Rejected	3.64%	42-136	200	30
Acenaphthene	**800**			40	"	1017	U	79.1%	52-116	3.59	30
2,4-Dinitrophenol	**200**	(CCV), J		210	"	1017	34	15.9%	20-119	9.94	46
Dibenzofuran	**850**			40	"	1017	U	83.4%	53-119	1.95	30
4-Nitrophenol	**770**			210	"	1017	28	73.4%	49-132	3.49	30
2,4-Dinitrotoluene	**790**			40	"	1017	U	77.2%	63-143	1.41	30
Fluorene	**880**			40	"	1017	U	86.7%	58-120	0.631	30
Diethylphthalate	**960**			40	"	1017	37	90.3%	67-124	0.675	30
4-Chlorophenylphenyl ether	**860**			40	"	1017	U	84.2%	56-119	1.19	30
4-Nitroaniline	**72**	Q		210	"	1017	U	7.08%	58-139	62.1	30
4,6-Dinitro-2-methylphenol	**400**			40	"	1017	28	36.5%	51-127	2.82	30
Azobenzene	**820**			210	"	1017	U	81.1%	65-118	2.76	30
4-Bromophenyl phenyl ether	**900**			40	"	1017	U	88.3%	63-118	2.97	30
Hexachlorobenzene	**850**			40	"	1017	U	84.0%	65-113	2.37	30
Pentachlorophenol	**440**	(CCV), J		210	"	1017	29	40.4%	28-151	15.2	30
Phenanthrene	**860**			40	"	1017	31	82.0%	68-114	2.54	30
Anthracene	**840**			40	"	1017	U	82.4%	70-116	1.97	30
Carbazole	**960**			40	"	1017	U	93.9%	74-119	0.113	30
Di-n-butylphthalate	**1000**			210	"	1017	U	100%	63-173	0.760	30
Fluoranthene	**970**			40	"	1017	74	87.8%	71-122	0.832	30
Pyrene	**990**			40	"	1017	62	90.9%	72-117	3.61	30
Butylbenzylphthalate	**980**			40	"	1017	47	92.1%	70-127	2.93	30
Benzo (a) anthracene	**920**			40	"	1017	38	86.7%	68-115	5.24	30
Chrysene	**890**			40	"	1017	55	82.1%	69-117	0.863	30
Bis(2-ethylhexyl)phthalate	**3900**			40	"	1017	2700	115%	65-143	1.25	30
Di-n-octylphthalate	**1100**			40	"	1017	24	106%	69-147	0.521	30
Benzo(b)fluoranthene	**1200**			40	"	1017	110	106%	69-128	0.522	30
Benzo(k)fluoranthene	**930**			40	"	1017	30	88.2%	63-135	3.08	30
Benzo(a)pyrene	**970**			40	"	1017	47	90.5%	69-133	0.579	30
Indeno(1,2,3-cd)pyrene	**1000**			40	"	1017	41	98.1%	70-129	1.59	30

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B16K043 - Solvent Extraction

Matrix Spike Dup (B16K043-MSD2) **Source: 1611041-22** **Prepared: Nov-17-16 Analyzed: Dec-12-16**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Dibenz(a,h)anthracene	**1100**			40	ug/kg dry	1017	U	106%	69-131	0.476	30
Benzo(g,h,i)perylene	**1000**			40	"	1017	48	93.8%	54-139	2.05	30
Surrogate: 2-Fluorophenol	*560*				"	*1017*		*55.0%*	*38.2-115*		
Surrogate: Phenol-d5	*800*				"	*1017*		*79.1%*	*44.5-111*		
Surrogate: Nitrobenzene-d5	*620*				"	*1017*		*61.0%*	*50-94.9*		
Surrogate: 2-Fluorobiphenyl	*690*				"	*1017*		*67.4%*	*48.1-108*		
Surrogate: 2,4,6-Tribromophenol	*900*				"	*1017*		*88.8%*	*26.1-119*		
Surrogate: Terphenyl-d14	*950*				"	*1017*		*93.0%*	*59.4-127*		

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Air Division, US EPA Region 5	Project: L'Anse, Michigan Biomass Utility Soil Sampling	
77 West Jackson Boulevard	Project Number: [none]	**Reported:**
Chicago IL, 60605	Project Manager: Molly Smith	Feb-17-17 17:26

Notes and Definitions

R	Rejected
L	The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
B	Analyte concentration is < 5x that in the associated method blank(s); this concentration may be a high-bias estimate.
(SURR)	Associated surrogate recovery criteria not met for this analyte
(RL)	RL verification criteria not met for this analyte.
(RES)	Resolution criteria for isomer peaks not met for this analyte.
(MS)	Matrix spike recovery criteria not met for this analyte
(LCS)	Blank spike recovery criteria not met for this analyte
(IS)	Internal standard criteria not met for this analyte
(CCV)	Continuing calibration verification criteria not met for this analyte
U	Not Detected
NR	Not Reported
Q	QC limit Exceeded

Laboratory Results for Soil Dioxin Analysis

Sample Summary Report

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: DBLK1Y	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.15	U	ng/kg	0.15	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.33	U	ng/kg	0.33	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.52	U	ng/kg	0.52	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.27	U	ng/kg	0.27	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.36	U	ng/kg	0.36	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	0.46	U	ng/kg	0.46	UM	1	Yes	S2AVE
OCDD	Target	0.98	U	ng/kg	0.98	UM	1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.21	U	ng/kg	0.21	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.31	U	ng/kg	0.31	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.26	U	ng/kg	0.26	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.26	U	ng/kg	0.26	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.46	U	ng/kg	0.46	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.56	U	ng/kg	0.56	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	0.31	U	ng/kg	0.31	UM	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.56	U	ng/kg	0.56	UM	1	Yes	S2AVE
OCDF	Target	0.85	U	ng/kg	0.85	UM	1	Yes	S2AVE
Total TCDD	Derived		UJ		0.15	U	1	Yes	S2AVE
Total PeCDD	Derived		UJ		0.33	U	1	Yes	S2AVE
Total HxCDD	Derived		UJ		0.27	U	1	Yes	S2AVE
Total HpCDD	Derived		UJ		0.46	U	1	Yes	S2AVE
Total TCDF	Derived		UJ		0.21	U	1	Yes	S2AVE
Total PeCDF	Derived		UJ		0.26	U	1	Yes	S2AVE
Total HxCDF	Derived		UJ		0.26	U	1	Yes	S2AVE
Total HpCDF	Derived		UJ		0.31	U	1	Yes	S2AVE
TEQ (Mammal)	Derived	0		ng/kg	0		1	Yes	S2AVE
TEQ (Bird)	Derived	0		ng/kg	0		1	Yes	S2AVE
TEQ (Fish)	Derived	0		ng/kg	0		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: DLCS5W	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Spike	20		ng/kg	20		1	Yes	S2AVE
1,2,3,7,8-PeCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Spike	98		ng/kg	98		1	Yes	S2AVE
OCDD	Spike	200		ng/kg	200		1	Yes	S2AVE
2,3,7,8-TCDF	Spike	19		ng/kg	19		1	Yes	S2AVE
1,2,3,7,8-PeCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
2,3,4,7,8-PeCDF	Spike	96		ng/kg	96		1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Spike	97		ng/kg	97		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
OCDF	Spike	250		ng/kg	250		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: DLCSD2V	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Spike	20		ng/kg	20		1	Yes	S2AVE
1,2,3,7,8-PeCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Spike	110		ng/kg	110		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
OCDD	Spike	200		ng/kg	200		1	Yes	S2AVE
2,3,7,8-TCDF	Spike	20		ng/kg	20		1	Yes	S2AVE
1,2,3,7,8-PeCDF	Spike	110		ng/kg	110		1	Yes	S2AVE
2,3,4,7,8-PeCDF	Spike	98		ng/kg	98		1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
OCDF	Spike	250		ng/kg	250		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WN6	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: A001	pH:	Sample Date: 11/08/2016	Sample Time: 14:43:00
% Moisture :		% Solids : 80.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.91	J	ng/kg	0.91	J	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.97	J	ng/kg	0.97	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	1.7	J	ng/kg	1.7	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	7.1		ng/kg	7.1		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	3.2	J	ng/kg	3.2	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	200		ng/kg	200		1	Yes	S2AVE
OCDD	Target	1500		ng/kg	1500		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.44	U	ng/kg	0.44	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	1.2	J	ng/kg	1.2	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.99	J	ng/kg	0.99	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	3.4	J	ng/kg	3.4	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.94	J	ng/kg	0.94	J	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	2.5	J	ng/kg	2.5	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	48		ng/kg	48		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	3.3	J	ng/kg	3.3	J	1	Yes	S2AVE
OCDF	Target	170		ng/kg	170		1	Yes	S2AVE
Total TCDD	Derived	1.4	J	ng/kg	1.4		1	Yes	S2AVE
Total PeCDD	Derived	7.4	J	ng/kg	7.4		1	Yes	S2AVE
Total HxCDD	Derived	47	J	ng/kg	47		1	Yes	S2AVE
Total HpCDD	Derived	460	J	ng/kg	460		1	Yes	S2AVE
Total TCDF	Derived	5.5	J	ng/kg	5.5		1	Yes	S2AVE
Total PeCDF	Derived	19	J	ng/kg	19		1	Yes	S2AVE
Total HxCDF	Derived	57	J	ng/kg	57		1	Yes	S2AVE
Total HpCDF	Derived	160	J	ng/kg	160		1	Yes	S2AVE
TEQ (Mammal)	Derived	7.3		ng/kg	7.3		1	Yes	S2AVE
TEQ (Bird)	Derived	5.2		ng/kg	5.2		1	Yes	S2AVE
TEQ (Fish)	Derived	5.1		ng/kg	5.1		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WN7	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: A002	pH:	Sample Date: 11/08/2016	Sample Time: 13:40:00
% Moisture :		% Solids : 84.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.19	U	ng/kg	0.19	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.90	J	ng/kg	0.90	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	1.6	J	ng/kg	1.6	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	5.7		ng/kg	5.7		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	2.8	J	ng/kg	2.8	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	180		ng/kg	180		1	Yes	S2AVE
OCDD	Target	1300		ng/kg	1300		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.40	J	ng/kg	0.40	J	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.51	J	ng/kg	0.51	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	1.1	J	ng/kg	1.1	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.1	J	ng/kg	1.1	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.41	U	ng/kg	0.41	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	1.7	J	ng/kg	1.7	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	31		ng/kg	31		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	2.0	J	ng/kg	2.0	J	1	Yes	S2AVE
OCDF	Target	120		ng/kg	120		1	Yes	S2AVE
Total TCDD	Derived	1.4	J	ng/kg	1.4		1	Yes	S2AVE
Total PeCDD	Derived	4.7	J	ng/kg	4.7		1	Yes	S2AVE
Total HxCDD	Derived	39	J	ng/kg	39		1	Yes	S2AVE
Total HpCDD	Derived	360	J	ng/kg	360		1	Yes	S2AVE
Total TCDF	Derived	2.7	J	ng/kg	2.7		1	Yes	S2AVE
Total PeCDF	Derived	8.5	J	ng/kg	8.5		1	Yes	S2AVE
Total HxCDF	Derived	33	J	ng/kg	33		1	Yes	S2AVE
Total HpCDF	Derived	110	J	ng/kg	110		1	Yes	S2AVE
TEQ (Mammal)	Derived	5.0		ng/kg	5.0		1	Yes	S2AVE
TEQ (Bird)	Derived	3.3		ng/kg	3.3		1	Yes	S2AVE
TEQ (Fish)	Derived	3.1		ng/kg	3.1		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WN8	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: A003	pH:	Sample Date: 11/09/2016	Sample Time: 09:38:00
% Moisture :		% Solids : 79.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.20	U	ng/kg	0.20	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.62	J	ng/kg	0.62	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.54	J	ng/kg	0.54	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	1.0	J	ng/kg	1.0	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	47		ng/kg	47		1	Yes	S2AVE
OCDD	Target	370		ng/kg	370		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.54	U	ng/kg	0.54	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.32	J	ng/kg	0.32	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.62	J	ng/kg	0.62	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.79	J	ng/kg	0.79	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.66	J	ng/kg	0.66	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.44	U	ng/kg	0.44	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.78	J	ng/kg	0.78	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	12		ng/kg	12		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.74	J	ng/kg	0.74	J	1	Yes	S2AVE
OCDF	Target	40		ng/kg	40		1	Yes	S2AVE
Total TCDD	Derived	3.0	J	ng/kg	3.0		1	Yes	S2AVE
Total PeCDD	Derived	2.7	J	ng/kg	2.7	J	1	Yes	S2AVE
Total HxCDD	Derived	17	J	ng/kg	17		1	Yes	S2AVE
Total HpCDD	Derived	110	J	ng/kg	110		1	Yes	S2AVE
Total TCDF	Derived	5.7	J	ng/kg	5.7		1	Yes	S2AVE
Total PeCDF	Derived	9.0	J	ng/kg	9.0		1	Yes	S2AVE
Total HxCDF	Derived	14	J	ng/kg	14		1	Yes	S2AVE
Total HpCDF	Derived	36	J	ng/kg	36		1	Yes	S2AVE
TEQ (Mammal)	Derived	2.1		ng/kg	2.1		1	Yes	S2AVE
TEQ (Bird)	Derived	1.9		ng/kg	1.9		1	Yes	S2AVE
TEQ (Fish)	Derived	1.7		ng/kg	1.7		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WN9	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: A003	pH:	Sample Date: 11/09/2016	Sample Time: 09:38:00
% Moisture :		% Solids : 79.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.21	U	ng/kg	0.21	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.43	J	ng/kg	0.43	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.61	J	ng/kg	0.61	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.6	J	ng/kg	1.6	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	1.0	J	ng/kg	1.0	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	39		ng/kg	39		1	Yes	S2AVE
OCDD	Target	300		ng/kg	300		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.52	J	ng/kg	0.52	J	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.38	J	ng/kg	0.38	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.45	J	ng/kg	0.45	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.76	J	ng/kg	0.76	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.54	J	ng/kg	0.54	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.42	U	ng/kg	0.42	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.61	J	ng/kg	0.61	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	9.6		ng/kg	9.6		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.60	J	ng/kg	0.60	J	1	Yes	S2AVE
OCDF	Target	34		ng/kg	34		1	Yes	S2AVE
Total TCDD	Derived	2.0	J	ng/kg	2.0		1	Yes	S2AVE
Total PeCDD	Derived	3.8	J	ng/kg	3.8	J	1	Yes	S2AVE
Total HxCDD	Derived	14	J	ng/kg	14		1	Yes	S2AVE
Total HpCDD	Derived	94	J	ng/kg	94		1	Yes	S2AVE
Total TCDF	Derived	5.2	J	ng/kg	5.2		1	Yes	S2AVE
Total PeCDF	Derived	7.1	J	ng/kg	7.1		1	Yes	S2AVE
Total HxCDF	Derived	11	J	ng/kg	11		1	Yes	S2AVE
Total HpCDF	Derived	29	J	ng/kg	29		1	Yes	S2AVE
TEQ (Mammal)	Derived	1.7		ng/kg	1.7		1	Yes	S2AVE
TEQ (Bird)	Derived	2.0		ng/kg	2.0		1	Yes	S2AVE
TEQ (Fish)	Derived	1.4		ng/kg	1.4		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP0	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: A004	pH:	Sample Date: 11/08/2016	Sample Time: 14:21:00
% Moisture :		% Solids : 83.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.18	U	ng/kg	0.18	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	1.1	J	ng/kg	1.1	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	2.6	J	ng/kg	2.6	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	13		ng/kg	13		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	4.9		ng/kg	4.9	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	440		ng/kg	440		1	Yes	S2AVE
OCDD	Target	3400		ng/kg	3400		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.37	U	ng/kg	0.37	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.27	J	ng/kg	0.27	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.53	J	ng/kg	0.53	*	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	2.3	J	ng/kg	2.3	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.70	J	ng/kg	0.70	J	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	3.1	J	ng/kg	3.1	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	86		ng/kg	86		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	6.3		ng/kg	6.3		1	Yes	S2AVE
OCDF	Target	440		ng/kg	440		1	Yes	S2AVE
Total TCDD	Derived	1.1	J	ng/kg	1.1		1	Yes	S2AVE
Total PeCDD	Derived	7.5	J	ng/kg	7.5		1	Yes	S2AVE
Total HxCDD	Derived	91	J	ng/kg	91		1	Yes	S2AVE
Total HpCDD	Derived	1100	J	ng/kg	1100		1	Yes	S2AVE
Total TCDF	Derived	1.7	J	ng/kg	1.7		1	Yes	S2AVE
Total PeCDF	Derived	14	J	ng/kg	14		1	Yes	S2AVE
Total HxCDF	Derived	82	J	ng/kg	82		1	Yes	S2AVE
Total HpCDF	Derived	350	J	ng/kg	350		1	Yes	S2AVE
TEQ (Mammal)	Derived	10		ng/kg	10		1	Yes	S2AVE
TEQ (Bird)	Derived	4.3		ng/kg	4.3		1	Yes	S2AVE
TEQ (Fish)	Derived	5.1		ng/kg	5.1		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP1	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: A005	pH:	Sample Date: 11/08/2016	Sample Time: 15:00:00
% Moisture :		% Solids : 81.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.20	U	ng/kg	0.20	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	2.7	J	ng/kg	2.7	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	5.4		ng/kg	5.4		1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	14		ng/kg	14		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	11		ng/kg	11		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	410		ng/kg	410		1	Yes	S2AVE
OCDD	Target	3400		ng/kg	3400		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.42	U	ng/kg	0.42	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.60	J	ng/kg	0.60	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	1.3	J	ng/kg	1.3	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	4.5	J	ng/kg	4.5	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	3.9	J	ng/kg	3.9	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	1.2	J	ng/kg	1.2	J	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	5.5		ng/kg	5.5		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	120		ng/kg	120		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	7.7		ng/kg	7.7		1	Yes	S2AVE
OCDF	Target	380		ng/kg	380		1	Yes	S2AVE
Total TCDD	Derived	1.7	J	ng/kg	1.7		1	Yes	S2AVE
Total PeCDD	Derived	13	J	ng/kg	13		1	Yes	S2AVE
Total HxCDD	Derived	100	J	ng/kg	100		1	Yes	S2AVE
Total HpCDD	Derived	800	J	ng/kg	800		1	Yes	S2AVE
Total TCDF	Derived	6.8	J	ng/kg	6.8		1	Yes	S2AVE
Total PeCDF	Derived	29	J	ng/kg	29		1	Yes	S2AVE
Total HxCDF	Derived	120	J	ng/kg	120		1	Yes	S2AVE
Total HpCDF	Derived	370	J	ng/kg	370		1	Yes	S2AVE
TEQ (Mammal)	Derived	14		ng/kg	14		1	Yes	S2AVE
TEQ (Bird)	Derived	9.0		ng/kg	9.0		1	Yes	S2AVE
TEQ (Fish)	Derived	9.8		ng/kg	9.8		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP2	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N001	pH:	Sample Date: 11/08/2016	Sample Time: 13:59:00
% Moisture :		% Solids : 79.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.20	J	ng/kg	0.20	J	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	2.4	J	ng/kg	2.4	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	6.9		ng/kg	6.9		1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	28		ng/kg	28		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	11		ng/kg	11		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	870		ng/kg	870		1	Yes	S2AVE
OCDD	Target	6900	J	ng/kg	6900	E	1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.50	U	ng/kg	0.50	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.82	J	ng/kg	0.82	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	6.1		ng/kg	6.1		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	3.5	J	ng/kg	3.5	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	1.5	J	ng/kg	1.5	J	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	6.9		ng/kg	6.9		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	190		ng/kg	190		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	12		ng/kg	12		1	Yes	S2AVE
OCDF	Target	860		ng/kg	860		1	Yes	S2AVE
Total TCDD	Derived	2.3	J	ng/kg	2.3		1	Yes	S2AVE
Total PeCDD	Derived	16	J	ng/kg	16		1	Yes	S2AVE
Total HxCDD	Derived	190	J	ng/kg	190		1	Yes	S2AVE
Total HpCDD	Derived	2100	J	ng/kg	2100		1	Yes	S2AVE
Total TCDF	Derived	10	J	ng/kg	10		1	Yes	S2AVE
Total PeCDF	Derived	37	J	ng/kg	37		1	Yes	S2AVE
Total HxCDF	Derived	180	J	ng/kg	180		1	Yes	S2AVE
Total HpCDF	Derived	730	J	ng/kg	730		1	Yes	S2AVE
TEQ (Mammal)	Derived	23		ng/kg	23		1	Yes	S2AVE
TEQ (Bird)	Derived	12		ng/kg	12		1	Yes	S2AVE
TEQ (Fish)	Derived	13		ng/kg	13		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP3	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N002	pH:	Sample Date: 11/09/2016	Sample Time: 10:50:00
% Moisture :		% Solids : 80.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.17	J	ng/kg	0.17	J	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.55	J	ng/kg	0.55	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.99	J	ng/kg	0.99	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	3.5	J	ng/kg	3.5	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	100		ng/kg	100		1	Yes	S2AVE
OCDD	Target	840		ng/kg	840		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.40	U	ng/kg	0.40	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.65	J	ng/kg	0.65	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.62	J	ng/kg	0.62	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	2.1	J	ng/kg	2.1	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.87	J	ng/kg	0.87	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.52	J	ng/kg	0.52	J	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	1.2	J	ng/kg	1.2	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	26		ng/kg	26		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	2.4	J	ng/kg	2.4	J	1	Yes	S2AVE
OCDF	Target	170		ng/kg	170		1	Yes	S2AVE
Total TCDD	Derived	0.64	J	ng/kg	0.64	J	1	Yes	S2AVE
Total PeCDD	Derived	3.0	J	ng/kg	3.0	J	1	Yes	S2AVE
Total HxCDD	Derived	19	J	ng/kg	19		1	Yes	S2AVE
Total HpCDD	Derived	160	J	ng/kg	160		1	Yes	S2AVE
Total TCDF	Derived	3.7	J	ng/kg	3.7		1	Yes	S2AVE
Total PeCDF	Derived	9.9	J	ng/kg	9.9		1	Yes	S2AVE
Total HxCDF	Derived	28	J	ng/kg	28		1	Yes	S2AVE
Total HpCDF	Derived	91	J	ng/kg	91		1	Yes	S2AVE
TEQ (Mammal)	Derived	3.6		ng/kg	3.6		1	Yes	S2AVE
TEQ (Bird)	Derived	2.6		ng/kg	2.6		1	Yes	S2AVE
TEQ (Fish)	Derived	2.6		ng/kg	2.6		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP4	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N003	pH:	Sample Date: 11/08/2016	Sample Time: 10:58:00
% Moisture :		% Solids : 79.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.22	U	ng/kg	0.22	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.87	J	ng/kg	0.87	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	1.5	J	ng/kg	1.5	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	2.7	J	ng/kg	2.7	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	2.9	J	ng/kg	2.9	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	64		ng/kg	64		1	Yes	S2AVE
OCDD	Target	470		ng/kg	470		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.39	U	ng/kg	0.39	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.37	J	ng/kg	0.37	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.53	J	ng/kg	0.53	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	1.1	J	ng/kg	1.1	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.0	J	ng/kg	1.0	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.44	U	ng/kg	0.44	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	1.0	J	ng/kg	1.0	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	14		ng/kg	14		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.88	J	ng/kg	0.88	J	1	Yes	S2AVE
OCDF	Target	29		ng/kg	29		1	Yes	S2AVE
Total TCDD	Derived	1.0	J	ng/kg	1.0		1	Yes	S2AVE
Total PeCDD	Derived	8.0	J	ng/kg	8.0		1	Yes	S2AVE
Total HxCDD	Derived	32	J	ng/kg	32		1	Yes	S2AVE
Total HpCDD	Derived	120	J	ng/kg	120		1	Yes	S2AVE
Total TCDF	Derived	2.6	J	ng/kg	2.6		1	Yes	S2AVE
Total PeCDF	Derived	8.9	J	ng/kg	8.9		1	Yes	S2AVE
Total HxCDF	Derived	16	J	ng/kg	16		1	Yes	S2AVE
Total HpCDF	Derived	34	J	ng/kg	34		1	Yes	S2AVE
TEQ (Mammal)	Derived	3.0		ng/kg	3.0		1	Yes	S2AVE
TEQ (Bird)	Derived	2.4		ng/kg	2.4		1	Yes	S2AVE
TEQ (Fish)	Derived	2.5		ng/kg	2.5		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP5	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N004	pH:	Sample Date: 11/08/2016	Sample Time: 10:36:00
% Moisture :		% Solids : 88.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.18	J	ng/kg	0.18	J	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.27	U	ng/kg	0.27	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.43	U	ng/kg	0.43	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.5	J	ng/kg	1.5	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.78	J	ng/kg	0.78	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	42		ng/kg	42		1	Yes	S2AVE
OCDD	Target	340		ng/kg	340		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.32	U	ng/kg	0.32	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.28	J	ng/kg	0.28	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.42	J	ng/kg	0.42	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.38	J	ng/kg	0.38	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.38	U	ng/kg	0.38	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.49	J	ng/kg	0.49	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	9.0		ng/kg	9.0		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.56	J	ng/kg	0.56	J	1	Yes	S2AVE
OCDF	Target	39		ng/kg	39		1	Yes	S2AVE
Total TCDD	Derived	0.45	J	ng/kg	0.45	J	1	Yes	S2AVE
Total PeCDD	Derived	0.48	J	ng/kg	0.48	J	1	Yes	S2AVE
Total HxCDD	Derived	11	J	ng/kg	11		1	Yes	S2AVE
Total HpCDD	Derived	100	J	ng/kg	100		1	Yes	S2AVE
Total TCDF	Derived	0.53	J	ng/kg	0.53	J	1	Yes	S2AVE
Total PeCDF	Derived	3.6	J	ng/kg	3.6	J	1	Yes	S2AVE
Total HxCDF	Derived	9.3	J	ng/kg	9.3		1	Yes	S2AVE
Total HpCDF	Derived	31	J	ng/kg	31		1	Yes	S2AVE
TEQ (Mammal)	Derived	1.2		ng/kg	1.2		1	Yes	S2AVE
TEQ (Bird)	Derived	0.85		ng/kg	0.85		1	Yes	S2AVE
TEQ (Fish)	Derived	0.64		ng/kg	0.64		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP6	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N004	pH:	Sample Date: 11/08/2016	Sample Time: 10:36:00
% Moisture :		% Solids : 88.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.51	U	ng/kg	0.51	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	1.6	U	ng/kg	1.6	U	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	2.1	U	ng/kg	2.1	U	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.8	U	ng/kg	1.8	U	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	2.0	U	ng/kg	2.0	U	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	37		ng/kg	37		1	Yes	S2AVE
OCDD	Target	270		ng/kg	270		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.62	U	ng/kg	0.62	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	1.5	U	ng/kg	1.5	U	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	1.2	U	ng/kg	1.2	U	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	1.9	U	ng/kg	1.9	U	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.9	U	ng/kg	1.9	U	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	2.9	U	ng/kg	2.9	U	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	1.8	U	ng/kg	1.8	U	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	8.1		ng/kg	8.1	*	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	3.1	U	ng/kg	3.1	U	1	Yes	S2AVE
OCDF	Target	33		ng/kg	33		1	Yes	S2AVE
Total TCDD	Derived		UJ		0.51	U	1	Yes	S2AVE
Total PeCDD	Derived		UJ		1.6	U	1	Yes	S2AVE
Total HxCDD	Derived	7.8	J	ng/kg	7.8		1	Yes	S2AVE
Total HpCDD	Derived	85	J	ng/kg	85		1	Yes	S2AVE
Total TCDF	Derived		UJ		0.62	U	1	Yes	S2AVE
Total PeCDF	Derived		UJ		0.99	U	1	Yes	S2AVE
Total HxCDF	Derived	3.9	J	ng/kg	3.9	J	1	Yes	S2AVE
Total HpCDF	Derived	20	J	ng/kg	20		1	Yes	S2AVE
TEQ (Mammal)	Derived	0.46		ng/kg	0.46		1	Yes	S2AVE
TEQ (Bird)	Derived	0.067		ng/kg	0.067		1	Yes	S2AVE
TEQ (Fish)	Derived	0.067		ng/kg	0.067		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP7	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N005	pH:	Sample Date: 11/09/2016	Sample Time: 10:00:00
% Moisture :		% Solids : 82.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.17	U	ng/kg	0.17	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.29	U	ng/kg	0.29	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.47	U	ng/kg	0.47	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.65	J	ng/kg	0.65	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.44	J	ng/kg	0.44	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	14		ng/kg	14		1	Yes	S2AVE
OCDD	Target	110		ng/kg	110		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.32	U	ng/kg	0.32	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.41	U	ng/kg	0.41	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.50	U	ng/kg	0.50	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	3.4	J	ng/kg	3.4	J	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.50	U	ng/kg	0.50	UM	1	Yes	S2AVE
OCDF	Target	11		ng/kg	11		1	Yes	S2AVE
Total TCDD	Derived	0.56	J	ng/kg	0.56	J	1	Yes	S2AVE
Total PeCDD	Derived		UJ		0.29	U	1	Yes	S2AVE
Total HxCDD	Derived	5.2	J	ng/kg	5.2		1	Yes	S2AVE
Total HpCDD	Derived	34	J	ng/kg	34		1	Yes	S2AVE
Total TCDF	Derived	0.34	J	ng/kg	0.34	J	1	Yes	S2AVE
Total PeCDF	Derived	0.38	J	ng/kg	0.38	J	1	Yes	S2AVE
Total HxCDF	Derived	3.2	J	ng/kg	3.2	J	1	Yes	S2AVE
Total HpCDF	Derived	9.7	J	ng/kg	9.7		1	Yes	S2AVE
TEQ (Mammal)	Derived	0.32		ng/kg	0.32		1	Yes	S2AVE
TEQ (Bird)	Derived	0.11		ng/kg	0.11		1	Yes	S2AVE
TEQ (Fish)	Derived	0.071		ng/kg	0.071		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP8	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N006	pH:	Sample Date: 11/09/2016	Sample Time: 10:29:00
% Moisture :		% Solids : 77.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.26	J	ng/kg	0.26	J	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.94	J	ng/kg	0.94	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	8.3		ng/kg	8.3		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	3.0	J	ng/kg	3.0	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	280		ng/kg	280		1	Yes	S2AVE
OCDD	Target	2300		ng/kg	2300		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.41	U	ng/kg	0.41	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.30	U	ng/kg	0.30	U	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.64	J	ng/kg	0.64	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	1.1	J	ng/kg	1.1	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.2	J	ng/kg	1.2	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.45	U	ng/kg	0.45	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	1.5	J	ng/kg	1.5	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	52		ng/kg	52		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	2.0	J	ng/kg	2.0	J	1	Yes	S2AVE
OCDF	Target	250		ng/kg	250		1	Yes	S2AVE
Total TCDD	Derived	11	J	ng/kg	11		1	Yes	S2AVE
Total PeCDD	Derived	9.0	J	ng/kg	9.0		1	Yes	S2AVE
Total HxCDD	Derived	51	J	ng/kg	51		1	Yes	S2AVE
Total HpCDD	Derived	470	J	ng/kg	470		1	Yes	S2AVE
Total TCDF	Derived	6.8	J	ng/kg	6.8		1	Yes	S2AVE
Total PeCDF	Derived	12	J	ng/kg	12		1	Yes	S2AVE
Total HxCDF	Derived	41	J	ng/kg	41		1	Yes	S2AVE
Total HpCDF	Derived	180	J	ng/kg	180		1	Yes	S2AVE
TEQ (Mammal)	Derived	7.2		ng/kg	7.2		1	Yes	S2AVE
TEQ (Bird)	Derived	3.8		ng/kg	3.8		1	Yes	S2AVE
TEQ (Fish)	Derived	3.8		ng/kg	3.8		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WP9	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: N007	pH:	Sample Date: 11/08/2016	Sample Time: 10:11:00
% Moisture :		% Solids : 83.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.16	U	ng/kg	0.16	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.33	J	ng/kg	0.33	*	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.47	U	ng/kg	0.47	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.90	J	ng/kg	0.90	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.79	J	ng/kg	0.79	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	30		ng/kg	30		1	Yes	S2AVE
OCDD	Target	240		ng/kg	240		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.33	U	ng/kg	0.33	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.48	J	ng/kg	0.48	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.23	J	ng/kg	0.23	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.42	U	ng/kg	0.42	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.51	U	ng/kg	0.51	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	6.6		ng/kg	6.6		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.62	J	ng/kg	0.62	J	1	Yes	S2AVE
OCDF	Target	58		ng/kg	58		1	Yes	S2AVE
Total TCDD	Derived	0.46	J	ng/kg	0.46	J	1	Yes	S2AVE
Total PeCDD	Derived	1.1	J	ng/kg	1.1	J	1	Yes	S2AVE
Total HxCDD	Derived	9.8	J	ng/kg	9.8		1	Yes	S2AVE
Total HpCDD	Derived	78	J	ng/kg	78		1	Yes	S2AVE
Total TCDF	Derived	1.9	J	ng/kg	1.9		1	Yes	S2AVE
Total PeCDF	Derived	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
Total HxCDF	Derived	5.7	J	ng/kg	5.7		1	Yes	S2AVE
Total HpCDF	Derived	20	J	ng/kg	20		1	Yes	S2AVE
TEQ (Mammal)	Derived	0.70		ng/kg	0.70		1	Yes	S2AVE
TEQ (Bird)	Derived	0.29		ng/kg	0.29		1	Yes	S2AVE
TEQ (Fish)	Derived	0.22		ng/kg	0.22		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WQ0	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: S001	pH:	Sample Date: 11/09/2016	Sample Time: 11:30:00
% Moisture :		% Solids : 83.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.13	U	ng/kg	0.13	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.29	U	ng/kg	0.29	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.46	U	ng/kg	0.46	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.59	J	ng/kg	0.59	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.59	J	ng/kg	0.59	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	20		ng/kg	20		1	Yes	S2AVE
OCDD	Target	310		ng/kg	310		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.26	J	ng/kg	0.26	J	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.27	U	ng/kg	0.27	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.41	U	ng/kg	0.41	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.50	U	ng/kg	0.50	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	3.0	J	ng/kg	3.0	J	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.49	U	ng/kg	0.49	UM	1	Yes	S2AVE
OCDF	Target	14		ng/kg	14		1	Yes	S2AVE
Total TCDD	Derived	0.96	J	ng/kg	0.96		1	Yes	S2AVE
Total PeCDD	Derived	0.32	J	ng/kg	0.32	J	1	Yes	S2AVE
Total HxCDD	Derived	4.6	J	ng/kg	4.6		1	Yes	S2AVE
Total HpCDD	Derived	44	J	ng/kg	44		1	Yes	S2AVE
Total TCDF	Derived	1.4	J	ng/kg	1.4		1	Yes	S2AVE
Total PeCDF	Derived	1.8	J	ng/kg	1.8	J	1	Yes	S2AVE
Total HxCDF	Derived	3.0	J	ng/kg	3.0	J	1	Yes	S2AVE
Total HpCDF	Derived	9.2	J	ng/kg	9.2		1	Yes	S2AVE
TEQ (Mammal)	Derived	0.48		ng/kg	0.48		1	Yes	S2AVE
TEQ (Bird)	Derived	0.41		ng/kg	0.41		1	Yes	S2AVE
TEQ (Fish)	Derived	0.11		ng/kg	0.11		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WQ1	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: S002	pH:	Sample Date: 11/09/2016	Sample Time: 11:56:00
% Moisture :		% Solids : 81.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.20	U	ng/kg	0.20	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.63	J	ng/kg	0.63	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.99	J	ng/kg	0.99	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	6.1		ng/kg	6.1		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	88		ng/kg	88		1	Yes	S2AVE
OCDD	Target	350		ng/kg	350		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.58	U	ng/kg	0.58	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	3.8	J	ng/kg	3.8	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	9.5		ng/kg	9.5		1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	31		ng/kg	31		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	47		ng/kg	47		1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	12		ng/kg	12		1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	44		ng/kg	44		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	13000		ng/kg	13000	D	10	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	15		ng/kg	15		1	Yes	S2AVE
OCDF	Target	4200		ng/kg	4200	D	10	Yes	S2AVE
Total TCDD	Derived	1.5	J	ng/kg	1.5		1	Yes	S2AVE
Total PeCDD	Derived	9.1	J	ng/kg	9.1		1	Yes	S2AVE
Total HxCDD	Derived	40	J	ng/kg	40		1	Yes	S2AVE
Total HpCDD	Derived	140	J	ng/kg	140		1	Yes	S2AVE
Total TCDF	Derived	32	J	ng/kg	32		1	Yes	S2AVE
Total PeCDF	Derived	330	J	ng/kg	330		1	Yes	S2AVE
Total HxCDF	Derived	6200	J	ng/kg	6200	D	1	Yes	S2AVE
Total HxCDF	Derived	6200		ng/kg	6200	D	10	Yes	S2AVE
Total HpCDF	Derived	21000	J	ng/kg	21000	D	1	Yes	S2AVE
Total HpCDF	Derived	21000		ng/kg	21000	D	10	Yes	S2AVE
TEQ (Mammal)	Derived	140		ng/kg	140		1	Yes	S2AVE
TEQ (Bird)	Derived	150		ng/kg	150		1	Yes	S2AVE
TEQ (Fish)	Derived	140		ng/kg	140		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WQ2	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: S003	pH:	Sample Date: 11/09/2016	Sample Time: 11:14:00
% Moisture :		% Solids : 80.9	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.22	U	ng/kg	0.22	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.35	J	ng/kg	0.35	*	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.48	U	ng/kg	0.48	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.2	J	ng/kg	1.2	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.77	J	ng/kg	0.77	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	20		ng/kg	20		1	Yes	S2AVE
OCDD	Target	130		ng/kg	130		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.33	U	ng/kg	0.33	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.24	U	ng/kg	0.24	U	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.29	J	ng/kg	0.29	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.29	J	ng/kg	0.29	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.42	U	ng/kg	0.42	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.51	U	ng/kg	0.51	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	4.1	J	ng/kg	4.1	J	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.51	U	ng/kg	0.51	UM	1	Yes	S2AVE
OCDF	Target	9.6		ng/kg	9.6	J	1	Yes	S2AVE
Total TCDD	Derived		UJ		0.22	U	1	Yes	S2AVE
Total PeCDD	Derived	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
Total HxCDD	Derived	9.5	J	ng/kg	9.5		1	Yes	S2AVE
Total HpCDD	Derived	45	J	ng/kg	45		1	Yes	S2AVE
Total TCDF	Derived	0.53	J	ng/kg	0.53	J	1	Yes	S2AVE
Total PeCDF	Derived	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
Total HxCDF	Derived	4.9	J	ng/kg	4.9		1	Yes	S2AVE
Total HpCDF	Derived	8.8	J	ng/kg	8.8		1	Yes	S2AVE
TEQ (Mammal)	Derived	0.53		ng/kg	0.53		1	Yes	S2AVE
TEQ (Bird)	Derived	0.22		ng/kg	0.22		1	Yes	S2AVE
TEQ (Fish)	Derived	0.15		ng/kg	0.15		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WQ3	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: S004	pH:	Sample Date: 11/09/2016	Sample Time: 12:33:00
% Moisture :		% Solids : 82.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.21	U	ng/kg	0.21	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.32	U	ng/kg	0.32	U	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.48	U	ng/kg	0.48	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.7	J	ng/kg	1.7	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	1.0	J	ng/kg	1.0	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	47		ng/kg	47		1	Yes	S2AVE
OCDD	Target	420		ng/kg	420		1	Yes	S2AVE
2,3,7,8-TCDF	Target	1.3		ng/kg	1.3		1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	2.3	J	ng/kg	2.3	J	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.56	J	ng/kg	0.56	J	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	10		ng/kg	10		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	1.5	J	ng/kg	1.5	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.58	J	ng/kg	0.58	J	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	32		ng/kg	32		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	9.2		ng/kg	9.2		1	Yes	S2AVE
OCDF	Target	1300		ng/kg	1300		1	Yes	S2AVE
Total TCDD	Derived	0.80	J	ng/kg	0.80	J	1	Yes	S2AVE
Total PeCDD	Derived	4.1	J	ng/kg	4.1	J	1	Yes	S2AVE
Total HxCDD	Derived	14	J	ng/kg	14		1	Yes	S2AVE
Total HpCDD	Derived	100	J	ng/kg	100		1	Yes	S2AVE
Total TCDF	Derived	5.3	J	ng/kg	5.3		1	Yes	S2AVE
Total PeCDF	Derived	13	J	ng/kg	13		1	Yes	S2AVE
Total HxCDF	Derived	26	J	ng/kg	26		1	Yes	S2AVE
Total HpCDF	Derived	66	J	ng/kg	66		1	Yes	S2AVE
TEQ (Mammal)	Derived	3.4		ng/kg	3.4		1	Yes	S2AVE
TEQ (Bird)	Derived	4.3		ng/kg	4.3		1	Yes	S2AVE
TEQ (Fish)	Derived	2.5		ng/kg	2.5		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WQ4	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: Z001	pH:	Sample Date: 11/08/2016	Sample Time: 12:27:00
% Moisture :		% Solids : 83.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.12	U	ng/kg	0.12	UM	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.29	U	ng/kg	0.29	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.46	U	ng/kg	0.46	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.24	U	ng/kg	0.24	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.32	U	ng/kg	0.32	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	6.5		ng/kg	6.5		1	Yes	S2AVE
OCDD	Target	45		ng/kg	45		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.26	U	ng/kg	0.26	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.27	U	ng/kg	0.27	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.41	U	ng/kg	0.41	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.50	U	ng/kg	0.50	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	1.6	J	ng/kg	1.6	J	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.50	U	ng/kg	0.50	UM	1	Yes	S2AVE
OCDF	Target	2.9	J	ng/kg	2.9	J	1	Yes	S2AVE
Total TCDD	Derived	0.40	J	ng/kg	0.40	J	1	Yes	S2AVE
Total PeCDD	Derived		UJ		0.29	U	1	Yes	S2AVE
Total HxCDD	Derived	2.5	J	ng/kg	2.5	J	1	Yes	S2AVE
Total HpCDD	Derived	17	J	ng/kg	17		1	Yes	S2AVE
Total TCDF	Derived		UJ		0.26	U	1	Yes	S2AVE
Total PeCDF	Derived	0.32	J	ng/kg	0.32	J	1	Yes	S2AVE
Total HxCDF	Derived	1.3	J	ng/kg	1.3	J	1	Yes	S2AVE
Total HpCDF	Derived	3.1	J	ng/kg	3.1	J	1	Yes	S2AVE
TEQ (Mammal)	Derived	0.095		ng/kg	0.095		1	Yes	S2AVE
TEQ (Bird)	Derived	0.027		ng/kg	0.027		1	Yes	S2AVE
TEQ (Fish)	Derived	0.027		ng/kg	0.027		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WN6	Lab Code: CFA
Sample Number: PE5WQ5	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: Z002	pH:	Sample Date: 11/08/2016	Sample Time: 11:44:00
% Moisture :		% Solids : 79.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.14	U	ng/kg	0.14	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.32	U	ng/kg	0.32	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.50	U	ng/kg	0.50	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.26	U	ng/kg	0.26	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.35	U	ng/kg	0.35	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	3.4	J	ng/kg	3.4	J	1	Yes	S2AVE
OCDD	Target	24		ng/kg	24		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.21	J	ng/kg	0.21	J	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.30	U	ng/kg	0.30	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.27	U	ng/kg	0.27	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.44	U	ng/kg	0.44	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.54	U	ng/kg	0.54	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	1.2	J	ng/kg	1.2	J	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.54	U	ng/kg	0.54	UM	1	Yes	S2AVE
OCDF	Target	3.6	J	ng/kg	3.6	J	1	Yes	S2AVE
Total TCDD	Derived	0.31	J	ng/kg	0.31	J	1	Yes	S2AVE
Total PeCDD	Derived	0.34	J	ng/kg	0.34	J	1	Yes	S2AVE
Total HxCDD	Derived	0.55	J	ng/kg	0.55	J	1	Yes	S2AVE
Total HpCDD	Derived	6.5	J	ng/kg	6.5		1	Yes	S2AVE
Total TCDF	Derived	0.21	J	ng/kg	0.21	J	1	Yes	S2AVE
Total PeCDF	Derived		UJ		0.25	U	1	Yes	S2AVE
Total HxCDF	Derived	0.47	J	ng/kg	0.47	J	1	Yes	S2AVE
Total HpCDF	Derived	2.7	J	ng/kg	2.7	J	1	Yes	S2AVE
TEQ (Mammal)	Derived	0.076		ng/kg	0.076		1	Yes	S2AVE
TEQ (Bird)	Derived	0.23		ng/kg	0.23		1	Yes	S2AVE
TEQ (Fish)	Derived	0.029		ng/kg	0.029		1	Yes	S2AVE

Sample Summary Report

Case No: 46658	Contract: EPW16005	SDG No: PE5WQ6	Lab Code: CFA
Sample Number: DBLK1Z	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.21	U	ng/kg	0.21	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.33	U	ng/kg	0.33	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.52	U	ng/kg	0.52	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.27	U	ng/kg	0.27	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.36	U	ng/kg	0.36	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	0.46	U	ng/kg	0.46	UM	1	Yes	S2AVE
OCDD	Target	1.1	U	ng/kg	1.1	U	1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.31	U	ng/kg	0.31	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.31	U	ng/kg	0.31	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.26	U	ng/kg	0.26	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.26	U	ng/kg	0.26	UM	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.46	U	ng/kg	0.46	UM	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.56	U	ng/kg	0.56	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	0.31	U	ng/kg	0.31	UM	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.56	U	ng/kg	0.56	UM	1	Yes	S2AVE
OCDF	Target	1.1	U	ng/kg	1.1	U	1	Yes	S2AVE
Total TCDD	Derived		UJ		0.21	U	1	Yes	S2AVE
Total PeCDD	Derived		UJ		0.33	U	1	Yes	S2AVE
Total HxCDD	Derived		UJ		0.27	U	1	Yes	S2AVE
Total HpCDD	Derived		UJ		0.46	U	1	Yes	S2AVE
Total TCDF	Derived		UJ		0.31	U	1	Yes	S2AVE
Total PeCDF	Derived		UJ		0.26	U	1	Yes	S2AVE
Total HxCDF	Derived		UJ		0.26	U	1	Yes	S2AVE
Total HpCDF	Derived		UJ		0.31	U	1	Yes	S2AVE
TEQ (Mammal)	Derived	0		ng/kg	0		1	Yes	S2AVE
TEQ (Bird)	Derived	0		ng/kg	0		1	Yes	S2AVE
TEQ (Fish)	Derived	0		ng/kg	0		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WQ6	Lab Code: CFA
Sample Number: DLCS5X	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Spike	19		ng/kg	19		1	Yes	S2AVE
1,2,3,7,8-PeCDD	Spike	98		ng/kg	98		1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Spike	96		ng/kg	96		1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Spike	96		ng/kg	96		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Spike	96		ng/kg	96		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Spike	97		ng/kg	97		1	Yes	S2AVE
OCDD	Spike	190		ng/kg	190		1	Yes	S2AVE
2,3,7,8-TCDF	Spike	19		ng/kg	19		1	Yes	S2AVE
1,2,3,7,8-PeCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
2,3,4,7,8-PeCDF	Spike	92		ng/kg	92		1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Spike	94		ng/kg	94		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Spike	99		ng/kg	99		1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Spike	97		ng/kg	97		1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Spike	96		ng/kg	96		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Spike	99		ng/kg	99		1	Yes	S2AVE
OCDF	Spike	240		ng/kg	240		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WQ6	Lab Code: CFA
Sample Number: DLCSD2W	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture :		% Solids : 100	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Spike	19		ng/kg	19		1	Yes	S2AVE
1,2,3,7,8-PeCDD	Spike	98		ng/kg	98		1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Spike	96		ng/kg	96		1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Spike	97		ng/kg	97		1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Spike	94		ng/kg	94		1	Yes	S2AVE
OCDD	Spike	190		ng/kg	190		1	Yes	S2AVE
2,3,7,8-TCDF	Spike	19		ng/kg	19		1	Yes	S2AVE
1,2,3,7,8-PeCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
2,3,4,7,8-PeCDF	Spike	94		ng/kg	94		1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Spike	94		ng/kg	94		1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Spike	97		ng/kg	97		1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Spike	97		ng/kg	97		1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Spike	95		ng/kg	95		1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Spike	100		ng/kg	100		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Spike	99		ng/kg	99		1	Yes	S2AVE
OCDF	Spike	240		ng/kg	240		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WQ6	Lab Code: CFA
Sample Number: PE5WQ6	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: Z003	pH:	Sample Date: 11/08/2016	Sample Time: 12:04:00
% Moisture :		% Solids : 80.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.25	U	ng/kg	0.25	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.30	U	ng/kg	0.30	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.47	U	ng/kg	0.47	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	0.34	U	ng/kg	0.34	U	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	0.36	U	ng/kg	0.36	U	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	3.3	J	ng/kg	3.3	J	1	Yes	S2AVE
OCDD	Target	24		ng/kg	24		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.26	U	ng/kg	0.26	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.28	U	ng/kg	0.28	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.23	U	ng/kg	0.23	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.25	U	ng/kg	0.25	UM	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.24	U	ng/kg	0.24	U	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.42	U	ng/kg	0.42	U	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.51	U	ng/kg	0.51	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	0.92	J	ng/kg	0.92	J	1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.51	U	ng/kg	0.51	UM	1	Yes	S2AVE
OCDF	Target	1.7	J	ng/kg	1.7	J	1	Yes	S2AVE
Total TCDD	Derived		UJ		0.25	U	1	Yes	S2AVE
Total PeCDD	Derived		UJ		0.30	U	1	Yes	S2AVE
Total HxCDD	Derived	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
Total HpCDD	Derived	7.0	J	ng/kg	7.0		1	Yes	S2AVE
Total TCDF	Derived		UJ		0.26	U	1	Yes	S2AVE
Total PeCDF	Derived	0.32	J	ng/kg	0.32	J	1	Yes	S2AVE
Total HxCDF	Derived	0.52	J	ng/kg	0.52	J	1	Yes	S2AVE
Total HpCDF	Derived	1.8	J	ng/kg	1.8	J	1	Yes	S2AVE
TEQ (Mammal)	Derived	0.050		ng/kg	0.050		1	Yes	S2AVE
TEQ (Bird)	Derived	0.015		ng/kg	0.015		1	Yes	S2AVE
TEQ (Fish)	Derived	0.015		ng/kg	0.015		1	Yes	S2AVE

Case No: 46658	Contract: EPW16005	SDG No: PE5WQ6	Lab Code: CFA
Sample Number: PE5WQ7	Method: Dioxin	Matrix: Soil	MA Number:
Sample Location: Z004	pH:	Sample Date: 11/08/2016	Sample Time: 11:22:00
% Moisture :		% Solids : 79.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
2,3,7,8-TCDD	Target	0.24	U	ng/kg	0.24	U	1	Yes	S2AVE
1,2,3,7,8-PeCDD	Target	0.31	U	ng/kg	0.31	UM	1	Yes	S2AVE
1,2,3,4,7,8-HxCDD	Target	0.84	J	ng/kg	0.84	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDD	Target	1.9	J	ng/kg	1.9	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDD	Target	1.4	J	ng/kg	1.4	J	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDD	Target	59		ng/kg	59		1	Yes	S2AVE
OCDD	Target	580		ng/kg	580		1	Yes	S2AVE
2,3,7,8-TCDF	Target	0.30	U	ng/kg	0.30	U	1	Yes	S2AVE
1,2,3,7,8-PeCDF	Target	0.29	U	ng/kg	0.29	UM	1	Yes	S2AVE
2,3,4,7,8-PeCDF	Target	0.26	U	ng/kg	0.26	U	1	Yes	S2AVE
1,2,3,4,7,8-HxCDF	Target	0.44	J	ng/kg	0.44	J	1	Yes	S2AVE
1,2,3,6,7,8-HxCDF	Target	0.30	J	ng/kg	0.30	J	1	Yes	S2AVE
1,2,3,7,8,9-HxCDF	Target	0.47	U	ng/kg	0.47	U	1	Yes	S2AVE
2,3,4,6,7,8-HxCDF	Target	0.53	U	ng/kg	0.53	UM	1	Yes	S2AVE
1,2,3,4,6,7,8-HpCDF	Target	7.8		ng/kg	7.8		1	Yes	S2AVE
1,2,3,4,7,8,9-HpCDF	Target	0.70	U	ng/kg	0.70	U	1	Yes	S2AVE
OCDF	Target	21		ng/kg	21		1	Yes	S2AVE
Total TCDD	Derived	0.33	J	ng/kg	0.33	J	1	Yes	S2AVE
Total PeCDD	Derived	0.59	J	ng/kg	0.59	J	1	Yes	S2AVE
Total HxCDD	Derived	13	J	ng/kg	13		1	Yes	S2AVE
Total HpCDD	Derived	110	J	ng/kg	110		1	Yes	S2AVE
Total TCDF	Derived		UJ		0.30	U	1	Yes	S2AVE
Total PeCDF	Derived	2.2	J	ng/kg	2.2	J	1	Yes	S2AVE
Total HxCDF	Derived	5.5	J	ng/kg	5.5		1	Yes	S2AVE
Total HpCDF	Derived	22	J	ng/kg	22		1	Yes	S2AVE
TEQ (Mammal)	Derived	1.3		ng/kg	1.3		1	Yes	S2AVE
TEQ (Bird)	Derived	0.47		ng/kg	0.47		1	Yes	S2AVE
TEQ (Fish)	Derived	0.73		ng/kg	0.73		1	Yes	S2AVE

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDGNumbrr:	**103X90260001S051707200**	Clie-nt:	CTLAOOJ	Projecl:	CTLA00317
Lab Sample ID:	11233001	Date Collected:	08/16/2017 12:15	i\latri:c	SOIL
Client Sample:	8290 Soil	Date Ueceind:	08/18/201710:20	%Moisture:	28
Client ID:	[redacted] SS-01-08			Prep iiJ	,, j8_!&,t
Batch ID:	35581	Method:	SW846 8290A		
Ihm Date:	09/13/2017 20:00	Analyst:	MJC	Instrument:	HRP750
Data Filr:	A13SEP17A-5			Dilution:	IO
Pn'.'p Batch:	35579	Prep Method:	SW846 3540C		
Prep Date:	**11-SEP-17**	Prep Aliquot:	**14.27g**		

CASNo.	Parmname	Qual	Result	**EMPC**	Unils	EDL	**PQL**
1746-01-6	2,3,7,8-TCDD	U	2.05		pg/g	2.05	9.74
40321-76-4	1,2,3,7,8-PeCDD	U	1.66		pg/g	1.66	48.7
39227-28-6	1,2,3,4,7,8-HxCDD	U	3.14		pg/g	3.14	48.7
57653-85-7	1,2,3,6,7,8-HxCDD	JK		5.34	pg/g	2.86	48.7
19408-74-3	1,2,3,7,8,9-JlxCDD	U	3.06		pg/g	3.06	48.7
35822-46-9	1,2,3,4,6,7,8-HpCDD		85.3		pg/g	3.21	48.7
3268-87-9	1,2,3,4,6,7,8,9-0CDD		404		pg/g	14.2	97.4
51207-31-9	2,3,7,8-TCDF	U	3.04		pg/g	3.o.t	9.74
57117-41-6	1,2,3,7,8-PeCDF		3.80		pg/g	3.16	48.7
57ll7-31-4	2,3,4,7,8-PeCDF		10.0		pg/g	2.86	48.7
70648-26-9	1,2,3,4,7,8-HxCDF		25.7		pg.lg	6.41	48.7
57117-44-9	1,2,3,6,7,8-HxCDF		49.9		pg/g	5.88	48.7
60851-34-5	2,3,4,6,7,8-HxCDF		46.4		pg/g	6.35	48.7
72918-21-9	1,2,3,7,8,9-HxCDF	J	12.4		pg/g	7.48	48.7
67562-39-4	1,2,3,4,6,7,8-HpCDF		10700		pg/g	7.09	48.7
55673-89-7	1,2,3,4,7,8,9-HpCDF		14.8		pg/g	9.06	48.7
39001-02-0	1,2,3,4,6,7,8,9-0CDF		2820		pg/g	12.4	97.4
41903-57-5	Total Tctrachlorodibcnw-p-dioxin	U	2.05		pg/g	2.05	9.74
36088-22-9	Total Pentachlorodibcnzo-p-dioxin	u	1.66	5.38	pg/g	1.66	48.7
34465-46-8	Total Hexachlorodibcnzo-p-<lioxin	U	2.86	32.4	pg/g	2.86	48.7
37871-00-4	Total Heptachlorodibcnzo-p-dioxin		146		pg/g	3.21	48.7
30.102-14-3	Total Tetrachlorodibcnzofuran		9.88	14.0	pg/g	3.04	9.74
30402-15-4	Total Pentachlorodibcnzofuran		273	277	pg/g	0.514	48.7
55684-94-1	Total Hexad1lorodibcnzofuran		4750		pg/g	5.88	48.7
38998-75-3	Total Heptachlorodibcuzofuran		16600		pg/g	7.09	48.7
3333-30-0	TEQ WH02005 ND=O		126	126	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		128	129	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Reco,,ery%	Acceptable Limits
13C-2,3,7,8-TCDD		147	195	pg/g	*15.5*	(40%-135%)
13C-J,2,3,7,8-PeCDD		177	195	pg/g	91.0	(40%-135%)
13C-I,2,3,6,7,8-HxCDD		201	195	pg/g	103	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		187	195	pg/g	96.1	(40%-135%)
13C-OCDD		318	390	pg/g	81.6	(40%-135%)
13C-2,3,7,8-TCDF		144	195	pg/g	7.17	(40%-135%)
13C-l,2,3,7,8-PeCDF		180	195	pg/g	92.4	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		195	195	pg/g	100	(40'%-135%)
13C- l,2,3,4,6,7,8-HpCDF		215	195	pg/g	110	(40%--135%)

Comments:
J Value is estimated
K Estimated l\laximum PossibleConcentration
U Analyle was analr1:ed for, but not detected above the specified detrction limit.

Hi-Res Dioxins/Furnns
Certificate of Analysis
Sample Summary

SDG Number: **103X9026000IS051707200**
Lab Sample ID: **11233002**
Client Sample-: 8290 Soil
Client ID: [redacted]-SS-01-08
Batch ID: 35581
Run Date: 09/13/201720:48
Data Filr: A13SEP17A-6
Prep Batch: 35579
Prep Date: ll-SEP-17

Client: CTLAOOl
Date Collected: 08/16/201712:15
Date Recehred: 08/18/201710:20

Method: SW846 8290A
Analyst: MJC

Prep l\Iethod: SW846 3540C
Prep Aliquot: 14.49 g

Project: CTLA00317
Matrix: **SOIL**
%Moisture: **16.8**
Prep Basis: Dry Weight

Instrument: **IIRl'750**
Dilution: **10**

CAS No.	Parmname	Qual	Re-suit	EI\IPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.6		pgfg	1.60	8.30
40321-76-4	1,2,3,7,8-PcCDD	U	2.27		pg/g	2.27	41.5
39227-28-6	l,2,3,4,7,8-llxCDD	U	2.8		pg/g	2.80	41.5
57653-85-7	1,2,3,6,7,8-flxCDD		6.79		pg/g	2.56	41.5
19408-74-3	1,2,3,7,8,9-HxCDD	U	2.75		pg/g	2.75	41.5
35822-46-9	1,2,3,4,6,7,8-HpCDD		92.4		pg/g	3.75	41.5
3268-87-9	1,2,3,4,6,7,8,9-0CDD		353		pg/g	18.6	83.0
51207-31-9	2,3,7,8-TCDF	U	2.54		pg/g	2.54	8.30
57117-41-6	1,2,3,7,8-PeCDF		3.91		pg/g	2.66	41.5
57117-31-4	2,3,4,7,8-PeCDF		10.2		pgfg	2.41	41.5
70648-26-9	1,2,3,4,7,8-HxCDF		30.9		pg/g	6.36	41.5
57117-44-9	1,2,3,6,7,8-HxCDF		48.2		pg/g	5.s.t	41.5
60851-34-5	2,3,4,6,7,8-HxCDF		47.4		pg/g	6.29	41.5
72918-21-9	1,2,3,7,8,9-HxCDF		13.9		pg/g	7.42	41.5
67562-39-4	1,2,3,4,6,7,8-HpCDF		13500		pg/g	7.75	-11.S
55673-89-7	1,2,3,4,7,8,9-HpCDF	JK		13.9	pg.lg	9.91	41.5
39001-02-0	1,2,3,4,6,7,8,9-0CDF		3290		pg/g	16.8	83.0
41903-57-5	Total Tetrn.chlorodibenzo-p-dioxin	U	1.6		pg/g	1.60	8.30
36088-22-9	Total Pentachlorodibenzo--p-dioxin	U	2.27	4.14	pg/g	2.27	41.5
34465-46-8	Total Hexachlorodibenzo--p-dioxin		31.2	34.4	pg/g	2.56	41.5
37871-00-4	Total Heptachlorodibenzo-p-dioxin		151		pg/g	3.75	41.5
30--102-14-3	Total Tetmchlorodibenzofuran		8.80	14.3	pg/g	2.54	8.30
30--102-15-4	Total Pentachlorodibenzofuran		298		pg/g	0.602	41.5
55684-9--1-1	Total Hexachlorodibenzofuran		5250		pg/g	5.8-1	41.5
38998-75-3	Total lkptachlorodibenzofuran		20800		pg/g	7.75	41.5
3333-30-0	TEQ WHD2005 ND=O		155	155	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		157	158	pg/g		

urrogate/fraccr eco,,_ery	Qual	Result	Nominal	Unils	Recovery%	Acceptable Limits
l3C-2,3,7,8-TCDD		123	166	pg/g	7-1.4	(40%-135%)
13C-1,2,3,7,8-PeCDD		142	166	pg/g	85.6	(40%-135%)
13C- l,2,3,6,7,8-HxCDD		149	166	pg/g	89.6	(40%-135%)
13C-1,2,3,4,6,7,8-JfpCDD		142	166	pg/g	85.3	(40'%-135%)
l3C-OCDD		250	332	pg/g	75.3	(-10%,-135%)
l3C-2,3,7,8-TCDF		131	166	pg/g	79.1	(40%-135%)
l3C- l,2,3,7,8-PeCDF		146	166	pg/g	88.2	(-10%-135%)
13C- l,2,3,6,7,8-HxCDF		151	166	pg/g	91.2	(-10%-135%)
13C·1,2,3,4,6,7,8-1fpCDF		161	166	pg/g	96.7	(40%-135%)

Comments:
J Value is eslimated
K Eslimated i\laximum Possible Concentration
U Analyte was analyzed for, but not detected above the specified detection limit.

Hi-Res Dioxins/Furans
Ccl'tificate of Analysis
Sample Summary

SDG Number:	103X90260001S051707200	Clienl:	CTLAOOl	Project:	CTLA00317
Lab Sample ID:	11233003	Date Collected:	08/16/2017 12:25	Matrix:	SOIL
Client Sample:	8290 Soil	Date Recciwd:	08/18/2017 10:20	%Moisture:	15.6
Client ID:	SS-02-08			**Pre11o!W.ii;,, ...,Jl¥t- l'. -'l'i,,,**	
Batch ID:	35581	l\Iethod:	SW846 8290A		
Run Date:	09/13/2017 21:37	Analyst:	MJC	Instrument:	HRP750
Data .File:	A13SEP17A-7			Dilution:	10
Prep Batch:	35579	Prep Method:	SW846 3540C		
Prep Date:	11-SEP-17	Prep Aliquot:	**14.16 g**		

CASNo.	Parmname	Q1rnl	Result	El\lPC	Unils	EDL	PQL
1746-01-6	2,3,7,8-TCDD	u	2.33		pg/g	2.33	8.37
40321•76-4	1,2,3,7,8-PeCDD	u	2.02		pg/g	2.02	41.8
39227-28-6	1,2,3,4,7,8-HxCDD	u	*2A8*		pg/g	2.48	41.8
57653-85-7	1,2,3,6,7,8-JixCDD	JK		3.29	pg/g	2.28	41.8
19--108-74-3	1,2,3,7,8,9-lfxCDD	u	2.43		pg/g	2.43	41.8
35822-46-9	1,2,3,4,6,7,8-HpCDD		55.8		pg/g	3.55	41.8
3268-87-9	1,2,3,4,6,7,8,9-0CDD		2B8		pg/g	14.5	83.7
51207-31-9	2,3,7,8-TCDF	u	2.43		pg/g	2.43	8.37
57I17-4I-6	1,2,3,7,8-PeCDF	u	2.86		pg/g	2.86	41.8
57117-31-4	2,3,4,7,8-PeCDF		5.68		pg/g	2.59	41.8
706-18-26-9	1,2,3,4,7,8-llxCDF		17.3		pg/g	4.89	41.8
57117-44-9	1,2,3,6,7,8-llxCDF		27.2		pg/g	4.50	41.8
60851-34-5	2,3,4,6,7,8-HxCDF		27.0		pg/g	4.84	41.8
72918-21-9	1,2,3,7,8,9-HxCDF		7.20		pg/g	5.71	41.8
67562-39-4	1,2,3,4,6,7,8-HpCDF		7270		pg/g	6.24	41.8
55673-89-7	1,2,3,4,7,8,9-HpCDF		10.8		pg/g	8.00	41.8
39001-02-0	1,2,3,4,6,7,8,9-0CDF		1790		pg/g	14.3	83.7
41903-57-5	Total Tctrachlorodibe1120-p-dioxin	u	2.33		pg/g	2.33	8.37
36088-22-9	Total Pentachlorodibenzo-p-dioxin		3.09		pg/g	2.02	41.8
34465-46-8	Total Hexachlorodibenzo-p-dioxin		JO.I	18.2	pg/g	2.28	41.8
37871-00-4	Total Heptach!orodibenzo-p-dioxin		107		pg/g	3.55	4I.8
30-102-14-3	Total Tetrnehlorodibcnwfurnn		01		pg/g	2.43	8.37
30-102-15-4	Total Pentachlorodibenzofuran		142	160	pg/g	0.522	41.8
55684-9-1-1	Total Hexachlorodibenzofuran		2980		pglg	4.50	41.8
38998-75-3	Total lkptaehlorodibenzofuran		11200		pg/g	6.24	41.8
3333-30-0	TEQ WH02005 ND=O		83.5	83.9	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		86.2	86.5	pg.lg		

S_ - .rogate/fracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceplable L !! its
13C-2,3,7,8-TCDD		128	167	pg/g	76.6	(40%-135%)
13C-l,2,3,7,8-PeCDD		142	167	pg/g	85.0	(40%-135%)
13C-l,2,3,6,7,8-HxCDD		142	167	pg/g	84.7	(40%-135%)
13C- I,2,3,4,6,7,8-llpCDD		133	167	pg/g	79.3	(40%-135%)
13C-OCDD		205	335	pg/g	61.3	(40%-135%)
13C-2,3,7,8-TCDF		131	167	pg/g	78.4	(40%-135%)
13C-1,2,3,7,8-PeCDF		143	167	pg/g	85.6	(40 '<1-135%)
IJC-1,2,3,6,7,8-HxCDF		141	167	pg/g	84.0	(40%-135%)
13C-I,2,3,4,6,7,8-HpCDF		146	167	pg/g	87.0	(40 '<,-135%)

Commenls:

J Value is estimaled

K Estinrnttcl i\Iaximum Possible Concentration

U Analyte was analyztd for, but not cletecled abon the specified detection limit.

Hi-Res Dioxins/Furans

Certificate of Analysis

Sample Summary

SDG Number:	103X90l60001SOS1707l00	**Client:**	**CTLAOOl**	**Projrcl:**	**CTLA00317**
Lab Sample ID:	11233006	**Dale Collel.'ted:**	**08/16/2017 12:50**	**Matrix:**	**SOIL**
Client Sample:	**8290 Soil**	***Datt* Received:**	**08/18/2017 10:20**	**%Moisture:**	**15.5**
ClirntID:	SS-01-08			**Preiffl fii ¥1ijy-f,,,' iiiii ·**	
llatc-h ID:	**35581**	**l\lethod:**	**SW846 8290A**		
Run Date:	09/14/201700:02	**Analyst:**	**MJC**	**Instrument:**	**HRP750**
Data File:	A13SEP17A-10			**Dilution:**	I
Prep Hatch:	35579	**Prep i\lelhod:**	**SW846 3540C**		
Prep Date:	11-SEP-17	**Prep Aliquot:**	**14.6 g**		

CASNo.	Parmname	Qual	Result	Ei\lPC	Unils	EDL	PQL
i746-0i-6	2,3,7,8-TC'DD	u	0.182		pg/g	0.182	0.810
40321-76-4	1,2,3,7,8-PeCDD	u	0.147		pg/g	0.147	4.05
39227-28-6	1,2,3,4,7,8-HxCDD	JK		0.271	pg/g	0.227	4.05
57653-85-7	1,2,3,6,7,8-llxCDD	JK		0.554	pg/g	0.207	4.05
19W8-74-3	1,2,3,7,8,9-HxCDD		0.378		pg/g	0.222	4.05
35822-46-9	1,2,3,4,6,7,8-HpC'DD		18.9		pg/g	0.379	4.05
3268-87-9	1,2,3,4,6,7,8,9-0CDD		161		pg/g	1.13	8.10
51207-31-9	2,3,7,8-TCOF	u	0.245		pg/g	0.245	0.810
57117-41-6	1,2,3,7,8-PeCOF	JK		0.139	pg/g	0.122	4.05
57117-31-4	2,3,4,7,8-PcCOF		0.170		pg/g	0.1 IO	4.05
70648-26-9	1,2,3,4,7,8-HxC'DF	u	0.237		pg/g	0.237	4.05
57117-44-9	1,2,3,6,7,8-llxCDF	u	0.217		pg/g	0.217	4.05
60851-34-5	2,3,4,6,7,8-1-ixCDF	JK		0.279	pg/g	0.233	4.05
72918-21-9	1,2,3,7,8,9-HxCDF	u	0.276		pg/g	0.276	4.05
67562-39-4	1,2,3,4,6,7,8-HpC'DF		4.74		pg/g	0.170	4.05
55673-89-7	1,2,3,4,7,8,9-HpCOF		0.311		pg/g	0.217	4.05
39001-02-0	1,2,3,4,6,7,8,9-0CDF		12.6		pg/g	0.363	8.10
41903-57-5	Total Tetrachlorodi!xnzo-p-dioxin	u	0.182	0.789	pg/g	0.182	0.810
36088-22-9	Total Pentachlorodi!xnzo-p-dioxin		l.0-0	1.39	pg/g	0.147	4.05
34465-46-8	Total Hcxachlorodi!xnzo·p-dioxin		4.69	6.34	pg/g	0.207	4.05
37871-00-4	Total Ilcptachlorodibenzo-p-dioxin		48.3		pg/g	0.379	4.05
30--102-14-3	Total Tctrachlorodibenzofuran		0.890	1.18	pg/g	0.245	0.810
30--102-15-4	Total Pcntachlorodibenzofuran		1.93	2.21	pg/g	0.0345	4.05
55684-94-1	Total Hcxachlorodibenzofuron		3.64	3.91	pg/g	0.217	4.05
38998-75-3	Total Hcptachlorodibenzofuran		13.0		pg/g	0.170	4.05
3333-30-0	TEQ WH02005 ND=O		0.381	0.495	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		0.629	0.708	pg/g		

rrogate/fraccr reco\'ery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
l3C-2,3,7,8-TCDD		140	162	pg/g	86.4	(40'%-135%)
I 3C- 1,2,3,7,8-PeCDD		150	162	pg/g	92.6	(40%-135%)
l3C- I,2,3,6,7,8-HxCDD		147	162	pg/g	90.6	(40%-135%)
I 3C- l,2,3,4,6,7,8-HpCDD		144	162	pg/g	89.1	(40%-135%)
l3C-OCDD		259	324	pg/g	80.0	(40%-135%)
l3C-2,3,7,8-TCDF		132	162	pg/g	81.5	(40%-135%)
13C- l,2,3,7,8-PeCDF		161	162	pg/g	99.0	(40%-135%)
13C-l,2,3,6,7,8-HxCDF		151	162	pg/g	93.2	(40'%-135%)
i3C• 1.2.3.4.6.7.8-HpC'DF		141	162	pg/g	86.8	(40%-135%)

Commenls:

J Value is estimated

K Estimated Maximum Possible Concentration·

U Analytc was analyzed for, but not detected above the specified delection limit.

Hi-Res Dioxins/Funms
Certificate of Analysis
Sample Summary

SDG Number:	103X90260001S051707200	Clirnt:	CTLAOOI	Project:	**CTLA00317**
Lab Samph.• ID:	11233007	Date Collected:	08/16/201713:IO	Matrix:	**SOIL**
Client Sample:	8290 Soil	Date Received:	08/18/201710:20	%,Moisture:	**18.6**
Client ID:	[redacted]S-01-08			Prep nasis _ijff• XfJJ	
Batch ID:	35581	Method:	S1V846 8290A		
Run Date:	09/1412017 00:50	Analyst:	i\lJC	Instrument:	**HRP750**
Data File:	Al3SEPl7A-ll			Dilution:	I
Prep Batch:	35579	Prep i\lcthod:	S\\'846 3540C		
Prep Date:	11-SEP-17	Prep Alic1uot:	14.07 g		

CAS No.	Parmnantl.'	Qua(	Result	El\lPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TC'DD	u	0.189		pg/g	0.189	0.873
40321-76-4	J,2,3,7,8-PeCDD		0.314		pg/g	0.218	4.37
39227-28-6	1,2,3,4,7,8-lfxCDD	u	0.615		pglg	0.615	4.37
57653-85-7	1,2,3,6,7,8-HxCDD		1.43		pglg	0.562	4.37
19--108-74-3	1,2,3,7,8,9-HxCDD		0.836		pg/g	0.602	4.37
35822-46-9	l,2,3,4,6,7,8-HpCDD		70.J		pglg	0.810	4.37
3268-87-9	1,2,3,4,6,7,8,9-0CDD		583		pglg	1.58	8.73
51207-31-9	2,3,7,8-TC'DF	u	0.236		pg/g	0.236	0.873
57ll7-41-6	1,2,3,7,8-PeCDF		0.147		pglg	0.119	4.37
57ll7-3l-4	2,3,4,7,8-PeCDF	JK		0.178	pglg	0.108	4.37
706--18-26-9	1,2,3,4,7,8-HxCDF	JK		0.405	pglg	0.165	4.37
57117-44-9	1,2,3,6,7,8-HxCDF		0.251		pg/g	0.152	4.37
60851-34-5	2,3,4,6,7,8-HxCDF		0.412		pg/g	0.16-1	4.37
72918-21-9	l,2,3,7,8,9-HxCDF	u	0.192		pglg	0.192	4.37
67562-39-4	1,2,3,4,6,7,8-HpCDF		7.06		pglg	0.203	4.37
55673-89-7	1,2,3,4,7,8,9-HpCDF		0.567		pg/g	0.258	4.37
39001-02-0	1,2,3,4,6,7,8,9-0CDF		24.9		pglg	0.608	8.73
41903-57-5	Total Tetrachloro<libenzo-p-dioxin		0.306		pg/g	0.189	0.873
36088-22-9	Total Pentachlorodibenzo-p-dioxin		0.6--13	2.39	pglg	0.218	4.37
34465-46-8	Total Hexachlorodibenzo-p-dioxin		22.6		pglg	0.562	4.37
37871-00-4	Total Heptachlorodibenzo-p-dioxin		266		pglg	0.810	4.37
30--102-14-3	Total Tetrachlorodibenzofuran		0.321	0.875	pgfg	0.236	0.873
30--102-15-4	Total Pentachlorodibenzofuran		1.99	2.60	pglg	0.0344	4.37
55684-9--1-1	Total Hexachlorodibenzofuran		7.85	8.26	pglg	0.152	4.37
38998-75-3	Total Heptachlorodibenzofuran		25.1		pglg	0.203	4.37
3333-30-0	TEQ WH02005 ND=O		1.57	1.67	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		1.74	1.81	pg/g		

Surrogatr/frarr reconry	Qual	Result	Nominal	Units	Rcconry%	Ac !_ptable Limits
13C-2,3,7,8-TCDD		146	175	pglg	83.4	(40'%-135%)
13C-l,2,3,7,8-PeCDD		160	175	pg/g	91.7	(40%--135%)
l3C-1,2,3,6,7,8-HxCDD		156	175	pglg	89.4	(40%-135%)
13C-l ,2,3,4,6,7,8-HpCDD		156	175	pg/g	89.2	(40%..135%)
13C-OCDD		284	349	pglg	81.5	(40%-135%)
13C-2,3,7,8-TCDF		137	175	pg/g	78.3	(40%-135%)
13C-l,2,3,7,8-PeCDF		172	175	pg/g	98.2	(40%-135%)
13C-l,2,3,6,7,8-HxCDF		157	175	pg/g	89.7	(40%-135%)
13C-l,2,3,4,6,7,8-HpCDF		*153*	175	pg/g	87.7	(40%-135%)

Comments:
J Value is rsfimated
K Estimated laximum Possible Conrentration
U Analyte was analyzed for, but not drkctcd abo\'e the specified detection limit.

Hi Res Dioxins/Fur:ms
Certificate of Analysis
Sample Summary

SDG Number:	**103X9026000IS051707200**	Client:	CTLAOOl	Project:	CTLA00317
Lab Sample ID:	**11233008**	Date Collected:	08/16/2017 13:25	Malrix:	SOIL
Client Sample:	8290 Soil	Date Received:	08/18/201710:20	%Moisture:	14.5
Client ID:	[redacted]**S-01-081617**			Pre >11'Jffw,·ig	
Batch ID:	35581	Method:	SW846 8290A		
Run Date:	09/14/2017 01:39	Analysl:	MJC	Instrument:	**HRP750**
Data I<'ilr:	A13SEP17A-l2			Dilution:	
Prep Batch:	35579	Prep Method:	SW846 3540C		
Prep Date:	11-SEP-17	Prep Aliquo1:	**14.18** g		

CASNo.	Pannname	Qual	Result	EI\IPC	Units	EDL	PQL
1746-01-6	2,3,7,S•TCDD	u	0.1%		pg/g	0.196	0.825
40321-76-4	1,2,3,7,8-PeCDD		0.691		pg/g	0.195	4.13
39227-28-6	1,2,3,4,7,8-HxCDD		0.802		pg/g	0.216	4.13
57653-85-7	1,2,3,6,7,8-HxCDD		2.85		pg/g	0.198	4.13
19408-74-3	1,2,3,7,8,9-HxCOD		l.81		pg/g	0.213	4.13
35822-46-9	1,2,3,4,6,7,8-HpCDD		73.2		pg/g	0.498	4.13
3268-87-9	1,2,3,4,6,7,8,9-0C'DD		650		pg/g	1.28	8.25
51207-31-9	2,3,7,8-TCDF		0.479		pg/g	0.348	0.825
57117-41-6	1,2,3,7,8-PeCDF		0.398		pg/g	0.0898	4.13
57117-31-4	2,3,4,7,8-PeCDF		0.571		pg/g	0.0812	4.13
70648-26-9	1,2,3,4,7,8-HxCDF		1.85		pg/g	0.147	4.13
57117-44-9	1,2,3,6,7,8-HxCDF		0.807		pg/g	0.135	4.13
60851-34-5	2,3,4,6,7,8-HxCDF		0.987		pg/g	0.145	4.13
72918-21-9	1,2,3,7,8,9-fhCDF		0.279		pg/g	0.172	4.13
67562-39-4	1,2,3,4,6,7,8-HpCDF		17.1		pg/g	0.188	4.13
55673-89-7	1,2,3,4,7,8,9-HpCDF		1.81		pg/g	0.241	4.13
39001-02-0	1,2,3,4,6,7,8,9-0CDF		127		pg/g	0.508	8.25
41903-57-5	Total Tetrachlorodibenzo-p-dioxin		0.919		pg/g	0.196	0.825
36088-22-9	Total Pcntachlorodibenzo-p-dioxin		3.48	4.00	pg/g	0.195	4.13
34465-46-8	Total Hexach!orodibenzo-p-dioxin		19.2	20.3	pg.lg	0.198	4.13
37871-00-4	Total Heptachlorodibenzo-p-dioxin		161		pg/g	0.498	4.13
30402-14-3	Total Tetrachlorodibenzofuran		2.90	3.70	pglg	0.348	0.825
30--W2-15-4	Total Pentachlorodibenzofuran		8.9--1	9.42	pg/g	0.029-1	4.13
55684-9--1-l	Total Hexachlorodibenzofuran	J	21.3		pg/g	0.135	4.13
38998-75-3	Total Heptachlorodibenzofuran		50.5	50.9	pg/g	0.188	4.13
3333-30-0	TEQ WH02005 ND=O		3.01	3.01	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		3.11	3.11	pg/g		

Surrogate/J'ra_ r recowry	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		146	165	pg/g	88.3	(40%-135%)
13C- l,2,3,7,8-PeCDD		163	165	pg/g	98.5	(40%,-135%)
13C-l,2,3,6,7,8-Jfx:CDD		150	165	pg/g	90.7	(40%-135%)
13C- l,2,3,4,6,7,8-HpCDD		153	165	pg/g	92.5	(40%-135%)
I3C-OCDD		286	330	pg/g	86.6	(40%-135%)
!3C-2,3,7,8-TCDF		134	165	pg/g	81.0	(40%-135%)
13C-l,2,3,7,8-PeCOF		170	165	pg/g	103	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		151	165	pg/g	91.6	(40%-135%)
I3C-I,2,3,4,6,7,8-HpCDF		156	165	pg/g	94.4	(40%-135%)

Comments:
J Value is estimaled
K Estimated Maximum Possibll' Concenlration
U Analyle was analp:ed for, but not delecled above the specified detection limit.

Page I of I

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	103X90260001S051707200	Client:	CTLAOOl	Project:	**CTLA00317**
Lab Srtmple JD:	11233009	Datl' Collected:	08/16/2017 13:45	Matrix:	**SOIL**
Client Sample:	8290 Soil	Dale Receiwd:	08/18/2017 10:20	%l\loisture:	25.6
Client ID:	[redacted]-SS-			Prep Basis:	Dry Weight
Batch ID:	35581	Method:	SW846 8290A		
Hun Date:	09/14/2017 02:27	Analyst:	i\IJC	Instrumenl:	IJRP750
Data File:	A13SEP17A-13			Dilution:	1
P1·ep Batch:	35579	Prep Melhod:	**SW846 3540C**		
Prep Date:	ll-SEP-17	Prep Aliquot:	**14,95** g		

CASNo.	Parmname	Qual	Result	EI\IPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	u	0.15		pg/g	0.150	0,900
40321-76-4	1,2,3,7,8-PeCDD	u	0.0932		pg/g	0.0932	4.50
39227-28-6	1,2,3,4,7,8-HxCDD	u	0.106		pg/g	0.106	4.50
57653-85-7	1,2,3,6,7,8-HxCDD	u	0.0972		pg/g	0.0972	4.50
19408-74-3	1,2,3,7,8,9-HxCDD	u	0.104		pglg	0.10---I	4.50
35822-46-9	1,2,3,4,6,7,8-HpCDD	u	0.159		pg/g	0.159	4.50
3268-87-9	1,2,3,4,6,7,8,9-0CDD		0.225		pglg	0.223	9,0-0
51207-31-9	2,3,7,8-TCDF	u	0.142		pg/g	0.142	0,900
57117-41-6	1,2,3,7,8-PeCDF	u	0.0813		pg/g	0.0813	4.50
57117-31-4	2,3,4,7,8-PeCDF	u	0.0736		pg/g	0.0736	4.50
70648-26-9	1,2,3,4,7,8-JhCDF	u	0.0759		pglg	0.0759	4.50
57117-44-9	1,2,3,6,7,8-HxCDF	u	0.0698		pg/g	0.0698	4.50
60851-34-5	2,3,4,6,7,8-HxCDF	u	0.0752		pg/g	0.0752	4.50
72918-21-9	1,2,3,7,8,9-HxCDF	u	0.0887		pglg	0.0887	4.50
67562-39-4	1,2,3,4,6,7,8-HpCDF	JK		0.255	pg/g	0.0982	4.50
55673-89-7	1,2,3,4,7,8,9-HpCDF	u	0.126		pglg	0.126	4.50
39001-02-0	1,2,3,4,6,7,8,9-0CDr	u	0.209		pg/g	0.209	9,0-0
41903-57-5	Total Tetrachlorodibenzo-p-dioxin	u	0.15		pglg	0.150	0,900
36088-22-9	Total Pentachlorodibenzo-p-dioxin	u	0.0932	0.104	pglg	0.0932	4.50
34.\65-46-8	Total Hexachlorodibenzo-p-dioxin	u	0.0972	0.176	pglg	0.0972	4.50
37871-00-4	Total Heptachlorodibenzo-p-dioxin	u	0.159		pg/g	0.159	4.50
30402-14-3	Total Tetrachlorodibenzofuran	u	0.142		pg/g	0.142	0,900
30--102-15-4	Total Pentachlorodibenzofuran	u	0.0363		pglg	0.0363	4.50
55684-9-1-1	Total Hexachlorodibenzofumn	u	0.0698	0.0792	pg/g	0.0698	4.50
38998-75-3	To!al Heptachlorodibenzofuran	u	0.0982	0.255	pg/g	0.0982	4.50
3333-30-0	TEQ WH02005 ND=O		0.0000675	0.00262	pg/g		
3333-30-1	TEQ WH02005 ND=0.5		0.174	0.176	pg/g		

Surrogatef1:'rncer reco,·_er) '-------	Qt)_al	Result	Nominal	Units	Recowrt/o	Acceplable Limits
13C-2,3,7,8-TCDD		153	180	pglg	85.0	(40%-135%)
13C-l ,2,3,7,8-PeCDD		165	180	pglg	91.6	(40'%-135%)
13C-1,2,3,6,7,8-HxCDD		158	180	pglg	88.1	(40%-135%)
13C-I,2,3,4,6,7,8-HpCDD		154	180	pglg	85.3	(40%-135%)
13C-OCDD		263	360	pg/g	73.1	(40%-135%)
!3C-2,3,7,8-TCDF		144	180	pglg	80.2	(40%-135%)
13C-1,2,3,7,8-PeCDF		175	180	pg/g	97.4	(40%-135%)
J3C-1,2,3,6,7,8-HxCDF		160	180	pg/g	88.8	(40%-135%)
13C-l,2,3,4,6,7,8-HpCDF		151	180	pglg	84.0	(40%-135%)

Comments:
J Value is eslimatl'd
I(Estimated Maximum Possible Concentration
U Analyte was analyzed for, but not detected abow thespecified detcclion limit.

APPENDIX G

Soil Results Interpretation

Supporting material for *5.2.2 Semi-volatile Organic Compounds*

Table 1G. Potency Equivalency Factors (PEFs)

Polycyclic Aromatic Hydrocarbon	Potency Equivalency Factor
Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Indeno(123-cd)pyrene	0.1

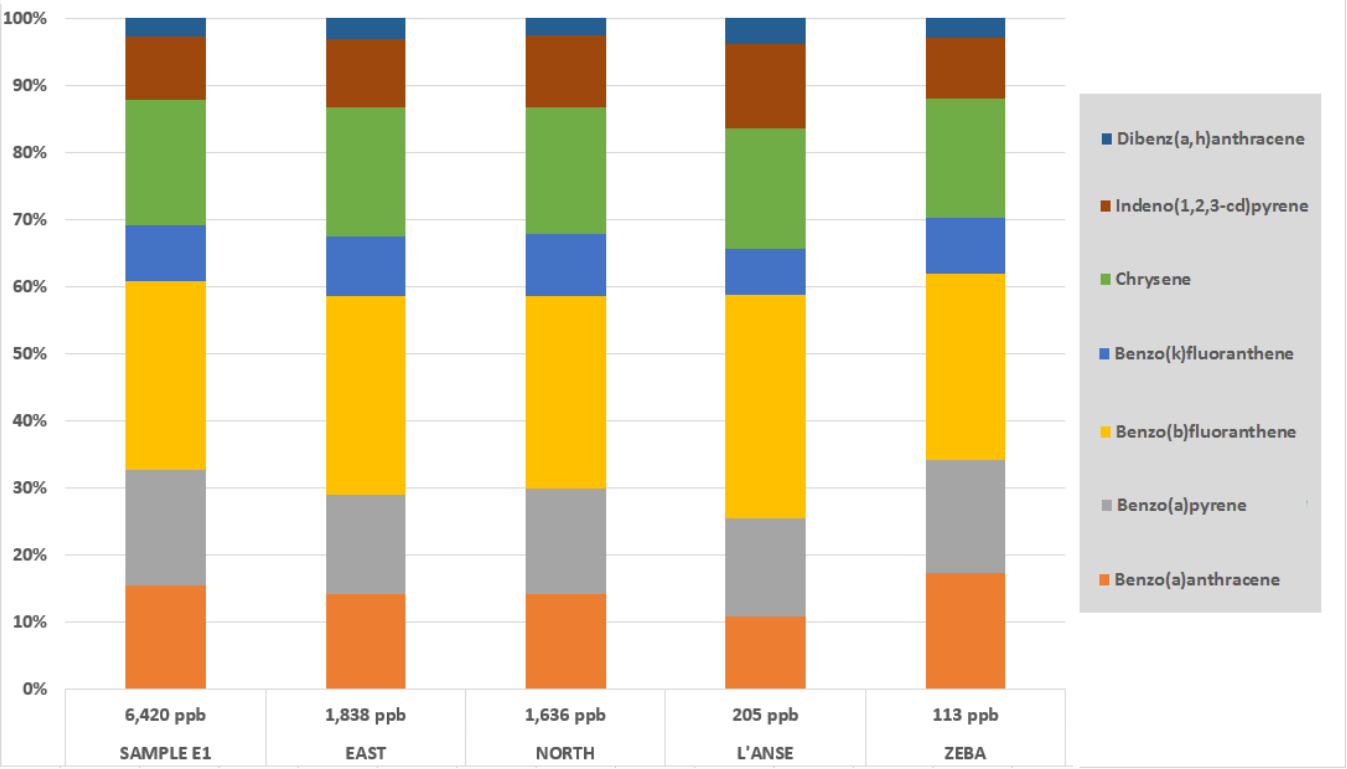
Source: Cal EPA 2005.

Chemical fingerprinting is a data analysis technique where the relative amounts of different compounds, i.e. the chemical profile, of several samples can be compared to look for potential patterns. For the L'Anse soil PAH data, ATSDR developed fingerprints by averaging the individual PAH concentrations by group (East, North, L'Anse, and Zeba) and then plotting them as a percentage of the total carcinogenic PAH concentration, i.e. total BaP TE plus dibenz(a,h)anthracene, a compound which EPA considers a carcinogen however ATSDR does not have a CV.

Chemical fingerprints for carcinogenic PAHs in soil are presented in Figure G1. Sample E1 is shown separately because its toxicity is notably higher than the other samples and could potentially have a different PAH composition. The total concentration of carcinogenic PAHs at E1 is 6,420 ppb. The group averages are similar for East and North areas: 1,838 and 1,636 ppb, respectively. The remaining L'Anse samples are much lower with an average 205 ppb and the background site (Zeba) averages 113 ppb.

Although the sampling groups have different PAH concentrations, their chemical profiles are essentially the same. These soil fingerprints suggest that PAHs in the L'Anse and Zeba communities are derived from the same source or group of sources. The sites with higher PAH concentrations do not have a differing profile that might suggest impacts from a specific industrial source(s). The PAH profile observed in L'Anse is typical of the chemical ratios observed in urban background soil around the United States [ARCADIS 2013; EPRI 2008].

Figure 1G. Sum of Carcinogenic PAHs in Soil and Fingerprint (Percent of Sum) by Group[1], parts per billion (ppb)



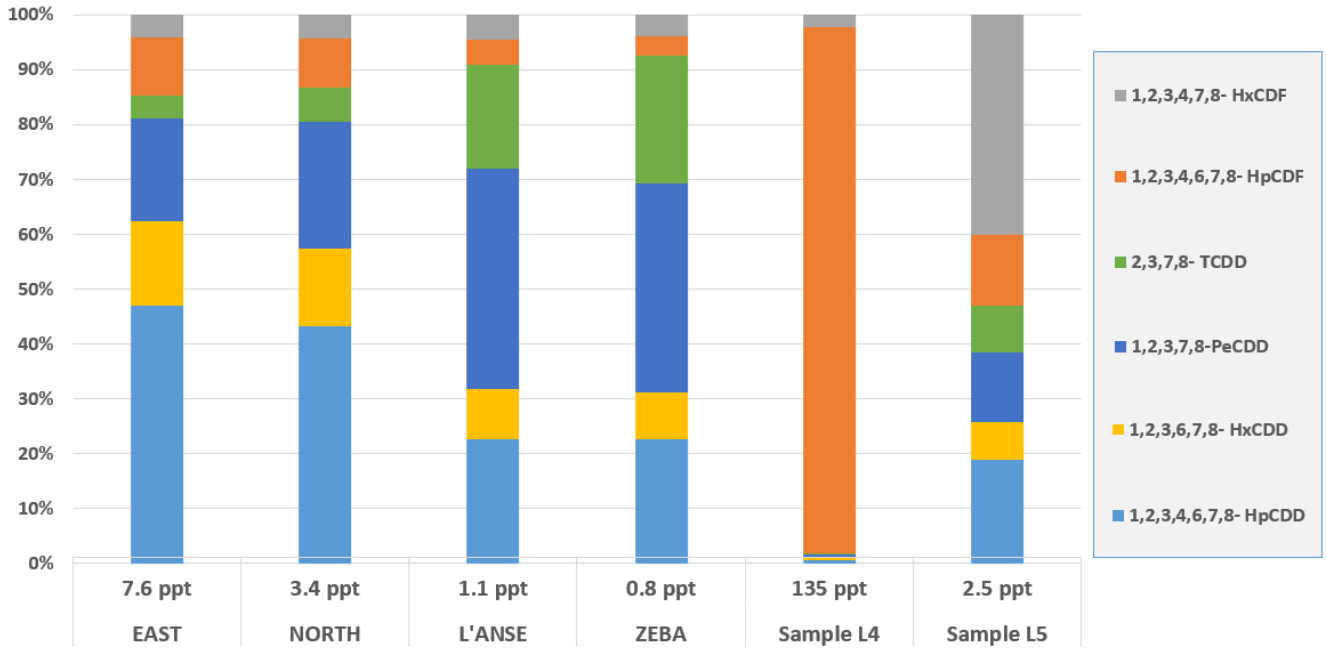
1. Sample E1 not included in "East" sum and fingerprint.

Supporting material for *5.2.3 Dioxins and Furans*

Figure G2 shows the Toxic Equivalence Factor (TEF)-Adjusted Concentration fingerprints for key dioxins averaged by site category in order to compare different parts of the study area. Samples L4 and L5, a residence adjacent to L4, are shown separately from the L'Anse group average. The total concentration of selected CDD/CDFs decreases with distance from LWEC: 7.6 ppt at the East sites, 3.4 ppt North, 1.1 in the remainder of L'Anse, and 0.8 ppt in Zeba.

The dioxin TEF-Adjusted Concentration fingerprints for the soil samples in the East and North areas near LWEC are similar to each other. The fingerprints for the remainder of L'Anse and Zeba are comparable to each other and also appear to be different from the samples in LWEC-impacted areas. In contrast to the L'Anse and Zeba samples, the soil in the East and North plumes has more toxicity contributed by 1,2,3,4,6,7,8-HpCDD and less from 2,3,7,8-TCDD and other compounds. Sample L4 has a uniquely different TEF-Adjusted Concentration profile, with toxicity contributed by CDFs not CDDs, suggesting that the soil contamination in this area has a different source. Sample L5 is similar to the profiles near LWEC, however the CDF content is higher.

Figure 2G. Fingerprint of Dioxin Toxic Equivalence Factor-Adjusted Concentrations Averaged by Group[1] (Percent of Total Concentration), parts per trillion (ppt)



1. Samples L4 and L5 not included in "L'Anse" fingerprint.

APPENDIX H

Health Evaluation Methods and Results

Exposure dose is calculated using the formulas shown on Figures 1H and 2H, respectively, for ingestion and dermal contact. ATSDR calculated exposure doses for both central tendency exposure (CTE), which refers to persons who have an average or typical soil intake rate, and reasonable maximum exposure (RME), which refers to persons who are at the upper end of the exposure distribution (approximately the 95th percentile). The RME scenario assesses exposures that are higher than average but still within a realistic exposure range. In the absence of complete exposure-specific information regarding soil exposures, ATSDR applied conservative exposure assumptions to define site-specific CTE and RME Table 3H shows the age group specific exposures to dioxins and hazard quotient calculated at Site L4, the location that exceeded screening levels for noncancer health effects. Table 4H shows an example of exposure and cancer risk calculations for one of the sites that exceeded screening for cancer risk (Site E1) and table 5H presents a summary of the ten other sites that exceeded CREGs.

Figure 1H. Exposure Dose Equation for Ingestion of Soil

$$D = \frac{C \times IR \times EF \times AF \times CF}{BW}$$

where,

D	=	exposure dose in milligrams per kilogram per day (mg/kg/day)
C	=	chemical concentration in milligrams per kilogram (mg/kg)
IR	=	intake rate in milligrams per day (mg/day)
EF	=	exposure factor (unitless)
AF	=	bioavailability factor
CF	=	conversion factor, 1×10^{-6} kilograms/milligram (kg/mg)
BW	=	body weight in kilograms (kg)

Figure 2H. Exposure Dose Equation for Dermal Contact with Soil

$$DAD = \frac{C_{soil/sediment} \times EF \times CF \times AF \times ABS_d \times SA}{BW}$$

Where:

Parameter	Definition (units)
DAD	= Dermal Absorbed Dose (mg/kg-day)
$C_{soil/sediment}$	= Chemical concentration in soil or sediment (mg/kg)
EF	= Exposure Factor (EV x EFr x ED)* • EV = Event Frequency (events/day) • EFr = Exposure Frequency (days/year) • ED = Exposure Duration (years)
CF	= Conversion factor (10^{-6} kg/mg)
AF	= Adherence factor of soil/sediment to skin (mg/cm²-event)
ABS_d	= Dermal absorption fraction for soil and sediment
SA	= Surface Area available for contact (cm²)
BW	= Body Weight (kg)

*For default exposure scenarios, the EF = 1 for acute, intermediate and chronic exposure

Table 1H. ATSDR-Recommended Soil and Sediment Ingestion Rates* [ATSDR 2016d]

Exposure Group	Soil Ingestion mg/day		Body Weight** kg
	Mean	Upper Percentile	Mean
6 wks to < 1 year	60	100	8.2
1 to < 2 years	100	200	11.4
2 to < 6 years	100	200	17.4
6 to < 11 years	100	200	31.8
11 to < 16 years	100	200	56.8
16 to < 21 years	100	200	71.6
Adults, ≥21 years	50	100	80
Special Groups			
Children with pica behavior (1 to < 2 and 2 to <6 years)	5,000 per event		11.4 and 17.4
Gardeners (≥21 years)	100		80
Geophagy (≥21 years)	50,000		80
Trespassers (any age)	Varies with age		
Workers—indoor	50		80
Workers—outdoor (low intensity soil contact)	100		80
Workers—outdoor (high intensity soil contact)	330		80

* Estimate doses for the most highly exposed group (e.g., usually children 1 to < 2 yr) or for the most sensitive group. If the estimated dose for this group exceeds the health guideline (e.g., MRL, RfD), then health assessors should estimate and evaluate doses for other groups.
**Use age-specific bodyweights.

Table 2H. ATSDR-Recommended Default Soil Dermal Exposure Assumptions [ATSDR 2016c]

Exposure Group	Skin Surface Area (cm2)	AF (mg/cm^2-event)	EF unitless	BW (kg)
6 wks to < 1 year	1,772	0.2	1	8.2
1 < 2 years	2,299	0.2	1	11.4
2 < 6 years	2,592	0.2	1	17.4
6 < 11 years	3,824	0.2	1	31.8
11 < 16 years	5,454	0.2	1	56.8
16 < 21 years	6,083	0.2	1	71.6
Adults (≥ 21 years	6,030	0.07	1	80

Figure 3H. Cancer Risk Equation

$$\text{Age-Specific Cancer Risk} = D \times CSF \times (ED / 78)$$

where,

D = age-specific exposure dose in milligrams per kilogram per day (mg/kg/day)
CFS = cancer slope factor in $(mg/kg/day)^{-1}$
ED = age-specific exposure duration in years

Table 3H. Central Tendency Exposure (CTE) and Reasonable Maximum Exposure (RME) for Dioxin Toxic Equivalent (TEQ) in Soil and Non-Cancer Hazard Quotient (HQ) at Site L4[1]

Exposure Group	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient	
	CTE	RME	CTE	RME
6 weeks to < 1 year	1.2E-09	1.9E-09	1.7	2.7
1 to < 2 years	1.4E-09	2.6E-09	2.0	3.8
2 to < 6 years	9.3E-10	1.7E-09	1.3	2.5
6 to < 11 years	5.4E-10	9.8E-10	0.77	1.4
11 to < 16 years	3.3E-10	5.7E-10	0.47	0.82
16 to < 21 years	2.7E-10	4.6E-10	0.38	0.66
Adult	1.1E-10	2E-10	0.16	0.28

1. HQs >1.0 are shaded gray.

Table 4H. Central Tendency Exposure (CTE) and Reasonable Maximum Exposure (RME) Predicted Cancer Risk from Total Exposure to Soil at Site E1[1]

Exposure Group	Chronic Dose (mg/kg/day)		Cancer Risk		
	CTE	RME	CTE	RME	Exposure Duration (yrs)
BaP TE					
6 weeks to < 1 year	1.90E-05	2.70E-05	1.00E-05	1.60E-05	0.88
1 to < 2 years	2.10E-05	3.40E-05			1
2 to < 6 years	1.40E-05	2.30E-05			4
6 to < 11 years	9.40E-06	1.40E-05			5
11 to < 16 years	6.40E-06	9.00E-06			5
16 to < 21 years	5.40E-06	7.50E-06			5
Total exposure duration for child cancer risk					21
Adult	2.00E-06	2.90E-06	8.30E-07	1.20E-06	33
Birth to < 21 years + 12 years during adulthood				1.60E-05	33
Dioxin TEQ					
6 weeks to < 1 year	2.00E-10	3.10E-10	3.20E-06	5.80E-06	0.88
1 to < 2 years	2.30E-10	4.30E-10			1
2 to < 6 years	1.50E-10	2.80E-10			4
6 to < 11 years	8.90E-11	1.60E-10			5
11 to < 16 years	5.40E-11	9.40E-11			5
16 to < 21 years	4.40E-11	7.60E-11			5
Total exposure duration for child cancer risk					21
Adult	1.80E-11	3.20E-11	9.90E-07	1.80E-06	33
Birth to < 21 years + 12 years during adulthood				6.50E-06	33
Combined Risk from BaP TE and Dioxin TEQ					
Childhood			1.32E-05	2.18E-05	21
Adult			1.82E-06	3.00E-06	12
Birth to < 21 years + 12 years during adulthood				2.25E-05	33

1. Cancer risks greater than 1.0E-06 shaded gray.

Table 5H. Central Tendency Exposure (CTE) and Reasonable Maximum Exposure (RME) Predicted Cancer Risk from Total Exposure to Benzo(a)pyrene Toxic Equivalent (BaP TE) and Dioxin Toxic Equivalent (TEQ) in Soil at Sites Above Screening Levels[1,2]

Site E1		CTE	RME
Child	BaP TE	1.0E-05	1.6E-05
Adult		8.3E-07	1.2E-06
Birth-33 yrs			1.6E-05
Child	Dioxin TEQ	3.2E-06	5.8E-06
Adult		9.9E-07	1.8E-06
Birth-33 yrs			6.5E-06
Child	BaP + TEQ	1.3E-05	2.2E-05
Adult		1.8E-06	3.0E-06
Birth-33 yrs			2.3E-05

Site E2		CTE	RME
Child	BaP TE	1.6E-06	2.4E-06
Adult		1.3E-07	1.9E-07
Birth-33 yrs			2.5E-06
Child	Dioxin TEQ	1.4E-06	2.5E-06
Adult		4.3E-07	7.7E-07
Birth-33 yrs			2.8E-06
Child	BaP + TEQ	3.0E-06	4.9E-06
Adult		5.6E-07	9.6E-07
Birth-33 yrs			5.3E-06

Site E3		CTE	RME
Child	BaP TE	2.6E-06	3.9E-06
Adult		2.1E-07	3.0E-07
Birth-33 yrs			4.0E-06
Child	Dioxin TEQ	2.0E-06	3.6E-06
Adult		6.0E-07	1.1E-06
Birth-33 yrs			3.9E-06
Child	BaP + TEQ	4.6E-06	7.5E-06
Adult		8.1E-07	1.4E-06
Birth-33 yrs			7.9E-06

Site E4		CTE	RME
Child	BaP TE	3.4E-06	5.1E-06
Adult		2.7E-07	3.9E-07
Birth-33 yrs			5.2E-06
Child	Dioxin TEQ	1.0E-06	1.9E-06
Adult		3.1E-07	5.7E-07
Birth-33 yrs			2.1E-06
Child	BaP + TEQ	4.4E-06	7.0E-06
Adult		5.8E-07	9.6E-07
Birth-33 yrs			7.3E-06

Site E5		CTE	RME
Child	BaP TE	2.6E-06	3.9E-06
Adult		2.1E-07	3.0E-07
Birth-33 yrs			4.0E-06
Child	Dioxin TEQ	7.1E-07	1.3E-06
Adult		2.2E-07	3.9E-07
Birth-33 yrs			1.4E-06
Child	BaP + TEQ	3.3E-06	5.2E-06
Adult		4.3E-07	6.9E-07
Birth-33 yrs			5.4E-06

Site E6		CTE	RME
Child	BaP TE	3.6E-06	5.5E-06
Adult		2.9E-07	4.3E-07
Birth-33 yrs			5.7E-06
Child	Dioxin TEQ	2.7E-07	4.8E-07
Adult		8.2E-08	1.5E-07
Birth-33 yrs			5.4E-07
Child	BaP + TEQ	3.9E-06	6.0E-06
Adult		3.7E-07	5.8E-07
Birth-33 yrs			6.2E-06

Site L4		CTE	RME
Child	BaP TE	4.1E-07	6.1E-07
Adult		3.2E-08	4.8E-08
Birth-33 yrs			6.3E-07
Child	Dioxin TEQ	2.0E-05	3.6E-05
Adult		6.0E-06	1.1E-05
Birth-33 yrs			3.9E-05
Child	BaP + TEQ	2.0E-05	3.7E-05
Adult		6.0E-06	1.1E-05
Birth-33 yrs			4.0E-05

Site L5		CTE	RME
Child	BaP TE	4.8E-07	7.2E-07
Adult		3.8E-08	5.6E-08
Birth-33 yrs			7.4E-07
Child	Dioxin TEQ	4.8E-07	8.6E-07
Adult		1.5E-07	2.6E-07
Birth-33 yrs			9.6E-07
Child	BaP + TEQ	9.6E-07	1.6E-06
Adult		1.9E-07	3.2E-07
Birth-33 yrs			1.7E-06

Site N1		CTE	RME
Child	BaP TE	2.0E-06	3.1E-06
Adult		1.6E-07	2.4E-07
Birth-33 yrs			3.2E-06
Child	Dioxin TEQ	1.0E-06	1.8E-06
Adult		3.1E-07	5.6E-07
Birth-33 yrs			2.0E-06
Child	BaP + TEQ	3.0E-06	4.9E-06
Adult		4.7E-07	8.0E-07
Birth-33 yrs			5.2E-06

Site N2		CTE	RME
Child	BaP TE	4.0E-06	6.0E-06
Adult		3.2E-07	4.7E-07
Birth-33 yrs			6.2E-06
Child	Dioxin TEQ	5.1E-07	9.1E-07
Adult		1.6E-07	2.8E-07
Birth-33 yrs			1.0E-06
Child	BaP + TEQ	4.5E-06	6.9E-06
Adult		4.8E-07	7.5E-07
Birth-33 yrs			7.2E-06

Site N3		CTE	RME
Child	BaP TE	1.7E-06	1.5E-06
Adult		1.3E-07	2.0E-07
Birth-33 yrs			2.6E-06
Child	Dioxin TEQ	4.2E-07	7.6E-07
Adult		1.3E-07	2.3E-07
Birth-33 yrs			8.5E-07
Child	BaP + TEQ	2.1E-06	2.3E-06
Adult		2.6E-07	4.3E-07
Birth-33 yrs			3.5E-06

1. Child = cancer risk for ages birth to 21 years; Adult = cancer risk for 33 years; 95th percentile residential occupancy
2. Cancer risk greater than 1.0E-06 shaded gray.