ENVi ENVIRONMENTAL, LLC
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August 19, 2020

Kasie McKenzie
Environmental Engineer
R.I. Department of Environmental Management
Office of Land Revitalization & Sustainable Materials Management
235 Promenade St.
Providence, RI 02908

Re: Beneficial Use Determination Application - Revised
Cumberland Foundry
Cumberland, Providence County, Rhode Island

Dear Ms. McKenzie,

Please find the enclosed revised Beneficial Use Determination (BUD) Application for Cumberland Foundry in Cumberland, Rhode Island for your review. Revisions were made to the BUD Application in response to your questions/comments based on your review, which you emailed ENVi Environmental LLC on July 15, 2020. The revisions to the narrative were made in Microsoft Office Word track changes for ease of your review. Additionally, a site plan map (Appendix C) and an Ohio Environmental Protection Agency *GENERAL PERMIT AUTHORIZATION TO BENEFICIALLY USE FOUNDRY SAND FROM, IRON, STEEL AND ALUMINUM FOUNDRIES FOR ROAD CONSTRUCTION SUB-BASE, AS A COMPONENT IN STRUCTURAL FILL, AND AS PIPE BEDDING* (Appendix G) were added to the appendices.

Please contact our office with any questions following your review. We will finalize the BUD Application upon receipt of your authorization of the revisions.

Sincerely,
ENVi Environmental, LLC

Brandon Smith
Sr., Project Manager

Enclosure

BENEFICIAL USE DETERMINATION

2020 APPLICATION

CUMBERLAND FOUNDRY

CUMBERLAND, PROVIDENCE COUNTY, RHODE ISLAND

~~May 27~~July 24, 2020

I. Introduction

ENVi Environmental, LLC (ENVi) has prepared this Beneficial Use Determination (BUD) Application on behalf of Cumberland Foundry to request a variance from the Solid Waste Regulations in order to beneficially use spent, non-toxic foundry sand generated by Cumberland Foundry located in Cumberland, Rhode Island. This BUD Application is for review and consideration by the Rhode Island Department of Environmental Management (DEM) Office of Waste Management.

II. Required Information/Data

This BUD Application addresses the necessary information ~~in order to~~to beneficially use the spent foundry sand generated by Cumberland Foundry. The following information required by DEM is included in this BUD Application.

1. Operational activities which will be implemented to minimize or eliminate environmental hazards associated with the proposed recycling of the spent foundry sand.

   Processing of this material does not generate environmental hazards. No air emissions are expected to occur. Erosion and windblown sand are negligible because of the compactibility of the sand and the vegetated cover. Storm water runoff is controlled by a vegetative cover and silt fence. The facility was formerly ~~from similar constituency storage piles at the facility is already~~ covered by a Rhode Island Pollutant Discharge Elimination System (RIPDES) General Permit. Currently, the facility has a RIPDES "No Exposure" certification, which is included in **Appendix A**.

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2. Information regarding why spent foundry sand is a viable and a beneficial substitution for commercial products or raw materials.

   Foundry sand is an industrial byproduct generated by the metal-casting industry. Foundry sand generated by iron (gray and ductile), steel, and aluminum foundries using silica sand with chemical or clay binders can be beneficially used for road construction sub-base, as a component in structural fill, and as pipe bedding.

3. The benefit of recycling the spent foundry sand relative to ~~it~~its being sent to a State's solid waste landfill and how the spent sand will not pose a threat to public health or the State's environmental resources.

   Recycling and reuse of spent foundry sand will prevent these materials from needlessly contributing to the waste volume going to landfills. These materials are natural products and can be used to produce a product that is used for land application purposes. No air emissions are expected to occur. Erosion and windblown sand are negligible because of the compactibility of the sand and the vegetated cover. Storm water runoff is controlled by a vegetative cover and silt fence~~from similar constituency storage piles at the facility is already covered by a RIPDES General Permit~~. Additionally, concentrations of samples of the material submitted for *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases*, March 3, 1993, as

amended November 2011, (*Remediation Regulations*), *Table 1 Direct Exposure Criteria* for soil were less than respective residential limits. A comparison summary table is included in **Appendix ~~A~~B**.

4. Discussion of the end market demand for the spent foundry sand.

Spent foundry sand is a viable and economically beneficial material which will be used in the construction industry.

5. Discussion of how spent foundry sand reuse/recycling will not be detrimental to the environment.

Recycling and reuse of spent foundry sand will prevent these materials from needlessly contributing to the waste volume going to landfills. These materials are natural products and can be used to produce a product that is used for land application purposes. No air emissions are expected to occur. Erosion and windblown sand are negligible because of the compactibility of the sand and the vegetated cover. Storm water is controlled by a vegetative cover and silt fence~~runoff from similar constituency storage piles at the facility is already covered by a RIPDES General Permit~~. Additionally, concentrations of samples of the material submitted for *Remediation Regulations*, *Table 1 Direct Exposure Criteria* were less than respective residential limits.

6. Provide a narrative as to how environmental, ~~engineering~~engineering, and institutional controls may be implemented to ~~properly and safely recycle/reuse~~recycle/reuse properly and safely the ~~the~~ spent foundry sand, which will include the following information.

a. The quantity of the spent foundry sand to be received/recycled.

40-60 tons of spent foundry sand is generated ~~on a monthly basis~~monthly.

b. The maximum quantity of the spent foundry sand to be stored at the site at any one time.

600 tons

c. The name and address of the generator.

Name:	Cumberland Foundry Co.
Address:	310 West Wrentham Road, Cumberland, Rhode Island 02864
Phone Number:	(401) 658-3300
Contact:	Tom Lucchetti, President

d. A detailed narrative and schematic diagram of the production, manufacturing, and/or residue process by which the waste material is produced.

Cumberland Foundry Co. is a cast iron foundry that uses the sand molding process to produce iron castings for many different types of industries.

Silica sand is purchased from Bryant Sands McConnelsville of New York and stored on the property in a 100-ton sand silo tank. It is then gravity fed into a sand blending machine (Mueller). Once inside the blending machine additions of bentonite clay and water are mixed into the silica sand to promote compactibility.

Sand molds are then produced using this sand and filled with molten iron. Once the molten iron solidifies the castings are removed from the sand and the sand is then returned to the blending machine where more new silica sand is added.

After repeating this process many times, the result is a buildup of excess sand in the system necessitating the removal of some of the sand. This excess sand is then removed and stored in a pile outside of the facility on a hard pan gravel surface. The sand is vegetated and surrounded by silt fence. Approximately 10% of the total amount of sand used per day goes into the excess sand pile. If needed, this sand may be brought back in to the building and re-used.

The sand usage varies and is determined by the amount and size of sand molds being made. New sand is added into the operation mix each day to ensure the vitality and compactibility of the molding sand. As more new sand is added to the operation mix, the volume of total sand builds up in the system which means some of the sand must be removed from the system.

The sand is passed through a reclaiming machine before it is reused in the system. At that point, any foreign matter is removed from the sand. That is, any pieces of metal or debris. Also, if the permit is granted, the facility would purchase a screening machine to pass the excess sand through before loading on a truck.

A site plan map is included as **Appendix C**. A schematic diagram of the production, manufacturing, and/or residue process by which the waste material is produced is presented in **Appendix ~~B~~D**.

e. The anticipated uniformity of the spent foundry sand.

The spent foundry sand is a homogenous, clean, grey-black, fine (80 AFS grain fineness) material.

f. A description regarding how the quantity and toxicity of the spent foundry sand will be minimized by the generator.

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The quantity of the material is minimized by re-using the material in the manufacturing process, if possible. The material is non-toxic, as indicated in the spent foundry sand laboratory analytical results. It is important to note that the new sand added is blended into the already used sand. Once mixed, there is no "new sand" or "old sand". The only sand removed is an amount that keeps the system from overflowing. It is excess sand, not new sand, or old sand. The results of sampling/testing have indicated the buildup of metals in the reused, or excess sand, is negligible.

g. A routine spent foundry sand inspection schedule.

Spent foundry sand is regularly inspected as part of the daily manufacturing process when the facility is operational.

h. A loss minimization plan, which will include site controls relating to the storage, handling, and processing of the spent foundry sand.

Cumberland Foundry Co. intends to process all or as close to all the materials in the piles into finished products. No storage, handling, or processing control issues are anticipated, and no significant losses are expected. Spent foundry sand loss minimization is part of the daily routine housekeeping schedule when the facility is operational.

i. A residual solid waste management plan, which will include operational activities to manage and dispose of residual solid waste. A location for the final disposal of residual solid wastes will be identified.

Cumberland Foundry Co. intends to process all or as close to all the materials in the piles into finished products. No storage, handling, or processing control issues are anticipated, and no significant losses expected. Spent foundry sand loss minimization is part of the daily routine housekeeping schedule when the facility is operational.

j. A nuisance control plan, which will include operational activities to control odor, sediment, storm water, and erosion.

No malodors are expected. Storm water runoff from these piles and processing operations is controlled by a vegetative cover and silt fence~~is expected to be equivalent to runoff associated from standard raw material processing piles at the site and is covered by an existing RIPDES General Permit~~. Spent foundry sand is controlled using Best Management Practices (BMPs) such as utilizing filter socks/berms, vegetative cover, and silt fences.

7. Address why the proposed recycling of spent foundry sand is not merely an alternate method of disposal.

The proposed recycling is not another method of disposal because most of the material that comprises the spent foundry sand stockpile will be made into a saleable product.

8. Describe the processing involved to recycle/reuse spent foundry sand and provide data which supports that mixing of different types of material improves the usefulness of the recycled spent foundry sand.

The spent foundry sand requires minimal processing and may be mixed with other materials to be used as fill for grading/shaping or pipe bedding.

9. The reuse of spent foundry sand as a "manufactured soil product" (*i.e.: solid waste that is or has been altered or rendered into a material with soil type properties*) will be compliant with the Residential Direct Exposure Criteria for soils listed in Rule 8.02 of the *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases*, the Compost Quality and Distribution Standards listed in Rule 8.8.00 (Compost Product Requirements and Distribution) of the Solid Waste Regulations, and will not degrade the environment.

a. Is compliant with the Residential Direct Exposure Criteria for soils listed in Rule 8.02 of the *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases*.

It is important to note that the new sand added is blended into the already used sand. Once mixed, there is no "new sand" or "old sand". The only sand removed is an amount that keeps the system from overflowing. It is excess sand, not new sand, or old sand. The results of sampling/testing have indicated the buildup of metals in the reused, or excess sand, is negligible. Concentrations of samples of the material submitted for *Remediation Regulations*, *Table 1 Direct Exposure Criteria* for soil were less than respective residential limits. A comparison summary table is presented in **Appendix A**. Laboratory analytical reports are presented in **Appendix ~~C~~E**.

b. Is compliant with the Compost Quality and Distribution Standards listed in Rule 8.8.00 (Compost Product Requirements and Distribution) of the Solid Waste Regulations.; and

Sampling is discussed in Section 11 and the Sampling and Analysis Plan (SAP) presented in **Appendix ~~D~~F**.

c. Will not result in degradation of the environment.

Recycling and reuse of spent foundry sand will not degrade the environment.

10. Address whether the spent foundry sand will be used in a land application. If so, relevant engineering standards and controls will be implemented in accordance with the Solid Waste Regulations. The controls may include final cover, leachate collection and removal, and gas control and recovery systems.

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The beneficial reuse of the excess foundry sand product will be utilized as agriculture blending of foundry sand with loam, geo-technical fill, flowable fill, pipe bedding, concrete septic and pipes, construction materials, and general fill applications.

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These are beneficial reuses that have already been granted to iron foundries in many states across the country. A copy of an Ohio Environmental Protection Agency (OEPA) *GENERAL PERMIT AUTHORIZATION TO BENEFICIALLY USE FOUNDRY SAND FROM, IRON, STEEL AND ALUMINUM FOUNDRIES FOR ROAD CONSTRUCTION SUB-BASE, AS A COMPONENT IN STRUCTURAL FILL, AND AS PIPE BEDDING* is included in **Appendix G**.

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According to a United States Environmental Protection Agency (USEPA) study, *Beneficial Reuse of Foundry Sand: A Review of State Practices and Regulations* (December 2002), state support to streamline the approval process can increase sand reuse while protecting against potential environmental impacts.

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Authorization to beneficially reuse excess foundry sand would give the facility tremendous financial relief from the ever-rising costs to dispose of a product that could be beneficially reused by many useful industries at a much lower cost to them while at the same time preserving finite limited capacity in landfills.
~~The materials will be processed into land application products which are not related to disposal. The spent foundry sand will be purposefully processed into soil products to use for land grading/shaping or pipe bedding, which will be sold to consumers.~~

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11. A waste characterization plan will include the following protocols for sample collection and analyses, which will provide a representative assessment of the waste material.

a. Sample methodology (i.e. locations, times, frequency per volume etc.).

The spent foundry sand has been sampled and submitted for analysis of *Remediation Regulations*, *Table 1 Direct Exposure Criteria* for soil. No concentrations of the spent foundry sand exceeded residential limits (**Appendix ~~A~~B**). The spent foundry sand is a relatively homogenous material. Therefore, additional sample collection is not warranted unless material characteristics change.

b. Sample type (i.e., discrete, grab, composite, etc.).

Composite samples of the spent foundry sand were collected.

c. Analytical methods used to identify potential contaminants of concern (COCs).

The following analytical methods were used to identify potential contaminants of concern (COCs):

8260B 8270D

8081A	8082A
6010B	7471A
7196A	9012A
Moisture	3050B
3060A	3540C
5030A	7471A
9012A	

d. Physical/chemical analyses (i.e. size, density, percent solids, liquid content, pH, reactivity, leachability [TCLP test], etc.).

The percent solids of the spent foundry sand ranged from 97.1% to 97.3%. Leachability tests are not considered to be necessary for applications such as fill for grading/shaping or pipe bedding.

e. Biological properties analyses (i.e. pathogens).

Pathogens tests are not necessary for applications such as fill for grading/shaping or pipe bedding.

f. Substance variability.

The spent foundry sand is a homogenous, clean, grey-black, fine (80 AFS grain fineness) material.

g. Grab and/or composite samples which will be collected/analyzed ~~in order to~~to adequately assess the physical, chemical, and biological properties of the waste.

Three composite samples of the spent foundry sand were collected.

h. Potential human health and ecological risks assessment.

The spent foundry sand has been sampled and submitted for analysis of *Remediation Regulations*, *Table 1 Direct Exposure Criteria* for soil. No concentrations of the spent foundry sand exceeded residential limits (**Appendix ~~A~~B**).

i. Verification sampling and analysis plan, which will include a comprehensive written report identifying the concentration/distribution of COCs.

The Sampling and Analysis Plan used to collect the spent foundry sand samples is included in **Appendix ~~D~~F**.

12. Parties involved in the storage/handling/processing/use of spent foundry sand shall be required to provide financial assurance that the BUD project will be completed, and unused spent foundry sand will be properly used and disposed.

Cumberland Foundry is a well-established company and will properly dispose of unusable materials and, remaining materials proper disposal is the sole responsibility of Cumberland Foundry should project operations cease.

- Landfill $50.00 tipping fees
- Hauling $150 per container (20 cubic yards)
- Loading: $100 per hour for 2 hours per week

13. At the discretion of the DEM, additional information will be provided if required.

Please contact Cumberland Foundry if additional information is required.

14. All parties will certify the spent foundry sand processing and use facilities are not subject to actual or potential state/federal statutory/regulatory environmental violations. Also, all parties will certify if actual or potential violations exist, the processing of the waste or its use are not part of a DEM approved final settlement or remedy.

Cumberland Foundry certifies the spent foundry sand processing and use facilities are not subject to actual or potential state/federal statutory/regulatory environmental violations. Also, Cumberland Foundry certifies no actual or potential violations exist, and the processing of the spent foundry sand or its use are not part of a DEM approved final settlement or remedy.

APPENDIX A

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 Promenade Street, Providence, Rhode Island 02908

RI POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES)
NO EXPOSURE CERTIFICATION (NEC)
FOR STORMWATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY UNDER THE RIPDES MULTI-SECTOR GENERAL PERMIT

Exclusion Information

Master Permit Number: RIRNE0000

RIPDES ID: RIRNE0350

Submission of this No Exposure Certification constitutes notice that the operator identified in Operator Information of this form does not require permit authorization under RIDEMs Stormwater Multi Sector General Permit for its stormwater discharges associated with industrial activity from the facility identified in Facility Information section due to the existence of a condition of no exposure.

Select the purpose for filling out this form:

☑ To obtain a new No Exposure Certification

Eligibility Information

State/territory where your facility is located: RI

Is your facility located on federally recognized Indian Country lands? No

Which type of form would you like to submit? No Exposure Certification (NEC)

By indicating "Yes" below, I understand that I am obligated to re-certify the no exposure status in accordance to RIPDES requirements, and, if requested, to the operator of the local municipal separate storm sewer system (MS4) into which the facility discharges (where applicable). I understand that I must allow the RIPDES permitting authority, or MS4 operator where the discharge is into the local MS4, to perform inspections to confirm the condition of no exposure and to make such inspection reports publicly available upon request. I understand that I must obtain coverage under a RIPDES permit prior to any point source discharges associated with industrial activity from the facility.

Yes

Have industrial stormwater discharges from your facility been covered previously under a RIPDES permit? Yes

→ **If yes, provide your most current RIPDES ID if you had coverage under RIDEM's MSGP or the RIPDES permit number if you had coverage under a RIDEM individual permit.**
RIR50F003

Has your facility previously been covered by a No Exposure exclusion? No

Has your facility previously been covered by a No Discharge exclusion? No

Operator Information

Operator Information

Operator: Thomas Lucchetti

Operator Mailing Address

Address Line 1: 310 West Wrentham Rd

Address Line 2:

City: Cumberland

ZIP/Postal Code: 02864

State: RI

Operator Point of Contact Information

First Name Middle Initial Last Name: Thomas J Lucchetti

Title: President

Phone: 401-658-3300

Ext.:

Email: tlucchetti@cumberlandfoundry.com

Please wait...

Facility Information

Facility Information

Facility Name: Cumberland Foundry Co., Inc.

Facility Address

Address Line 1: 310 West Wrentham Rd

Address Line 2:

City: Cumberland

ZIP/Postal Code: 02864

State: RI

Latitude/Longitude for the facility

Latitude/Longitude: 42.010382°N, 71.447034°W

Latitude/Longitude Data Source: Map

Horizontal Reference Datum: WGS 84

Other Facility Information

Identify the 4-digit Standard Industrial Classification code or 2-letter Activity Code that best represents the products produced or services rendered for which your facility is primarily engaged, as defined in MSGP.

Primary Regulated SIC Code:	OR	Primary Regulated Activity Code:
		AD1

Tarpaulins Information

Do you make use of tarpaulins to protect materials or products stored outdoors from exposure to stormwater? No

Have any spills and/or chronic leaks of significant materials occurred at the facility in the three years prior to the submission of the No Exposure Certification? No

Exposure Checklist

For your facility, are any of the following materials or activities exposed to precipitation, now or in the foreseeable future?

- **Using, storing or cleaning industrial machinery or equipment, and areas where residuals from using, storing or cleaning industrial machinery or equipment remain and are exposed to stormwater:** No
- **Materials or residuals on the ground or in stormwater inlets from spills/leaks:** No
- **Materials or products from past industrial activity:** No
- **Material handling equipment (except adequately maintained vehicles):** No
- **Materials or products during loading/unloading or transporting activities:** No
- **Materials or products stored outdoors (except final products intended for outside use [e.g., new cars] where exposure to stormwater does not result in the discharge of pollutants):** No
- **Materials contained in open, deteriorated or leaking storage drums, barrels, tanks, and similar containers:** No
- **Materials or products handled/stored on roads or railways owned or maintained by the discharger:** No
- **Waste material (except waste in covered, non-leaking containers [e.g., dumpsters]):** No
- **Application or disposal of process wastewater (unless otherwise permitted):** No
- **Particulate matter or visible deposits of residuals from roof stacks and/or vents not otherwise regulated (i.e., under an air quality control permit) and evident in the stormwater outflow:** No

Certification Information

I certify under penalty of law that I have read and understand the eligibility requirements for claiming a condition of "no exposure" and obtaining an exclusion from RIPDES stormwater permitting.

I understand that I am obligated to re-certify the no exposure status in accordance with the RIPDES requirements and, if requested, to the operator of the local municipal separate storm sewer system (MS4) into which the facility discharges (where applicable). I understand that I must allow the RIPDES permitting authority, or MS4 operator where the discharge is into the local MS4, to perform inspections to confirm the condition of no exposure and to make such inspection reports publicly available upon request. I understand that I must obtain coverage under a RIPDES permit prior to any point source discharges of stormwater associated with industrial activity from the facility.

Additionally, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Signing an electronic document on behalf of another person is subject to criminal, civil, administrative, or other lawful action.

Certified By: Thomas J. Lucchetti

Certifier Title: President

Certifier Email: tlucchetti@cumberlandfoundry.com

Certified On: 06/17/2020 11:08 AM ET

APPENDIX B

Cumberland Foundry
Results Comparison

Parameter	Exposure Criteria Residential[1] (mg/kg[2])	Exposure Criteria Industrial / Commercial[1] (mg/kg)	CF-FSP-01 10/10/2019 (mg/kg)	CF-FSP-02 10/10/2019 (mg/kg)	CF-FSP-03 10/10/2019 (mg/kg)
Volatile Organic Compounds (VOCs)					
1,1,1-Trichloroethane	5.40E+02	1.00E+04	<0.0051	<0.0046	<0.005
1,1,2,2-Tetrachloroethane	1.30E+00	2.90E+01	<0.0051	<0.0046	<0.005
1,1,2-Trichloroethane	3.60E+00	1.00E+02	<0.0051	<0.0046	<0.005
1,1-Dichloroethane	9.20E+02	1.00E+04	<0.0051	<0.0046	<0.005
1,1-Dichloroethene	2.00E-01	9.50E+00	<0.0051	<0.0046	<0.005
1,2,4-Trichlorobenzene	9.60E+01	1.00E+04	<0.0051	<0.0046	<0.005
1,2-Dibromo-3-Chloropropane	5.00E-01	4.10E+00	<0.01	<0.0091	<0.01
1,2-Dichlorobenzene	5.10E+02	1.00E+04	<0.0051	<0.0046	<0.005
1,2-Dichloroethane	9.00E-01	6.30E+01	<0.0051	<0.0046	<0.005
1,2-Dichloropropane	1.90E+00	8.40E+01	<0.0051	<0.0046	<0.005
1,3-Dichlorobenzene	4.30E+02	1.00E+04	<0.0051	<0.0046	<0.005
1,4-Dichlorobenzene	2.70E+01	2.40E+02	<0.0051	<0.0046	<0.005
2-Butanone (MEK)	1.00E+04	1.00E+04	<0.02	<0.018	<0.02
4-Methyl-2-pentanone (MIBK)	1.20E+03	1.00E+04	<0.02	<0.018	<0.02
Acetone	7.80E+03	1.00E+04	<0.025	<0.023	<0.025
Benzene	2.50E+00	2.00E+02	<0.0051	<0.0046	<0.005
Bromoform	8.10E+01	7.20E+02	<0.0051	<0.0046	<0.005
Bromomethane	8.00E-01	2.90E+03	<0.0051	<0.0046	<0.005
Carbon tetrachloride	1.50E+00	4.40E+01	<0.0051	<0.0046	<0.005
Chlorobenzene	2.10E+02	1.00E+04	<0.0051	<0.0046	<0.005
Chloroform	1.20E+00	9.40E+02	<0.0051	<0.0046	<0.005
cis-1,2-Dichloroethene	6.30E+02	1.00E+04	<0.0051	<0.0046	<0.005
Ethylbenzene	7.10E+01	1.00E+04	<0.0051	<0.0046	<0.005
Ethylene Dibromide	1.00E-02	7.00E-02	<0.0051	<0.0046	<0.005
Isopropylbenzene	2.70E+01	1.00E+04	<0.0051	<0.0046	<0.005
Methyl tert-butyl ether	3.90E+02	1.00E+04	<0.0051	<0.0046	<0.005
Methylene Chloride	4.50E+01	7.60E+02	**0.047**	**0.046**	**0.037**
Styrene	1.30E+01	1.90E+02	<0.0051	<0.0046	<0.005
Tetrachloroethene	1.20E+01	1.10E+02	<0.0051	<0.0046	<0.005
Toluene	1.90E+02	1.00E+04	**0.0013 J**	**0.00096 J**	**0.00099 J**
trans-1,2-Dichloroethene	1.10E+03	1.00E+04	<0.0051	<0.0046	<0.005
Trichloroethene	1.30E+01	5.20E+02	<0.0051	<0.0046	<0.005
Vinyl chloride	2.00E-02	3.00E+00	<0.0051	<0.0046	<0.005
Xylenes, Total	1.10E+02	1.00E+04	<0.01	<0.0091	<0.01
Semi-Volatile Organic Compounds (SVOCs)					
1,1'-Biphenyl	8.00E-01	1.00E+04	**0.11**	**0.091**	**0.099**
2,4,5-Trichlorophenol	3.30E+02	1.00E+04	<0.15	<0.15	<0.15
2,4,6-Trichlorophenol	5.80E+01	5.20E+02	<0.15	<0.15	<0.15
2,4-Dichlorophenol	3.00E+01	6.10E+03	<0.15	<0.15	<0.15
2,4-Dimethylphenol	1.40E+03	1.00E+04	**0.051 J**	**0.043 J**	**0.051 J**
2,4-Dinitrophenol	1.60E+02	4.10E+03	<0.33	<0.34	<0.34
2,4-Dinitrotoluene	9.00E-01	8.40E+00	<0.2	<0.21	<0.2

Cumberland Foundry
Results Comparison

Parameter	Exposure Criteria Residential[1] (mg/kg[2])	Exposure Criteria Industrial / Commercial[1] (mg/kg)	CF-FSP-01 10/10/2019 (mg/kg)	CF-FSP-02 10/10/2019 (mg/kg)	CF-FSP-03 10/10/2019 (mg/kg)
Semi-Volatile Organic Compounds (SVOCs)					
2-Chlorophenol	5.00E+01	1.00E+04	<0.051	<0.051	<0.051
2-Methylnaphthalene	1.23E+02	1.00E+04	**0.53**	**0.47**	**0.49**
3,3'-Dichlorobenzidine	1.40E+00	1.30E+01	<0.1	<0.1	<0.1
4-Chloroaniline	3.10E+02	8.20E+03	<0.15	<0.15	<0.15
Acenaphthene	4.30E+01	1.00E+04	**0.022**	**0.011 J**	**0.012 J**
Acenaphthylene	2.30E+01	1.00E+04	**0.011 J**	**0.0098 J**	**0.011 J**
Anthracene	3.50E+01	1.00E+04	**0.032**	**0.035**	**0.033**
Benzo[a]anthracene	9.00E-01	7.80E+00	**0.033**	**0.031**	**0.033**
Benzo[a]pyrene	4.00E-01	8.00E-01	**0.025**	**0.022**	**0.024**
Benzo[b]fluoranthene	9.00E-01	7.80E+00	**0.042**	**0.036**	**0.040**
Benzo[g,h,i]perylene	8.00E-01	1.00E+04	**0.034**	**0.032**	**0.033**
Benzo[k]fluoranthene	9.00E-01	7.80E+01	<0.015	<0.015	<0.015
bis (2-chloroisopropyl) ether	9.10E+00	8.20E+01	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether	6.00E-01	5.20E+00	<0.1	<0.1	<0.1
Bis(2-ethylhexyl) phthalate	4.60E+01	4.10E+02	**0.059 J**	<0.072	**0.061 J**
Chrysene	4.00E-01	7.80E+02	**0.038**	**0.038**	**0.042**
Dibenz(a,h)anthracene	4.00E-01	8.00E-01	<0.051	<0.015	<0.015
Diethyl phthalate	3.40E+02	1.00E+04	<0.071	<0.072	<0.072
Dimethyl phthalate	1.90E+03	1.00E+04	<0.071	<0.072	<0.072
Fluoranthene	2.00E+01	1.00E+04	**0.043**	**0.040**	**0.044**
Fluorene	2.80E+01	1.00E+04	**0.033**	**0.026**	**0.031**
Hexachlorobenzene	4.00E-01	3.60E+00	<0.015	<0.015	<0.015
Hexachlorobutadiene	8.20E+00	7.30E+01	<0.051	<0.051	<0.051
Hexachloroethane	4.60E+01	4.10E+02	<0.051	<0.051	<0.051
Indeno[1,2,3-cd]pyrene	9.00E-01	7.80E+00	**0.0089 J**	**0.0089 J**	**0.0094 J**
Naphthalene	5.40E+01	1.00E+04	**0.84**	**0.77**	**0.77**
Pentachlorophenol	5.30E+00	4.80E+01	<0.15	<0.15	<0.15
Phenanthrene	4.00E+01	1.00E+04	**0.24**	**0.22**	**0.24**
Phenol	6.00E+03	1.00E+04	**0.89**	**0.70**	**0.84**
Pyrene	1.30E+01	1.00E+04	**0.051**	**0.045**	**0.050**
Pesticides					
cis-Chlordane[3]	5.00E-01	4.40E+00	<0.0049	<0.0052	<0.005
Dieldrin	4.00E-02	4.00E-01	<0.0049	<0.0052	<0.005
trans-Chlordane[3]	5.00E-01	4.40E+00	<0.0049	<0.0052	<0.005
Polychlorinated Biphenyls (PCBs)					
Aroclor-1016	1.00E+01	1.00E+01	<0.049	<0.052	<0.05
Aroclor-1221	1.00E+01	1.00E+01	<0.049	<0.052	<0.05
Aroclor-1232	1.00E+01	1.00E+01	<0.049	<0.052	<0.05
Aroclor-1242	1.00E+01	1.00E+01	<0.049	<0.052	<0.05
Aroclor-1248	1.00E+01	1.00E+01	<0.049	<0.052	<0.05
Aroclor-1254	1.00E+01	1.00E+01	<0.049	<0.052	<0.05
Aroclor-1260	1.00E+01	1.00E+01	<0.049	<0.052	<0.05

Cumberland Foundry
Results Comparison

Parameter	Exposure Criteria Residential[1] (mg/kg[2])	Exposure Criteria Industrial / Commercial[1] (mg/kg)	CF-FSP-01 10/10/2019 (mg/kg)	CF-FSP-02 10/10/2019 (mg/kg)	CF-FSP-03 10/10/2019 (mg/kg)
Metals					
Antimony	1.00E+01	8.20E+02	<0.98	<0.96	<0.9
Arsenic	7.00E+00	7.00E+00	**2.2**	**2.7**	**2.4**
Barium	5.50E+03	1.00E+04	**18 J**	**20**	**20**
Beryllium	1.50E+00	1.50E+00	**0.24 J**	**0.25 J**	**0.28 J**
Cadmium	3.90E+01	1.00E+03	**0.066 J**	**0.055 J**	<0.18
Chromium, hexavalent	3.90E+02	1.00E+04	<0.82	<0.82	<0.82
Chromium, trivalent	1.40E+03	1.00E+04	**5.6**	**4.6**	**5.1**
Copper	3.10E+03	1.00E+04	**6.3**	**6.7**	**7.4**
Cyanide, Total	2.00E+02	1.00E+04	<0.49	<0.54	<0.51
Lead	1.50E+02	5.00E+02	**4.7**	**4.8**	**4.8**
Manganese	3.90E+02	1.00E+04	**160**	**170**	**170**
Mercury	2.30E+01	6.10E+02	<0.11	<0.093	<0.11
Nickel	1.00E+03	1.00E+04	**5.5**	**6.1**	**6.1**
Selenium	3.90E+02	1.00E+04	<1.5	<1.4	<1.4
Silver	2.00E+02	1.00E+04	<0.49	<0.48	<0.45
Thallium	5.50E+00	1.40E+02	<0.98	<0.96	<0.9
Vanadium	5.50E+02	1.00E+04	**3.7 J**	**3.9 J**	**4.5**
Zinc	6.00E+03	1.00E+04	**20**	**18**	**18**

1. State of Rhode Island and Providence Plantations Department of Environmental Management: Remediation Regulations, Table 1 Exposure Criteria, Amended November 2011.
2. Milligrams per kilogram
3. The Table 1 Exposure Criteria for chlordane is used for comparison purposes.

APPENDIX C

0 100 200 400 Feet

Revision	Date:	By:	Description:
	7/24/20	LMS	Site Plan

ENVi Environmental,LLC

Environmental Consulting Services

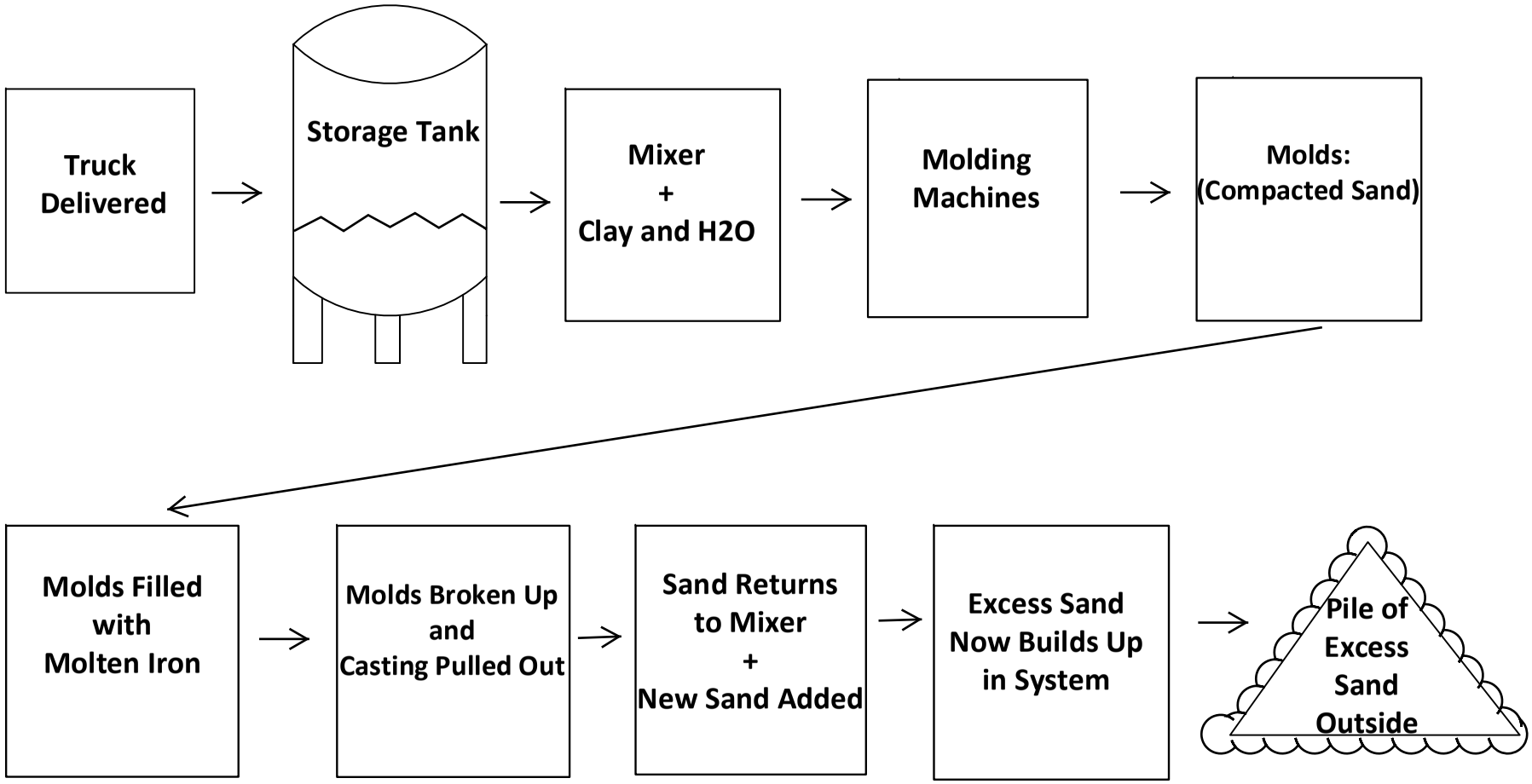
10247 Dewhurst, Suite 102 Elyria, Ohio 44035

Prepared For:

Cumberland Foundry
310 West Wrentham Road
Cumberland, RI 02864

APPENDIX D

Cumberland Foundry Co., Inc.
Process Flow Diagram



APPENDIX E

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

Laboratory Job ID: 240-120732-1
Client Project/Site: Cumberland Foundry
Revision: 2

For:
ENVi Environmental, LLC
6415 Granger Road
Independence, Ohio 44131

Attn: Brandon Smith

Authorized for release by:
1/16/2020 3:11:36 PM

Debbie Olszowka, Project Manager II
(513)733-5700
debbie.olszowka@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 240-120732-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

Job Narrative
240-120732-1

Revised Report
1,1,1,2-Tetrechloroethane was added to the volatiles list on all samples.

Receipt
The samples were received on 10/17/2019 4:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.6º C.

GC/MS VOA
Method 8260B: These jars were taken off a shelf in the sample receiving refrigerator, if they were opened in another part of the lab they could have been contaminated: CF-FSP-01 (240-120732-1), CF-FSP-02 (240-120732-2) and CF-FSP-03 (240-120732-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270D: The continuing calibration verification (CCV) associated with batch 240-407667 recovered above the upper control limit for 2,4-Dinitrophenol, 2-Nitroaniline, 2-Nitrophenol, 4,6-Dinitro-2-methylphenol, 4-Nitroaniline, Hexachlorocyclopentadiene, 2,6-Dinitrotoluene and 2,4-Dinitrotoluene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: CF-FSP-01 (240-120732-1), CF-FSP-02 (240-120732-2) and CF-FSP-03 (240-120732-3).

Method 8270D: Samples CF-FSP-01 (240-120732-1), CF-FSP-02 (240-120732-2) and CF-FSP-03 (240-120732-3) have reporting limit for the analyte 2-Nitrophenol not supported by the low point of the initial calibration. The RL, however, is greater than the method detection limit for this compound; therefore, the results have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method 8081A: The continuing calibration verification (CCV) associated with batch 240-408541 recovered above the upper control limit for cis-Chlordane. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported. The following samples are impacted: CF-FSP-01 (240-120732-1), CF-FSP-02 (240-120732-2) and CF-FSP-03 (240-120732-3).

Method 8082A: The following samples required a copper clean-up to reduce matrix interferences caused by sulfur: CF-FSP-01 (240-120732-1), CF-FSP-02 (240-120732-2) and CF-FSP-03 (240-120732-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Sample Summary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120732-1	CF-FSP-01	Solid	10/10/19 10:00	10/17/19 16:30	
240-120732-2	CF-FSP-02	Solid	10/10/19 10:25	10/17/19 16:30	
240-120732-3	CF-FSP-03	Solid	10/10/19 10:50	10/17/19 16:30	

Detection Summary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-01 — Lab Sample ID: 240-120732-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.047		0.025	0.012	mg/Kg	1	☼	8260B	Total/NA
Toluene	0.0013	J	0.0051	0.00078	mg/Kg	1	☼	8260B	Total/NA
Acenaphthene	0.022		0.015	0.0029	mg/Kg	1	☼	8270D	Total/NA
Acenaphthylene	0.011	J	0.015	0.0041	mg/Kg	1	☼	8270D	Total/NA
Anthracene	0.032		0.015	0.0024	mg/Kg	1	☼	8270D	Total/NA
Benzo[a]anthracene	0.033		0.015	0.0035	mg/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	0.025		0.015	0.0095	mg/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	0.042		0.015	0.0066	mg/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	0.034		0.015	0.0072	mg/Kg	1	☼	8270D	Total/NA
1,1'-Biphenyl	0.11		0.051	0.017	mg/Kg	1	☼	8270D	Total/NA
Bis(2-ethylhexyl) phthalate	0.059	J	0.071	0.052	mg/Kg	1	☼	8270D	Total/NA
Chrysene	0.038		0.015	0.0015	mg/Kg	1	☼	8270D	Total/NA
2,4-Dimethylphenol	0.051	J	0.15	0.041	mg/Kg	1	☼	8270D	Total/NA
Fluoranthene	0.043		0.015	0.0045	mg/Kg	1	☼	8270D	Total/NA
Fluorene	0.033		0.015	0.0028	mg/Kg	1	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	0.0089	J	0.015	0.0075	mg/Kg	1	☼	8270D	Total/NA
2-Methylnaphthalene	0.53		0.015	0.0020	mg/Kg	1	☼	8270D	Total/NA
Naphthalene	0.84		0.015	0.0024	mg/Kg	1	☼	8270D	Total/NA
Phenanthrene	0.24		0.015	0.0023	mg/Kg	1	☼	8270D	Total/NA
Phenol	0.89		0.051	0.0081	mg/Kg	1	☼	8270D	Total/NA
Pyrene	0.051		0.015	0.0022	mg/Kg	1	☼	8270D	Total/NA
Arsenic	2.2		0.98	0.31	mg/Kg	1	☼	6010B	Total/NA
Barium	18	J	20	0.35	mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.24	J	0.49	0.053	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.066	J	0.20	0.047	mg/Kg	1	☼	6010B	Total/NA
Chromium	5.6		0.49	0.15	mg/Kg	1	☼	6010B	Total/NA
Copper	6.3		2.4	0.23	mg/Kg	1	☼	6010B	Total/NA
Lead	4.7		0.98	0.28	mg/Kg	1	☼	6010B	Total/NA
Manganese	160		1.5	0.30	mg/Kg	1	☼	6010B	Total/NA
Nickel	5.5		3.9	0.23	mg/Kg	1	☼	6010B	Total/NA
Vanadium	3.7	J	4.9	0.81	mg/Kg	1	☼	6010B	Total/NA
Zinc	20		4.9	1.3	mg/Kg	1	☼	6010B	Total/NA
Chromium, trivalent	5.6		2.0	0.13	mg/Kg	1		7196A	Total/NA

Client Sample ID: CF-FSP-02 — Lab Sample ID: 240-120732-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.046		0.023	0.011	mg/Kg	1	☼	8260B	Total/NA
Toluene	0.00096	J	0.0046	0.00070	mg/Kg	1	☼	8260B	Total/NA
Acenaphthene	0.011	J	0.015	0.0029	mg/Kg	1	☼	8270D	Total/NA
Acenaphthylene	0.0098	J	0.015	0.0041	mg/Kg	1	☼	8270D	Total/NA
Anthracene	0.035		0.015	0.0025	mg/Kg	1	☼	8270D	Total/NA
Benzo[a]anthracene	0.031		0.015	0.0035	mg/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	0.022		0.015	0.0096	mg/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	0.036		0.015	0.0067	mg/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	0.032		0.015	0.0073	mg/Kg	1	☼	8270D	Total/NA
1,1'-Biphenyl	0.091		0.051	0.017	mg/Kg	1	☼	8270D	Total/NA
Chrysene	0.038		0.015	0.0015	mg/Kg	1	☼	8270D	Total/NA
2,4-Dimethylphenol	0.043	J	0.15	0.041	mg/Kg	1	☼	8270D	Total/NA
Fluoranthene	0.040		0.015	0.0046	mg/Kg	1	☼	8270D	Total/NA
Fluorene	0.026		0.015	0.0028	mg/Kg	1	☼	8270D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: CF-FSP-02 (Continued) — Lab Sample ID: 240-120732-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Indeno[1,2,3-cd]pyrene	0.0089	J	0.015	0.0076	mg/Kg	1	☼	8270D	Total/NA
2-Methylnaphthalene	0.47		0.015	0.0020	mg/Kg	1	☼	8270D	Total/NA
Naphthalene	0.77		0.015	0.0025	mg/Kg	1	☼	8270D	Total/NA
Phenanthrene	0.22		0.015	0.0023	mg/Kg	1	☼	8270D	Total/NA
Phenol	0.70		0.051	0.0082	mg/Kg	1	☼	8270D	Total/NA
Pyrene	0.045		0.015	0.0022	mg/Kg	1	☼	8270D	Total/NA
Arsenic	2.7		0.96	0.30	mg/Kg	1	☼	6010B	Total/NA
Barium	20		19	0.35	mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.25	J	0.48	0.052	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.055	J	0.19	0.046	mg/Kg	1	☼	6010B	Total/NA
Chromium	4.6		0.48	0.15	mg/Kg	1	☼	6010B	Total/NA
Copper	6.7		2.4	0.23	mg/Kg	1	☼	6010B	Total/NA
Lead	4.8		0.96	0.27	mg/Kg	1	☼	6010B	Total/NA
Manganese	170		1.4	0.30	mg/Kg	1	☼	6010B	Total/NA
Nickel	6.1		3.8	0.22	mg/Kg	1	☼	6010B	Total/NA
Vanadium	3.9	J	4.8	0.79	mg/Kg	1	☼	6010B	Total/NA
Zinc	18		4.8	1.3	mg/Kg	1	☼	6010B	Total/NA
Chromium, trivalent	4.6		2.0	0.13	mg/Kg	1		7196A	Total/NA

Client Sample ID: CF-FSP-03 — Lab Sample ID: 240-120732-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.037		0.025	0.012	mg/Kg	1	☼	8260B	Total/NA
Toluene	0.00099	J	0.0050	0.00078	mg/Kg	1	☼	8260B	Total/NA
Acenaphthene	0.012	J	0.015	0.0029	mg/Kg	1	☼	8270D	Total/NA
Acenaphthylene	0.011	J	0.015	0.0041	mg/Kg	1	☼	8270D	Total/NA
Anthracene	0.033		0.015	0.0025	mg/Kg	1	☼	8270D	Total/NA
Benzo[a]anthracene	0.033		0.015	0.0035	mg/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	0.024		0.015	0.0096	mg/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	0.040		0.015	0.0067	mg/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	0.033		0.015	0.0073	mg/Kg	1	☼	8270D	Total/NA
1,1'-Biphenyl	0.099		0.051	0.017	mg/Kg	1	☼	8270D	Total/NA
Bis(2-ethylhexyl) phthalate	0.061	J	0.072	0.052	mg/Kg	1	☼	8270D	Total/NA
Chrysene	0.042		0.015	0.0015	mg/Kg	1	☼	8270D	Total/NA
2,4-Dimethylphenol	0.051	J	0.15	0.041	mg/Kg	1	☼	8270D	Total/NA
Fluoranthene	0.044		0.015	0.0046	mg/Kg	1	☼	8270D	Total/NA
Fluorene	0.031		0.015	0.0028	mg/Kg	1	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	0.0094	J	0.015	0.0075	mg/Kg	1	☼	8270D	Total/NA
2-Methylnaphthalene	0.49		0.015	0.0020	mg/Kg	1	☼	8270D	Total/NA
Naphthalene	0.77		0.015	0.0025	mg/Kg	1	☼	8270D	Total/NA
Phenanthrene	0.24		0.015	0.0023	mg/Kg	1	☼	8270D	Total/NA
Phenol	0.84		0.051	0.0082	mg/Kg	1	☼	8270D	Total/NA
Pyrene	0.050		0.015	0.0022	mg/Kg	1	☼	8270D	Total/NA
Arsenic	2.4		0.90	0.29	mg/Kg	1	☼	6010B	Total/NA
Barium	20		18	0.33	mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.28	J	0.45	0.049	mg/Kg	1	☼	6010B	Total/NA
Chromium	5.1		0.45	0.14	mg/Kg	1	☼	6010B	Total/NA
Copper	7.4		2.3	0.21	mg/Kg	1	☼	6010B	Total/NA
Lead	4.8		0.90	0.25	mg/Kg	1	☼	6010B	Total/NA
Manganese	170		1.4	0.28	mg/Kg	1	☼	6010B	Total/NA
Nickel	6.1		3.6	0.21	mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-03 (Continued)

Lab Sample ID: 240-120732-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vanadium	4.5		4.5	0.74	mg/Kg	1	☼	6010B	Total/NA
Zinc	18		4.5	1.2	mg/Kg	1	☼	6010B	Total/NA
Chromium, trivalent	5.1		2.0	0.13	mg/Kg	1		7196A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-01

Date Collected: 10/10/19 10:00
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-1

Matrix: Solid
Percent Solids: 97.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		0.025	0.021	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Benzene	ND		0.0051	0.00071	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Bromoform	ND		0.0051	0.0024	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Bromomethane	ND		0.0051	0.0010	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
2-Butanone (MEK)	ND		0.020	0.0036	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Carbon tetrachloride	ND		0.0051	0.0033	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Chlorobenzene	ND		0.0051	0.00093	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Chlorodibromomethane	ND		0.0051	0.0028	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Chloroform	ND		0.0051	0.00080	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
cis-1,2-Dichloroethene	ND		0.0051	0.00066	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,2-Dibromo-3-Chloropropane	ND		0.010	0.0036	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,2-Dichlorobenzene	ND		0.0051	0.0011	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,3-Dichlorobenzene	ND		0.0051	0.00082	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,4-Dichlorobenzene	ND		0.0051	0.00089	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Dichlorobromomethane	ND		0.0051	0.00069	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,1-Dichloroethane	ND		0.0051	0.00070	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,2-Dichloroethane	ND		0.0051	0.00078	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,1-Dichloroethene	ND		0.0051	0.00091	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,2-Dichloropropane	ND		0.0051	0.00086	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Ethylbenzene	ND		0.0051	0.0011	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Ethylene Dibromide	ND		0.0051	0.00078	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Isopropylbenzene	ND		0.0051	0.00084	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Methylene Chloride	**0.047**		0.025	0.012	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
4-Methyl-2-pentanone (MIBK)	ND		0.020	0.0038	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Methyl tert-butyl ether	ND		0.0051	0.00083	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Styrene	ND		0.0051	0.0012	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,1,2,2-Tetrachloroethane	ND		0.0051	0.0014	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,1,1,2-Tetrachloroethane	ND		0.0051	0.0030	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Tetrachloroethene	ND		0.0051	0.00074	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Toluene	**0.0013**	**J**	0.0051	0.00078	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
trans-1,2-Dichloroethene	ND		0.0051	0.00047	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,2,4-Trichlorobenzene	ND		0.0051	0.00058	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,1,1-Trichloroethane	ND		0.0051	0.00083	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
1,1,2-Trichloroethane	ND		0.0051	0.0011	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Trichloroethene	ND		0.0051	0.00064	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Vinyl chloride	ND		0.0051	0.00085	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1
Xylenes, Total	ND		0.010	0.0016	mg/Kg	☼	10/21/19 13:03	10/21/19 20:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*107*		*51 - 127*	*10/21/19 13:03*	*10/21/19 20:04*	*1*
Dibromofluoromethane (Surr)	*90*		*56 - 122*	*10/21/19 13:03*	*10/21/19 20:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*59 - 120*	*10/21/19 13:03*	*10/21/19 20:04*	*1*
Toluene-d8 (Surr)	*120*		*64 - 124*	*10/21/19 13:03*	*10/21/19 20:04*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.022**		0.015	0.0029	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Acenaphthylene	**0.011**	**J**	0.015	0.0041	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Anthracene	**0.032**		0.015	0.0024	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Benzo[a]anthracene	**0.033**		0.015	0.0035	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-01

Date Collected: 10/10/19 10:00
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-1

Matrix: Solid
Percent Solids: 97.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]pyrene	**0.025**		0.015	0.0095	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Benzo[b]fluoranthene	**0.042**		0.015	0.0066	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Benzo[g,h,i]perylene	**0.034**		0.015	0.0072	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Benzo[k]fluoranthene	ND		0.015	0.0070	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
1,1'-Biphenyl	**0.11**		0.051	0.017	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Bis(2-chloroethyl)ether	ND		0.10	0.012	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
bis (2-chloroisopropyl) ether	ND		0.10	0.010	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Bis(2-ethylhexyl) phthalate	**0.059**	**J**	0.071	0.052	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
4-Chloroaniline	ND		0.15	0.030	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2-Chlorophenol	ND		0.051	0.010	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Chrysene	**0.038**		0.015	0.0015	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Dibenz(a,h)anthracene	ND		0.015	0.0070	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
3,3'-Dichlorobenzidine	ND		0.10	0.044	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2,4-Dichlorophenol	ND		0.15	0.045	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Diethyl phthalate	ND		0.071	0.031	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2,4-Dimethylphenol	**0.051**	**J**	0.15	0.041	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Dimethyl phthalate	ND		0.071	0.014	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2,4-Dinitrophenol	ND		0.33	0.14	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2,4-Dinitrotoluene	ND		0.20	0.063	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Fluoranthene	**0.043**		0.015	0.0045	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Fluorene	**0.033**		0.015	0.0028	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Hexachlorobenzene	ND		0.015	0.0029	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Hexachlorobutadiene	ND		0.051	0.012	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Hexachloroethane	ND		0.051	0.0091	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Indeno[1,2,3-cd]pyrene	**0.0089**	**J**	0.015	0.0075	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2-Methylnaphthalene	**0.53**		0.015	0.0020	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Naphthalene	**0.84**		0.015	0.0024	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Pentachlorophenol	ND		0.15	0.059	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Phenanthrene	**0.24**		0.015	0.0023	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Phenol	**0.89**		0.051	0.0081	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
Pyrene	**0.051**		0.015	0.0022	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2,4,5-Trichlorophenol	ND		0.15	0.070	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1
2,4,6-Trichlorophenol	ND		0.15	0.065	mg/Kg	☼	10/22/19 09:39	10/26/19 19:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*81*		*35 - 120*	*10/22/19 09:39*	*10/26/19 19:35*	*1*
2-Fluorophenol (Surr)	*75*		*26 - 120*	*10/22/19 09:39*	*10/26/19 19:35*	*1*
Nitrobenzene-d5 (Surr)	*103*		*28 - 120*	*10/22/19 09:39*	*10/26/19 19:35*	*1*
Phenol-d5 (Surr)	*78*		*28 - 120*	*10/22/19 09:39*	*10/26/19 19:35*	*1*
Terphenyl-d14 (Surr)	*86*		*39 - 120*	*10/22/19 09:39*	*10/26/19 19:35*	*1*
2,4,6-Tribromophenol (Surr)	*65*		*10 - 120*	*10/22/19 09:39*	*10/26/19 19:35*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-Chlordane	ND		0.0049	0.0015	mg/Kg	☼	10/22/19 09:06	10/31/19 14:41	1
Dieldrin	ND		0.0049	0.0011	mg/Kg	☼	10/22/19 09:06	10/31/19 14:41	1
trans-Chlordane	ND		0.0049	0.0012	mg/Kg	☼	10/22/19 09:06	10/31/19 14:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*109*		*13 - 135*	*10/22/19 09:06*	*10/31/19 14:41*	*1*

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-01

Date Collected: 10/10/19 10:00
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-1

Matrix: Solid
Percent Solids: 97.2

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	76		13 - 135	10/22/19 09:06	10/31/19 14:41	1
Tetrachloro-m-xylene	94		30 - 120	10/22/19 09:06	10/31/19 14:41	1
Tetrachloro-m-xylene	57	p	30 - 120	10/22/19 09:06	10/31/19 14:41	1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		0.049	0.022	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1
Aroclor-1221	ND		0.049	0.024	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1
Aroclor-1232	ND		0.049	0.023	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1
Aroclor-1242	ND		0.049	0.019	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1
Aroclor-1248	ND		0.049	0.024	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1
Aroclor-1254	ND		0.049	0.023	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1
Aroclor-1260	ND		0.049	0.022	mg/Kg	☼	10/22/19 09:06	10/24/19 14:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	78		14 - 128	10/22/19 09:06	10/24/19 14:02	1
DCB Decachlorobiphenyl	103		10 - 132	10/22/19 09:06	10/24/19 14:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.98	0.35	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Arsenic	**2.2**		0.98	0.31	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Barium	**18**	**J**	20	0.35	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Beryllium	**0.24**	**J**	0.49	0.053	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Cadmium	**0.066**	**J**	0.20	0.047	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Chromium	**5.6**		0.49	0.15	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Copper	**6.3**		2.4	0.23	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Lead	**4.7**		0.98	0.28	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Manganese	**160**		1.5	0.30	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Nickel	**5.5**		3.9	0.23	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Selenium	ND		1.5	0.46	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Silver	ND		0.49	0.079	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Thallium	ND		0.98	0.39	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Vanadium	**3.7**	**J**	4.9	0.81	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1
Zinc	**20**		4.9	1.3	mg/Kg	☼	10/23/19 14:00	10/24/19 16:36	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.11	0.021	mg/Kg	☼	10/23/19 16:00	10/24/19 11:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.82	0.53	mg/Kg	☼	10/30/19 09:38	11/01/19 10:52	1
Chromium, trivalent	**5.6**		2.0	0.13	mg/Kg			11/03/19 17:49	1
Cyanide, Total	ND		0.49	0.19	mg/Kg	☼	10/22/19 08:22	10/22/19 14:24	1
Percent Solids	**97.2**		0.1	0.1	%			10/21/19 13:23	1

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-02

Date Collected: 10/10/19 10:25
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-2

Matrix: Solid
Percent Solids: 97.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		0.023	0.019	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Benzene	ND		0.0046	0.00064	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Bromoform	ND		0.0046	0.0022	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Bromomethane	ND		0.0046	0.00090	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
2-Butanone (MEK)	ND		0.018	0.0032	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Carbon tetrachloride	ND		0.0046	0.0030	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Chlorobenzene	ND		0.0046	0.00084	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Chlorodibromomethane	ND		0.0046	0.0025	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Chloroform	ND		0.0046	0.00072	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
cis-1,2-Dichloroethene	ND		0.0046	0.00059	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,2-Dibromo-3-Chloropropane	ND		0.0091	0.0033	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,2-Dichlorobenzene	ND		0.0046	0.0010	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,3-Dichlorobenzene	ND		0.0046	0.00074	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,4-Dichlorobenzene	ND		0.0046	0.00080	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Dichlorobromomethane	ND		0.0046	0.00062	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,1-Dichloroethane	ND		0.0046	0.00063	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,2-Dichloroethane	ND		0.0046	0.00070	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,1-Dichloroethene	ND		0.0046	0.00082	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,2-Dichloropropane	ND		0.0046	0.00078	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Ethylbenzene	ND		0.0046	0.00095	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Ethylene Dibromide	ND		0.0046	0.00070	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Isopropylbenzene	ND		0.0046	0.00076	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Methylene Chloride	**0.046**		0.023	0.011	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
4-Methyl-2-pentanone (MIBK)	ND		0.018	0.0034	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Methyl tert-butyl ether	ND		0.0046	0.00075	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Styrene	ND		0.0046	0.0011	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,1,2,2-Tetrachloroethane	ND		0.0046	0.0013	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,1,1,2-Tetrachloroethane	ND		0.0046	0.0027	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Tetrachloroethene	ND		0.0046	0.00067	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Toluene	**0.00096**	**J**	0.0046	0.00070	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
trans-1,2-Dichloroethene	ND		0.0046	0.00042	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,2,4-Trichlorobenzene	ND		0.0046	0.00052	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,1,1-Trichloroethane	ND		0.0046	0.00075	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
1,1,2-Trichloroethane	ND		0.0046	0.0010	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Trichloroethene	ND		0.0046	0.00058	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Vinyl chloride	ND		0.0046	0.00076	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1
Xylenes, Total	ND		0.0091	0.0014	mg/Kg	☼	10/21/19 13:03	10/21/19 20:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*51 - 127*	*10/21/19 13:03*	*10/21/19 20:30*	*1*
Dibromofluoromethane (Surr)	*84*		*56 - 122*	*10/21/19 13:03*	*10/21/19 20:30*	*1*
1,2-Dichloroethane-d4 (Surr)	*92*		*59 - 120*	*10/21/19 13:03*	*10/21/19 20:30*	*1*
Toluene-d8 (Surr)	*110*		*64 - 124*	*10/21/19 13:03*	*10/21/19 20:30*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.011**	**J**	0.015	0.0029	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Acenaphthylene	**0.0098**	**J**	0.015	0.0041	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Anthracene	**0.035**		0.015	0.0025	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Benzo[a]anthracene	**0.031**		0.015	0.0035	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-02

Date Collected: 10/10/19 10:25
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-2

Matrix: Solid
Percent Solids: 97.3

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]pyrene	**0.022**		0.015	0.0096	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Benzo[b]fluoranthene	**0.036**		0.015	0.0067	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Benzo[g,h,i]perylene	**0.032**		0.015	0.0073	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Benzo[k]fluoranthene	ND		0.015	0.0071	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
1,1'-Biphenyl	**0.091**		0.051	0.017	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Bis(2-chloroethyl)ether	ND		0.10	0.012	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
bis (2-chloroisopropyl) ether	ND		0.10	0.010	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Bis(2-ethylhexyl) phthalate	ND		0.072	0.052	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
4-Chloroaniline	ND		0.15	0.031	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2-Chlorophenol	ND		0.051	0.010	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Chrysene	**0.038**		0.015	0.0015	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Dibenz(a,h)anthracene	ND		0.015	0.0071	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
3,3'-Dichlorobenzidine	ND		0.10	0.044	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2,4-Dichlorophenol	ND		0.15	0.045	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Diethyl phthalate	ND		0.072	0.032	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2,4-Dimethylphenol	**0.043**	**J**	0.15	0.041	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Dimethyl phthalate	ND		0.072	0.014	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2,4-Dinitrophenol	ND		0.34	0.15	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2,4-Dinitrotoluene	ND		0.21	0.064	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Fluoranthene	**0.040**		0.015	0.0046	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Fluorene	**0.026**		0.015	0.0028	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Hexachlorobenzene	ND		0.015	0.0029	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Hexachlorobutadiene	ND		0.051	0.012	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Hexachloroethane	ND		0.051	0.0093	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Indeno[1,2,3-cd]pyrene	**0.0089**	**J**	0.015	0.0076	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2-Methylnaphthalene	**0.47**		0.015	0.0020	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Naphthalene	**0.77**		0.015	0.0025	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Pentachlorophenol	ND		0.15	0.060	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Phenanthrene	**0.22**		0.015	0.0023	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Phenol	**0.70**		0.051	0.0082	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
Pyrene	**0.045**		0.015	0.0022	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2,4,5-Trichlorophenol	ND		0.15	0.071	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1
2,4,6-Trichlorophenol	ND		0.15	0.066	mg/Kg	☼	10/22/19 09:39	10/26/19 19:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*72*		*35 - 120*	*10/22/19 09:39*	*10/26/19 19:58*	*1*
2-Fluorophenol (Surr)	*68*		*26 - 120*	*10/22/19 09:39*	*10/26/19 19:58*	*1*
Nitrobenzene-d5 (Surr)	*98*		*28 - 120*	*10/22/19 09:39*	*10/26/19 19:58*	*1*
Phenol-d5 (Surr)	*71*		*28 - 120*	*10/22/19 09:39*	*10/26/19 19:58*	*1*
Terphenyl-d14 (Surr)	*83*		*39 - 120*	*10/22/19 09:39*	*10/26/19 19:58*	*1*
2,4,6-Tribromophenol (Surr)	*66*		*10 - 120*	*10/22/19 09:39*	*10/26/19 19:58*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-Chlordane	ND		0.0052	0.0016	mg/Kg	☼	10/22/19 09:06	10/31/19 14:54	1
Dieldrin	ND		0.0052	0.0011	mg/Kg	☼	10/22/19 09:06	10/31/19 14:54	1
trans-Chlordane	ND		0.0052	0.0013	mg/Kg	☼	10/22/19 09:06	10/31/19 14:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*97*		*13 - 135*	*10/22/19 09:06*	*10/31/19 14:54*	*1*

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-02

Date Collected: 10/10/19 10:25
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-2

Matrix: Solid
Percent Solids: 97.3

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	72		13 - 135	10/22/19 09:06	10/31/19 14:54	1
Tetrachloro-m-xylene	109		30 - 120	10/22/19 09:06	10/31/19 14:54	1
Tetrachloro-m-xylene	50	p	30 - 120	10/22/19 09:06	10/31/19 14:54	1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		0.052	0.023	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1
Aroclor-1221	ND		0.052	0.025	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1
Aroclor-1232	ND		0.052	0.024	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1
Aroclor-1242	ND		0.052	0.020	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1
Aroclor-1248	ND		0.052	0.025	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1
Aroclor-1254	ND		0.052	0.024	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1
Aroclor-1260	ND		0.052	0.023	mg/Kg	☼	10/22/19 09:06	10/24/19 14:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	70		14 - 128	10/22/19 09:06	10/24/19 14:14	1
DCB Decachlorobiphenyl	95		10 - 132	10/22/19 09:06	10/24/19 14:14	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.96	0.34	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Arsenic	**2.7**		0.96	0.30	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Barium	**20**		19	0.35	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Beryllium	**0.25**	**J**	0.48	0.052	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Cadmium	**0.055**	**J**	0.19	0.046	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Chromium	**4.6**		0.48	0.15	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Copper	**6.7**		2.4	0.23	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Lead	**4.8**		0.96	0.27	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Manganese	**170**		1.4	0.30	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Nickel	**6.1**		3.8	0.22	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Selenium	ND		1.4	0.45	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Silver	ND		0.48	0.078	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Thallium	ND		0.96	0.38	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Vanadium	**3.9**	**J**	4.8	0.79	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1
Zinc	**18**		4.8	1.3	mg/Kg	☼	10/23/19 14:00	10/24/19 16:40	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.093	0.017	mg/Kg	☼	10/23/19 16:00	10/24/19 11:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.82	0.53	mg/Kg	☼	10/30/19 09:38	11/01/19 10:54	1
Chromium, trivalent	**4.6**		2.0	0.13	mg/Kg			11/03/19 17:49	1
Cyanide, Total	ND		0.54	0.20	mg/Kg	☼	10/22/19 08:22	10/22/19 14:26	1
Percent Solids	**97.3**		0.1	0.1	%			10/21/19 13:23	1

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-03

Date Collected: 10/10/19 10:50
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-3

Matrix: Solid
Percent Solids: 97.1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		0.025	0.021	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Benzene	ND		0.0050	0.00070	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Bromoform	ND		0.0050	0.0024	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Bromomethane	ND		0.0050	0.00099	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
2-Butanone (MEK)	ND		0.020	0.0036	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Carbon tetrachloride	ND		0.0050	0.0033	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Chlorobenzene	ND		0.0050	0.00092	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Chlorodibromomethane	ND		0.0050	0.0028	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Chloroform	ND		0.0050	0.00079	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
cis-1,2-Dichloroethene	ND		0.0050	0.00065	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,2-Dibromo-3-Chloropropane	ND		0.010	0.0036	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,2-Dichlorobenzene	ND		0.0050	0.0011	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,3-Dichlorobenzene	ND		0.0050	0.00082	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,4-Dichlorobenzene	ND		0.0050	0.00088	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Dichlorobromomethane	ND		0.0050	0.00068	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,1-Dichloroethane	ND		0.0050	0.00069	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,2-Dichloroethane	ND		0.0050	0.00077	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,1-Dichloroethene	ND		0.0050	0.00091	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,2-Dichloropropane	ND		0.0050	0.00085	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Ethylbenzene	ND		0.0050	0.0010	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Ethylene Dibromide	ND	F1	0.0050	0.00077	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Isopropylbenzene	ND		0.0050	0.00083	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Methylene Chloride	**0.037**		0.025	0.012	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
4-Methyl-2-pentanone (MIBK)	ND		0.020	0.0037	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Methyl tert-butyl ether	ND		0.0050	0.00082	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Styrene	ND		0.0050	0.0012	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,1,2,2-Tetrachloroethane	ND		0.0050	0.0014	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,1,1,2-Tetrachloroethane	ND		0.0050	0.0030	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Tetrachloroethene	ND		0.0050	0.00073	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Toluene	**0.00099**	**J**	0.0050	0.00078	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
trans-1,2-Dichloroethene	ND		0.0050	0.00047	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,2,4-Trichlorobenzene	ND	F1	0.0050	0.00057	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,1,1-Trichloroethane	ND		0.0050	0.00082	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
1,1,2-Trichloroethane	ND		0.0050	0.0011	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Trichloroethene	ND		0.0050	0.00063	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Vinyl chloride	ND		0.0050	0.00084	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1
Xylenes, Total	ND		0.010	0.0016	mg/Kg	☼	10/21/19 13:03	10/21/19 22:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*51 - 127*	*10/21/19 13:03*	*10/21/19 22:14*	*1*
Dibromofluoromethane (Surr)	*85*		*56 - 122*	*10/21/19 13:03*	*10/21/19 22:14*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*59 - 120*	*10/21/19 13:03*	*10/21/19 22:14*	*1*
Toluene-d8 (Surr)	*112*		*64 - 124*	*10/21/19 13:03*	*10/21/19 22:14*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.012**	**J**	0.015	0.0029	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Acenaphthylene	**0.011**	**J**	0.015	0.0041	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Anthracene	**0.033**		0.015	0.0025	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Benzo[a]anthracene	**0.033**		0.015	0.0035	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1

Client Sample ID: CF-FSP-03

Date Collected: 10/10/19 10:50
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-3

Matrix: Solid
Percent Solids: 97.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]pyrene	**0.024**		0.015	0.0096	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Benzo[b]fluoranthene	**0.040**		0.015	0.0067	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Benzo[g,h,i]perylene	**0.033**		0.015	0.0073	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Benzo[k]fluoranthene	ND		0.015	0.0071	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
1,1'-Biphenyl	**0.099**		0.051	0.017	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Bis(2-chloroethyl)ether	ND		0.10	0.012	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
bis (2-chloroisopropyl) ether	ND		0.10	0.010	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Bis(2-ethylhexyl) phthalate	**0.061**	**J**	0.072	0.052	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
4-Chloroaniline	ND		0.15	0.031	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2-Chlorophenol	ND		0.051	0.010	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Chrysene	**0.042**		0.015	0.0015	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Dibenz(a,h)anthracene	ND		0.015	0.0071	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
3,3'-Dichlorobenzidine	ND		0.10	0.044	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2,4-Dichlorophenol	ND		0.15	0.045	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Diethyl phthalate	ND		0.072	0.032	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2,4-Dimethylphenol	**0.051**	**J**	0.15	0.041	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Dimethyl phthalate	ND		0.072	0.014	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2,4-Dinitrophenol	ND		0.34	0.15	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2,4-Dinitrotoluene	ND		0.20	0.063	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Fluoranthene	**0.044**		0.015	0.0046	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Fluorene	**0.031**		0.015	0.0028	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Hexachlorobenzene	ND		0.015	0.0029	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Hexachlorobutadiene	ND		0.051	0.012	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Hexachloroethane	ND		0.051	0.0092	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Indeno[1,2,3-cd]pyrene	**0.0094**	**J**	0.015	0.0075	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2-Methylnaphthalene	**0.49**		0.015	0.0020	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Naphthalene	**0.77**		0.015	0.0025	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Pentachlorophenol	ND		0.15	0.059	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Phenanthrene	**0.24**		0.015	0.0023	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Phenol	**0.84**		0.051	0.0082	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
Pyrene	**0.050**		0.015	0.0022	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2,4,5-Trichlorophenol	ND		0.15	0.071	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1
2,4,6-Trichlorophenol	ND		0.15	0.066	mg/Kg	☼	10/22/19 09:39	10/26/19 20:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*77*		*35 - 120*	*10/22/19 09:39*	*10/26/19 20:21*	*1*
2-Fluorophenol (Surr)	*69*		*26 - 120*	*10/22/19 09:39*	*10/26/19 20:21*	*1*
Nitrobenzene-d5 (Surr)	*96*		*28 - 120*	*10/22/19 09:39*	*10/26/19 20:21*	*1*
Phenol-d5 (Surr)	*74*		*28 - 120*	*10/22/19 09:39*	*10/26/19 20:21*	*1*
Terphenyl-d14 (Surr)	*86*		*39 - 120*	*10/22/19 09:39*	*10/26/19 20:21*	*1*
2,4,6-Tribromophenol (Surr)	*71*		*10 - 120*	*10/22/19 09:39*	*10/26/19 20:21*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-Chlordane	ND		0.0050	0.0015	mg/Kg	☼	10/22/19 09:06	10/31/19 15:07	1
Dieldrin	ND		0.0050	0.0011	mg/Kg	☼	10/22/19 09:06	10/31/19 15:07	1
trans-Chlordane	ND		0.0050	0.0012	mg/Kg	☼	10/22/19 09:06	10/31/19 15:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*85*		*13 - 135*	*10/22/19 09:06*	*10/31/19 15:07*	*1*

Client Sample Results

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-03

Date Collected: 10/10/19 10:50
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-3

Matrix: Solid
Percent Solids: 97.1

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	72		13 - 135	10/22/19 09:06	10/31/19 15:07	1
Tetrachloro-m-xylene	105		30 - 120	10/22/19 09:06	10/31/19 15:07	1
Tetrachloro-m-xylene	50	p	30 - 120	10/22/19 09:06	10/31/19 15:07	1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		0.050	0.022	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1
Aroclor-1221	ND		0.050	0.024	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1
Aroclor-1232	ND		0.050	0.023	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1
Aroclor-1242	ND		0.050	0.019	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1
Aroclor-1248	ND		0.050	0.024	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1
Aroclor-1254	ND		0.050	0.023	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1
Aroclor-1260	ND		0.050	0.022	mg/Kg	☼	10/22/19 09:06	10/24/19 14:27	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	74		14 - 128	10/22/19 09:06	10/24/19 14:27	1
DCB Decachlorobiphenyl	100		10 - 132	10/22/19 09:06	10/24/19 14:27	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.90	0.32	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Arsenic	**2.4**		0.90	0.29	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Barium	**20**		18	0.33	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Beryllium	**0.28**	**J**	0.45	0.049	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Cadmium	ND		0.18	0.043	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Chromium	**5.1**		0.45	0.14	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Copper	**7.4**		2.3	0.21	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Lead	**4.8**		0.90	0.25	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Manganese	**170**		1.4	0.28	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Nickel	**6.1**		3.6	0.21	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Selenium	ND		1.4	0.42	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Silver	ND		0.45	0.073	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Thallium	ND		0.90	0.36	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Vanadium	**4.5**		4.5	0.74	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1
Zinc	**18**		4.5	1.2	mg/Kg	☼	10/23/19 14:00	10/24/19 16:52	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.11	0.021	mg/Kg	☼	10/23/19 16:00	10/24/19 11:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.82	0.54	mg/Kg	☼	10/30/19 09:38	11/01/19 10:56	1
Chromium, trivalent	**5.1**		2.0	0.13	mg/Kg			11/03/19 17:49	1
Cyanide, Total	ND		0.51	0.20	mg/Kg	☼	10/22/19 08:22	10/22/19 14:27	1
Percent Solids	**97.1**		0.1	0.1	%			10/21/19 13:23	1

Method Summary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8081A	Organochlorine Pesticides (GC)	SW846	TAL CAN
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL CAN
6010B	Metals (ICP)	SW846	TAL CAN
7471A	Mercury (CVAA)	SW846	TAL CAN
7196A	Chromium, Hexavalent	SW846	TAL CAN
7196A	Chromium, Trivalent (Colorimetric)	SW846	TAL CAN
9012A	Cyanide, Total and/or Amenable	SW846	TAL CAN
Moisture	Percent Moisture	EPA	TAL CAN
3050B	Preparation, Metals	SW846	TAL CAN
3060A	Alkaline Digestion (Chromium, Hexavalent)	SW846	TAL CAN
3540C	Soxhlet Extraction	SW846	TAL CAN
5030A	Purge and Trap	SW846	TAL CAN
7471A	Preparation, Mercury	SW846	TAL CAN
9012A	Cyanide, Total and/or Amenable, Distillation	SW846	TAL CAN

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MRL 240-406670/7
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	0.0100	0.0131		ng/uL		131	10 - 150
Benzene	0.00500	0.00429		ng/uL		86	10 - 150
Bromoform	0.00500	0.00334		ng/uL		67	10 - 150
Bromomethane	0.00500	0.00391		ng/uL		78	10 - 150
2-Butanone (MEK)	0.0100	0.00864	J	ng/uL		86	10 - 150
Carbon disulfide	0.00500	0.00372		ng/uL		74	10 - 150
Carbon tetrachloride	0.00500	0.00208		ng/uL		42	10 - 150
Chlorobenzene	0.00500	0.00457		ng/uL		91	10 - 150
Chlorodibromomethane	0.00500	0.00331		ng/uL		66	10 - 150
Chloroethane	0.00500	0.00401		ng/uL		80	10 - 150
Chloroform	0.00500	0.00391		ng/uL		78	10 - 150
Chloromethane	0.00500	0.00395		ng/uL		79	10 - 150
cis-1,2-Dichloroethene	0.00500	0.00422		ng/uL		84	10 - 150
cis-1,3-Dichloropropene	0.00500	0.00350		ng/uL		70	10 - 150
Cyclohexane	0.00500	0.00362		ng/uL		72	10 - 150
1,2-Dibromo-3-Chloropropane	0.00500	0.00406		ng/uL		81	10 - 150
1,2-Dichlorobenzene	0.00500	0.00481		ng/uL		96	10 - 150
1,3-Dichlorobenzene	0.00500	0.00423		ng/uL		85	10 - 150
1,4-Dichlorobenzene	0.00500	0.00441		ng/uL		88	10 - 150
Dichlorobromomethane	0.00500	0.00348		ng/uL		70	10 - 150
Dichlorodifluoromethane	0.00500	0.00309		ng/uL		62	10 - 150
1,1-Dichloroethane	0.00500	0.00400		ng/uL		80	10 - 150
1,2-Dichloroethane	0.00500	0.00463		ng/uL		93	10 - 150
1,1-Dichloroethene	0.00500	0.00344		ng/uL		69	10 - 150
1,2-Dichloropropane	0.00500	0.00461		ng/uL		92	10 - 150
Ethylbenzene	0.00500	0.00440		ng/uL		88	10 - 150
Ethylene Dibromide	0.00500	0.00517		ng/uL		103	10 - 150
2-Hexanone	0.0100	0.00988	J	ng/uL		99	10 - 150
Isopropylbenzene	0.00500	0.00392		ng/uL		78	10 - 150
Methyl acetate	0.0100	0.0102		ng/uL		102	10 - 150
Methylcyclohexane	0.00500	0.00371		ng/uL		74	10 - 150
Methylene Chloride	0.00500	0.00474	J	ng/uL		95	10 - 150
4-Methyl-2-pentanone (MIBK)	0.0100	0.00993	J	ng/uL		99	10 - 150
Methyl tert-butyl ether	0.00500	0.00394		ng/uL		79	10 - 150
m-Xylene & p-Xylene	0.00500	0.00418		ng/uL		84	10 - 150
o-Xylene	0.00500	0.00412		ng/uL		82	10 - 150
Styrene	0.00500	0.00419		ng/uL		84	10 - 150
1,1,2,2-Tetrachloroethane	0.00500	0.00637		ng/uL		127	10 - 150
1,1,1,2-Tetrachloroethane	0.00500	0.00355		ng/uL		71	10 - 150
Tetrachloroethene	0.00500	0.00691		ng/uL		138	10 - 150
Toluene	0.00500	0.00461		ng/uL		92	10 - 150
trans-1,2-Dichloroethene	0.00500	0.00376		ng/uL		75	10 - 150
trans-1,3-Dichloropropene	0.00500	0.00362		ng/uL		72	10 - 150
1,2,4-Trichlorobenzene	0.00500	0.00441		ng/uL		88	10 - 150
1,1,1-Trichloroethane	0.00500	0.00282		ng/uL		56	10 - 150
1,1,2-Trichloroethane	0.00500	0.00556		ng/uL		111	10 - 150
Trichloroethene	0.00500	0.00395		ng/uL		79	10 - 150
Trichlorofluoromethane	0.00500	0.00284		ng/uL		57	10 - 150

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MRL 240-406670/7
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,2-Trichloro-1,2,2-trifluoroethane	0.00500	0.00303		ng/uL		61	10 - 150
Vinyl chloride	0.00500	0.00359		ng/uL		72	10 - 150
Xylenes, Total	0.0100	0.00830		ng/uL		83	10 - 150

Surrogate	*MRL %Recovery*	*MRL Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*10 - 150*
Dibromofluoromethane (Surr)	*83*		*10 - 150*
1,2-Dichloroethane-d4 (Surr)	*82*		*10 - 150*
Toluene-d8 (Surr)	*113*		*10 - 150*

Lab Sample ID: MB 240-406689/1-A
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406689

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		0.025	0.021	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Benzene	ND		0.0050	0.00070	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Bromoform	ND		0.0050	0.0024	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Bromomethane	ND		0.0050	0.00099	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
2-Butanone (MEK)	ND		0.020	0.0036	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Carbon tetrachloride	ND		0.0050	0.0033	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Chlorobenzene	ND		0.0050	0.00092	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Chlorodibromomethane	ND		0.0050	0.0028	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Chloroform	ND		0.0050	0.00079	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
cis-1,2-Dichloroethene	ND		0.0050	0.00065	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,2-Dibromo-3-Chloropropane	ND		0.010	0.0036	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,2-Dichlorobenzene	ND		0.0050	0.0011	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,3-Dichlorobenzene	ND		0.0050	0.00082	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,4-Dichlorobenzene	ND		0.0050	0.00088	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Dichlorobromomethane	ND		0.0050	0.00068	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,1-Dichloroethane	ND		0.0050	0.00069	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,2-Dichloroethane	ND		0.0050	0.00077	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,1-Dichloroethene	ND		0.0050	0.00090	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,2-Dichloropropane	ND		0.0050	0.00085	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Ethylbenzene	ND		0.0050	0.0010	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Ethylene Dibromide	ND		0.0050	0.00077	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Isopropylbenzene	ND		0.0050	0.00083	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Methylene Chloride	ND		0.025	0.012	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
4-Methyl-2-pentanone (MIBK)	ND		0.020	0.0037	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Methyl tert-butyl ether	ND		0.0050	0.00082	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Styrene	ND		0.0050	0.0012	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,1,2,2-Tetrachloroethane	ND		0.0050	0.0014	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,1,1,2-Tetrachloroethane	ND		0.0050	0.0030	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Tetrachloroethene	ND		0.0050	0.00073	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Toluene	ND		0.0050	0.00077	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
trans-1,2-Dichloroethene	ND		0.0050	0.00047	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,2,4-Trichlorobenzene	ND		0.0050	0.00057	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
1,1,1-Trichloroethane	ND		0.0050	0.00082	mg/Kg		10/21/19 13:03	10/21/19 15:18	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-406689/1-A
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406689

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloroethane	ND		0.0050	0.0011	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Trichloroethene	ND		0.0050	0.00063	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Vinyl chloride	ND		0.0050	0.00084	mg/Kg		10/21/19 13:03	10/21/19 15:18	1
Xylenes, Total	ND		0.010	0.0016	mg/Kg		10/21/19 13:03	10/21/19 15:18	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*51 - 127*	*10/21/19 13:03*	*10/21/19 15:18*	*1*
Dibromofluoromethane (Surr)	*83*		*56 - 122*	*10/21/19 13:03*	*10/21/19 15:18*	*1*
1,2-Dichloroethane-d4 (Surr)	*87*		*59 - 120*	*10/21/19 13:03*	*10/21/19 15:18*	*1*
Toluene-d8 (Surr)	*110*		*64 - 124*	*10/21/19 13:03*	*10/21/19 15:18*	*1*

Lab Sample ID: 240-120732-3 MS
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: CF-FSP-03
Prep Type: Total/NA
Prep Batch: 406689

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	ND		0.0974	0.0513		mg/Kg	☼	53	18 - 167
Benzene	ND		0.0487	0.0243		mg/Kg	☼	50	32 - 131
Bromoform	ND		0.0487	0.0130		mg/Kg	☼	27	10 - 122
Bromomethane	ND		0.0195	0.00917		mg/Kg	☼	47	10 - 149
2-Butanone (MEK)	ND		0.0974	0.0452		mg/Kg	☼	46	31 - 148
Carbon disulfide	ND		0.0487	0.0223		mg/Kg	☼	46	10 - 134
Carbon tetrachloride	ND		0.0487	0.0168		mg/Kg	☼	34	13 - 131
Chlorobenzene	ND		0.0487	0.0145		mg/Kg	☼	30	16 - 129
Chlorodibromomethane	ND		0.0487	0.0155		mg/Kg	☼	32	15 - 125
Chloroethane	ND		0.0195	0.0103		mg/Kg	☼	53	10 - 155
Chloroform	ND		0.0487	0.0228		mg/Kg	☼	47	38 - 129
Chloromethane	ND		0.0195	0.00972		mg/Kg	☼	50	20 - 140
cis-1,2-Dichloroethene	ND		0.0487	0.0204		mg/Kg	☼	42	35 - 130
cis-1,3-Dichloropropene	ND		0.0487	0.0127		mg/Kg	☼	26	12 - 131
Cyclohexane	ND		0.0487	0.0275		mg/Kg	☼	56	17 - 133
1,2-Dibromo-3-Chloropropane	ND		0.0487	0.0115		mg/Kg	☼	24	10 - 135
1,2-Dichlorobenzene	ND		0.0487	0.00966		mg/Kg	☼	20	10 - 131
1,3-Dichlorobenzene	ND		0.0487	0.00834		mg/Kg	☼	17	10 - 131
1,4-Dichlorobenzene	ND		0.0487	0.00749		mg/Kg	☼	15	10 - 129
Dichlorobromomethane	ND		0.0487	0.0186		mg/Kg	☼	38	18 - 125
Dichlorodifluoromethane	ND		0.0195	0.00817		mg/Kg	☼	42	10 - 141
1,1-Dichloroethane	ND		0.0487	0.0268		mg/Kg	☼	55	35 - 129
1,2-Dichloroethane	ND		0.0487	0.0178		mg/Kg	☼	37	33 - 130
1,1-Dichloroethene	ND		0.0487	0.0282		mg/Kg	☼	58	20 - 150
1,2-Dichloropropane	ND		0.0487	0.0258		mg/Kg	☼	53	33 - 134
Ethylbenzene	ND		0.0487	0.0170		mg/Kg	☼	35	12 - 133
Ethylene Dibromide	ND	F1	0.0487	0.0135		mg/Kg	☼	28	24 - 138
2-Hexanone	ND		0.0974	0.0364		mg/Kg	☼	37	23 - 149
Isopropylbenzene	ND		0.0487	0.0154		mg/Kg	☼	32	10 - 135
Methyl acetate	ND		0.0974	0.0495		mg/Kg	☼	51	20 - 155
Methylcyclohexane	ND		0.0487	0.0256		mg/Kg	☼	53	10 - 133
Methylene Chloride	0.037		0.0487	0.0604		mg/Kg	☼	47	22 - 153

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-120732-3 MS
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: CF-FSP-03
Prep Type: Total/NA
Prep Batch: 406689

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Methyl-2-pentanone (MIBK)	ND		0.0974	0.0528		mg/Kg	☼	54	29 - 140
Methyl tert-butyl ether	ND		0.0487	0.0264		mg/Kg	☼	54	42 - 127
m-Xylene & p-Xylene	ND		0.0487	0.0160		mg/Kg	☼	33	10 - 132
o-Xylene	ND		0.0487	0.0165		mg/Kg	☼	34	11 - 134
Styrene	ND		0.0487	0.0118		mg/Kg	☼	24	10 - 127
1,1,2,2-Tetrachloroethane	ND		0.0487	0.0200		mg/Kg	☼	41	10 - 168
1,1,1,2-Tetrachloroethane	ND		0.0487	0.0173		mg/Kg	☼	35	19 - 129
Tetrachloroethene	ND		0.0487	0.0207		mg/Kg	☼	42	13 - 144
Toluene	0.00099	J	0.0487	0.0225		mg/Kg	☼	44	20 - 141
trans-1,2-Dichloroethene	ND		0.0487	0.0229		mg/Kg	☼	47	31 - 138
trans-1,3-Dichloropropene	ND		0.0487	0.00800		mg/Kg	☼	16	10 - 123
1,2,4-Trichlorobenzene	ND	F1	0.0487	0.00559		mg/Kg	☼	11	10 - 120
1,1,1-Trichloroethane	ND		0.0487	0.0212		mg/Kg	☼	44	27 - 131
1,1,2-Trichloroethane	ND		0.0487	0.0223		mg/Kg	☼	46	17 - 152
Trichloroethene	ND		0.0487	0.0211		mg/Kg	☼	43	10 - 162
Trichlorofluoromethane	ND		0.0195	0.00893		mg/Kg	☼	46	16 - 148
1,1,2-Trichloro-1,2,2-trifluoroetha ne	ND		0.0487	0.0256		mg/Kg	☼	53	30 - 145
Vinyl chloride	ND		0.0195	0.00958		mg/Kg	☼	49	15 - 150
Xylenes, Total	ND		0.0974	0.0325		mg/Kg	☼	33	10 - 134

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*51 - 127*
Dibromofluoromethane (Surr)	*85*		*56 - 122*
1,2-Dichloroethane-d4 (Surr)	*90*		*59 - 120*
Toluene-d8 (Surr)	*111*		*64 - 124*

Lab Sample ID: 240-120732-3 MSD
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: CF-FSP-03
Prep Type: Total/NA
Prep Batch: 406689

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	ND		0.0998	0.0556		mg/Kg	☼	56	18 - 167	8	40
Benzene	ND		0.0499	0.0226		mg/Kg	☼	45	32 - 131	7	40
Bromoform	ND		0.0499	0.0117		mg/Kg	☼	24	10 - 122	10	40
Bromomethane	ND		0.0200	0.00853		mg/Kg	☼	43	10 - 149	7	40
2-Butanone (MEK)	ND		0.0998	0.0422		mg/Kg	☼	42	31 - 148	7	40
Carbon disulfide	ND		0.0499	0.0197		mg/Kg	☼	40	10 - 134	12	40
Carbon tetrachloride	ND		0.0499	0.0162		mg/Kg	☼	32	13 - 131	4	40
Chlorobenzene	ND		0.0499	0.0116		mg/Kg	☼	23	16 - 129	22	40
Chlorodibromomethane	ND		0.0499	0.0142		mg/Kg	☼	28	15 - 125	9	40
Chloroethane	ND		0.0200	0.00993		mg/Kg	☼	50	10 - 155	4	40
Chloroform	ND		0.0499	0.0217		mg/Kg	☼	44	38 - 129	5	40
Chloromethane	ND		0.0200	0.00964		mg/Kg	☼	48	20 - 140	1	40
cis-1,2-Dichloroethene	ND		0.0499	0.0183		mg/Kg	☼	37	35 - 130	11	40
cis-1,3-Dichloropropene	ND		0.0499	0.0109		mg/Kg	☼	22	12 - 131	15	40
Cyclohexane	ND		0.0499	0.0260		mg/Kg	☼	52	17 - 133	5	40
1,2-Dibromo-3-Chloropropane	ND		0.0499	0.0126		mg/Kg	☼	25	10 - 135	9	40
1,2-Dichlorobenzene	ND		0.0499	0.00757		mg/Kg	☼	15	10 - 131	24	40

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-120732-3 MSD
Matrix: Solid
Analysis Batch: 406670

Client Sample ID: CF-FSP-03
Prep Type: Total/NA
Prep Batch: 406689

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,3-Dichlorobenzene	ND		0.0499	0.00648		mg/Kg	☼	13	10 - 131	25	40
1,4-Dichlorobenzene	ND		0.0499	0.00538		mg/Kg	☼	11	10 - 129	33	40
Dichlorobromomethane	ND		0.0499	0.0172		mg/Kg	☼	34	18 - 125	8	40
Dichlorodifluoromethane	ND		0.0200	0.00808		mg/Kg	☼	40	10 - 141	1	40
1,1-Dichloroethane	ND		0.0499	0.0257		mg/Kg	☼	52	35 - 129	4	40
1,2-Dichloroethane	ND		0.0499	0.0167		mg/Kg	☼	34	33 - 130	6	40
1,1-Dichloroethene	ND		0.0499	0.0261		mg/Kg	☼	52	20 - 150	8	40
1,2-Dichloropropane	ND		0.0499	0.0245		mg/Kg	☼	49	33 - 134	5	40
Ethylbenzene	ND		0.0499	0.0135		mg/Kg	☼	27	12 - 133	23	40
Ethylene Dibromide	ND	F1	0.0499	0.0117	F1	mg/Kg	☼	23	24 - 138	14	40
2-Hexanone	ND		0.0998	0.0354		mg/Kg	☼	35	23 - 149	3	40
Isopropylbenzene	ND		0.0499	0.0125		mg/Kg	☼	25	10 - 135	21	40
Methyl acetate	ND		0.0998	0.0457		mg/Kg	☼	46	20 - 155	8	40
Methylcyclohexane	ND		0.0499	0.0234		mg/Kg	☼	47	10 - 133	9	40
Methylene Chloride	0.037		0.0499	0.0593		mg/Kg	☼	44	22 - 153	2	40
4-Methyl-2-pentanone (MIBK)	ND		0.0998	0.0503		mg/Kg	☼	50	29 - 140	5	40
Methyl tert-butyl ether	ND		0.0499	0.0249		mg/Kg	☼	50	42 - 127	6	40
m-Xylene & p-Xylene	ND		0.0499	0.0132		mg/Kg	☼	26	10 - 132	19	40
o-Xylene	ND		0.0499	0.0141		mg/Kg	☼	28	11 - 134	15	40
Styrene	ND		0.0499	0.00884		mg/Kg	☼	18	10 - 127	28	40
1,1,2,2-Tetrachloroethane	ND		0.0499	0.0199		mg/Kg	☼	40	10 - 168	0	40
1,1,1,2-Tetrachloroethane	ND		0.0499	0.0166		mg/Kg	☼	33	19 - 129	4	40
Tetrachloroethene	ND		0.0499	0.0167		mg/Kg	☼	33	13 - 144	21	40
Toluene	0.00099	J	0.0499	0.0201		mg/Kg	☼	38	20 - 141	11	40
trans-1,2-Dichloroethene	ND		0.0499	0.0197		mg/Kg	☼	39	31 - 138	15	40
trans-1,3-Dichloropropene	ND		0.0499	0.00653		mg/Kg	☼	13	10 - 123	20	40
1,2,4-Trichlorobenzene	ND	F1	0.0499	0.00419	J F1	mg/Kg	☼	8	10 - 120	29	40
1,1,1-Trichloroethane	ND		0.0499	0.0201		mg/Kg	☼	40	27 - 131	5	40
1,1,2-Trichloroethane	ND		0.0499	0.0216		mg/Kg	☼	43	17 - 152	3	40
Trichloroethene	ND		0.0499	0.0184		mg/Kg	☼	37	10 - 162	14	40
Trichlorofluoromethane	ND		0.0200	0.00868		mg/Kg	☼	43	16 - 148	3	40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.0499	0.0244		mg/Kg	☼	49	30 - 145	5	40
Vinyl chloride	ND		0.0200	0.00925		mg/Kg	☼	46	15 - 150	3	40
Xylenes, Total	ND		0.0998	0.0273		mg/Kg	☼	27	10 - 134	17	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*51 - 127*
Dibromofluoromethane (Surr)	*87*		*56 - 122*
1,2-Dichloroethane-d4 (Surr)	*89*		*59 - 120*
Toluene-d8 (Surr)	*115*		*64 - 124*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-406870/23-A
Matrix: Solid
Analysis Batch: 407667

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406870

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.015	0.0029	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Acenaphthylene	ND		0.015	0.0040	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Anthracene	ND		0.015	0.0024	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Benzo[a]anthracene	ND		0.015	0.0034	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Benzo[a]pyrene	ND		0.015	0.0093	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Benzo[b]fluoranthene	ND		0.015	0.0065	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Benzo[g,h,i]perylene	ND		0.015	0.0071	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Benzo[k]fluoranthene	ND		0.015	0.0069	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
1,1'-Biphenyl	ND		0.050	0.017	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Bis(2-chloroethyl)ether	ND		0.10	0.012	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
bis (2-chloroisopropyl) ether	ND		0.10	0.010	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Bis(2-ethylhexyl) phthalate	ND		0.070	0.051	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
4-Chloroaniline	ND		0.15	0.030	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2-Chlorophenol	ND		0.050	0.010	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Chrysene	ND		0.015	0.0015	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Dibenz(a,h)anthracene	ND		0.015	0.0069	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
3,3'-Dichlorobenzidine	ND		0.10	0.043	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2,4-Dichlorophenol	ND		0.15	0.044	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Diethyl phthalate	ND		0.070	0.031	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2,4-Dimethylphenol	ND		0.15	0.040	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Dimethyl phthalate	ND		0.070	0.014	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2,4-Dinitrophenol	ND		0.33	0.14	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2,4-Dinitrotoluene	ND		0.20	0.062	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Fluoranthene	ND		0.015	0.0045	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Fluorene	ND		0.015	0.0027	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Hexachlorobenzene	ND		0.015	0.0029	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Hexachlorobutadiene	ND		0.050	0.012	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Hexachloroethane	ND		0.050	0.0090	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Indeno[1,2,3-cd]pyrene	ND		0.015	0.0074	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2-Methylnaphthalene	ND		0.015	0.0020	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Naphthalene	ND		0.015	0.0024	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Pentachlorophenol	ND		0.15	0.058	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Phenanthrene	ND		0.015	0.0022	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Phenol	ND		0.050	0.0080	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
Pyrene	ND		0.015	0.0021	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2,4,5-Trichlorophenol	ND		0.15	0.069	mg/Kg		10/22/19 09:39	10/26/19 13:06	1
2,4,6-Trichlorophenol	ND		0.15	0.064	mg/Kg		10/22/19 09:39	10/26/19 13:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*69*		*35 - 120*	*10/22/19 09:39*	*10/26/19 13:06*	*1*
2-Fluorophenol (Surr)	*58*		*26 - 120*	*10/22/19 09:39*	*10/26/19 13:06*	*1*
Nitrobenzene-d5 (Surr)	*81*		*28 - 120*	*10/22/19 09:39*	*10/26/19 13:06*	*1*
Phenol-d5 (Surr)	*64*		*28 - 120*	*10/22/19 09:39*	*10/26/19 13:06*	*1*
Terphenyl-d14 (Surr)	*84*		*39 - 120*	*10/22/19 09:39*	*10/26/19 13:06*	*1*
2,4,6-Tribromophenol (Surr)	*52*		*10 - 120*	*10/22/19 09:39*	*10/26/19 13:06*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-406870/24-A
Matrix: Solid
Analysis Batch: 407667

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406870

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	0.667	0.450		mg/Kg		67	45 - 120
Acenaphthylene	0.667	0.468		mg/Kg		70	45 - 120
Acetophenone	0.667	0.415		mg/Kg		62	42 - 120
Anthracene	0.667	0.488		mg/Kg		73	52 - 120
Atrazine	1.33	1.03		mg/Kg		77	54 - 120
Benzaldehyde	1.33	0.809		mg/Kg		61	38 - 120
Benzo[a]anthracene	0.667	0.507		mg/Kg		76	52 - 120
Benzo[a]pyrene	0.667	0.488		mg/Kg		73	50 - 120
Benzo[b]fluoranthene	0.667	0.489		mg/Kg		73	52 - 120
Benzo[g,h,i]perylene	0.667	0.535		mg/Kg		80	54 - 120
Benzo[k]fluoranthene	0.667	0.474		mg/Kg		71	54 - 120
1,1'-Biphenyl	0.667	0.455		mg/Kg		68	43 - 120
Bis(2-chloroethoxy)methane	0.667	0.431		mg/Kg		65	43 - 120
Bis(2-chloroethyl)ether	0.667	0.404		mg/Kg		61	41 - 120
bis (2-chloroisopropyl) ether	0.667	0.409		mg/Kg		61	29 - 120
Bis(2-ethylhexyl) phthalate	0.667	0.558		mg/Kg		84	47 - 124
4-Bromophenyl phenyl ether	0.667	0.464		mg/Kg		70	47 - 120
Butyl benzyl phthalate	0.667	0.540		mg/Kg		81	47 - 120
Caprolactam	1.33	0.999		mg/Kg		75	55 - 120
Carbazole	0.667	0.523		mg/Kg		78	51 - 120
4-Chloroaniline	0.667	0.341		mg/Kg		51	30 - 120
4-Chloro-3-methylphenol	0.667	0.463		mg/Kg		70	39 - 120
2-Chloronaphthalene	0.667	0.457		mg/Kg		69	42 - 120
2-Chlorophenol	0.667	0.444		mg/Kg		67	42 - 120
4-Chlorophenyl phenyl ether	0.667	0.447		mg/Kg		67	46 - 120
Chrysene	0.667	0.498		mg/Kg		75	53 - 120
Dibenz(a,h)anthracene	0.667	0.521		mg/Kg		78	50 - 120
Dibenzofuran	0.667	0.457		mg/Kg		69	46 - 120
3,3'-Dichlorobenzidine	1.33	1.06		mg/Kg		79	29 - 120
2,4-Dichlorophenol	0.667	0.462		mg/Kg		69	40 - 120
Diethyl phthalate	0.667	0.478		mg/Kg		72	45 - 120
2,4-Dimethylphenol	0.667	0.416		mg/Kg		62	31 - 120
Dimethyl phthalate	0.667	0.478		mg/Kg		72	47 - 120
Di-n-butyl phthalate	0.667	0.528		mg/Kg		79	50 - 120
4,6-Dinitro-2-methylphenol	1.33	0.644		mg/Kg		48	27 - 120
2,4-Dinitrophenol	1.33	0.351		mg/Kg		26	10 - 120
2,4-Dinitrotoluene	0.667	0.611		mg/Kg		92	49 - 120
2,6-Dinitrotoluene	0.667	0.630		mg/Kg		94	49 - 120
Di-n-octyl phthalate	0.667	0.458		mg/Kg		69	38 - 122
Fluoranthene	0.667	0.516		mg/Kg		77	54 - 120
Fluorene	0.667	0.459		mg/Kg		69	48 - 120
Hexachlorobenzene	0.667	0.470		mg/Kg		71	45 - 120
Hexachlorobutadiene	0.667	0.431		mg/Kg		65	34 - 120
Hexachlorocyclopentadiene	0.667	0.406		mg/Kg		61	10 - 120
Hexachloroethane	0.667	0.429		mg/Kg		64	36 - 120
Indeno[1,2,3-cd]pyrene	0.667	0.526		mg/Kg		79	52 - 120
Isophorone	0.667	0.428		mg/Kg		64	42 - 120
2-Methylnaphthalene	0.667	0.446		mg/Kg		67	42 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-406870/24-A
Matrix: Solid
Analysis Batch: 407667

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406870

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylphenol	0.667	0.432		mg/Kg		65	42 - 120
3 & 4 Methylphenol	0.667	0.436		mg/Kg		65	43 - 120
Naphthalene	0.667	0.437		mg/Kg		66	39 - 120
2-Nitroaniline	0.667	0.602		mg/Kg		90	44 - 120
3-Nitroaniline	0.667	0.500		mg/Kg		75	41 - 120
4-Nitroaniline	0.667	0.614		mg/Kg		92	47 - 120
Nitrobenzene	0.667	0.485		mg/Kg		73	42 - 120
2-Nitrophenol	0.667	0.623		mg/Kg		94	41 - 120
4-Nitrophenol	1.33	0.996		mg/Kg		75	29 - 120
N-Nitrosodi-n-propylamine	0.667	0.411		mg/Kg		62	39 - 120
N-Nitrosodiphenylamine	0.667	0.458		mg/Kg		69	50 - 120
Pentachlorophenol	1.33	0.711		mg/Kg		53	16 - 120
Phenanthrene	0.667	0.475		mg/Kg		71	50 - 120
Phenol	0.667	0.429		mg/Kg		64	39 - 120
Pyrene	0.667	0.529		mg/Kg		79	50 - 120
2,4,5-Trichlorophenol	0.667	0.364		mg/Kg		55	28 - 120
2,4,6-Trichlorophenol	0.667	0.263		mg/Kg		39	14 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*70*		*35 - 120*
2-Fluorophenol (Surr)	*66*		*26 - 120*
Nitrobenzene-d5 (Surr)	*94*		*28 - 120*
Phenol-d5 (Surr)	*67*		*28 - 120*
Terphenyl-d14 (Surr)	*80*		*39 - 120*
2,4,6-Tribromophenol (Surr)	*46*		*10 - 120*

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 240-406866/25-A
Matrix: Solid
Analysis Batch: 407801

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406866

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-Chlordane	ND		0.0050	0.0015	mg/Kg		10/22/19 09:06	10/28/19 11:27	1
Dieldrin	ND		0.0050	0.0011	mg/Kg		10/22/19 09:06	10/28/19 11:27	1
trans-Chlordane	ND		0.0050	0.0012	mg/Kg		10/22/19 09:06	10/28/19 11:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*81*		*13 - 135*	*10/22/19 09:06*	*10/28/19 11:27*	*1*
DCB Decachlorobiphenyl	*69*		*13 - 135*	*10/22/19 09:06*	*10/28/19 11:27*	*1*
Tetrachloro-m-xylene	*68*		*30 - 120*	*10/22/19 09:06*	*10/28/19 11:27*	*1*
Tetrachloro-m-xylene	*68*		*30 - 120*	*10/22/19 09:06*	*10/28/19 11:27*	*1*

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 240-406866/27-A
Matrix: Solid
Analysis Batch: 407801

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406866

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-Chlordane	0.100	0.0799		mg/Kg		80	44 - 120
Dieldrin	0.100	0.0873		mg/Kg		87	47 - 120
trans-Chlordane	0.100	0.0789		mg/Kg		79	46 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*43*		*13 - 135*
DCB Decachlorobiphenyl	*36*		*13 - 135*
Tetrachloro-m-xylene	*34*		*30 - 120*
Tetrachloro-m-xylene	*35*		*30 - 120*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 240-406866/25-A
Matrix: Solid
Analysis Batch: 407324

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406866

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		0.050	0.022	mg/Kg		10/22/19 09:06	10/24/19 13:37	1
Aroclor-1221	ND		0.050	0.024	mg/Kg		10/22/19 09:06	10/24/19 13:37	1
Aroclor-1232	ND		0.050	0.023	mg/Kg		10/22/19 09:06	10/24/19 13:37	1
Aroclor-1242	ND		0.050	0.019	mg/Kg		10/22/19 09:06	10/24/19 13:37	1
Aroclor-1248	ND		0.050	0.024	mg/Kg		10/22/19 09:06	10/24/19 13:37	1
Aroclor-1254	ND		0.050	0.023	mg/Kg		10/22/19 09:06	10/24/19 13:37	1
Aroclor-1260	ND		0.050	0.022	mg/Kg		10/22/19 09:06	10/24/19 13:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*84*		*14 - 128*	*10/22/19 09:06*	*10/24/19 13:37*	*1*
DCB Decachlorobiphenyl	*99*		*10 - 132*	*10/22/19 09:06*	*10/24/19 13:37*	*1*

Lab Sample ID: LCS 240-406866/26-A
Matrix: Solid
Analysis Batch: 407324

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406866

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor-1016	1.00	0.802		mg/Kg		80	47 - 120
Aroclor-1260	1.00	0.872		mg/Kg		87	46 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*91*		*14 - 128*
DCB Decachlorobiphenyl	*97*		*10 - 132*

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 240-407118/1-A
Matrix: Solid
Analysis Batch: 407367

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 407118

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		1.0	0.36	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Arsenic	ND		1.0	0.32	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Barium	ND		20	0.36	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Beryllium	ND		0.50	0.054	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Cadmium	ND		0.20	0.048	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Chromium	ND		0.50	0.15	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Copper	ND		2.5	0.24	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Lead	ND		1.0	0.28	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Manganese	ND		1.5	0.31	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Nickel	ND		4.0	0.23	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Selenium	ND		1.5	0.47	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Silver	ND		0.50	0.081	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Thallium	ND		1.0	0.40	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Vanadium	ND		5.0	0.82	mg/Kg		10/23/19 14:00	10/24/19 15:27	1
Zinc	ND		5.0	1.4	mg/Kg		10/23/19 14:00	10/24/19 15:27	1

Lab Sample ID: LCS 240-407118/2-A
Matrix: Solid
Analysis Batch: 407367

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 407118

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	100	94.9		mg/Kg		95	80 - 120
Arsenic	200	197		mg/Kg		98	80 - 120
Barium	200	189		mg/Kg		95	80 - 120
Beryllium	100	90.3		mg/Kg		90	80 - 120
Cadmium	100	95.0		mg/Kg		95	80 - 120
Chromium	100	98.3		mg/Kg		98	80 - 120
Copper	100	93.8		mg/Kg		94	80 - 120
Lead	100	94.7		mg/Kg		95	80 - 120
Manganese	100	93.6		mg/Kg		94	80 - 120
Nickel	100	94.8		mg/Kg		95	80 - 120
Selenium	200	193		mg/Kg		96	80 - 120
Silver	10.0	9.51		mg/Kg		95	80 - 120
Thallium	200	194		mg/Kg		97	80 - 120
Vanadium	100	97.9		mg/Kg		98	80 - 120
Zinc	100	96.4		mg/Kg		96	80 - 120

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 240-407129/1-A
Matrix: Solid
Analysis Batch: 407358

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 407129

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.10	0.018	mg/Kg		10/23/19 16:00	10/24/19 11:02	1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 240-407129/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 407358 — **Prep Batch: 407129**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.833	0.841		mg/Kg		101	80 - 120

Method: 7196A - Chromium, Hexavalent

Lab Sample ID: MB 240-408279/9-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408753 — **Prep Batch: 408279**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.80	0.52	mg/Kg		10/30/19 09:38	11/01/19 10:32	1

Lab Sample ID: LCSI 240-408279/11-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408753 — **Prep Batch: 408279**

Analyte	Spike Added	LCSI Result	LCSI Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	643	544		mg/Kg		85	66 - 136

Lab Sample ID: LCSS 240-408279/10-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 408753 — **Prep Batch: 408279**

Analyte	Spike Added	LCSS Result	LCSS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	20.0	19.8		mg/Kg		99	90 - 110

Method: 9012A - Cyanide, Total and/or Amenable

Lab Sample ID: MB 240-406849/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406941 — **Prep Batch: 406849**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.54	0.21	mg/Kg		10/22/19 08:22	10/22/19 14:15	1

Lab Sample ID: LCS 240-406849/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 406941 — **Prep Batch: 406849**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	4.31	4.15		mg/Kg		96	65 - 128

QC Association Summary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

GC/MS VOA

Analysis Batch: 406670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	8260B	406689
240-120732-2	CF-FSP-02	Total/NA	Solid	8260B	406689
240-120732-3	CF-FSP-03	Total/NA	Solid	8260B	406689
MB 240-406689/1-A	Method Blank	Total/NA	Solid	8260B	406689
MRL 240-406670/7	Lab Control Sample	Total/NA	Solid	8260B	
240-120732-3 MS	CF-FSP-03	Total/NA	Solid	8260B	406689
240-120732-3 MSD	CF-FSP-03	Total/NA	Solid	8260B	406689

Prep Batch: 406689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	5030A	
240-120732-2	CF-FSP-02	Total/NA	Solid	5030A	
240-120732-3	CF-FSP-03	Total/NA	Solid	5030A	
MB 240-406689/1-A	Method Blank	Total/NA	Solid	5030A	
240-120732-3 MS	CF-FSP-03	Total/NA	Solid	5030A	
240-120732-3 MSD	CF-FSP-03	Total/NA	Solid	5030A	

GC/MS Semi VOA

Prep Batch: 406870

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	3540C	
240-120732-2	CF-FSP-02	Total/NA	Solid	3540C	
240-120732-3	CF-FSP-03	Total/NA	Solid	3540C	
MB 240-406870/23-A	Method Blank	Total/NA	Solid	3540C	
LCS 240-406870/24-A	Lab Control Sample	Total/NA	Solid	3540C	

Analysis Batch: 407667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	8270D	406870
240-120732-2	CF-FSP-02	Total/NA	Solid	8270D	406870
240-120732-3	CF-FSP-03	Total/NA	Solid	8270D	406870
MB 240-406870/23-A	Method Blank	Total/NA	Solid	8270D	406870
LCS 240-406870/24-A	Lab Control Sample	Total/NA	Solid	8270D	406870

GC Semi VOA

Prep Batch: 406866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	3540C	
240-120732-2	CF-FSP-02	Total/NA	Solid	3540C	
240-120732-3	CF-FSP-03	Total/NA	Solid	3540C	
MB 240-406866/25-A	Method Blank	Total/NA	Solid	3540C	
LCS 240-406866/26-A	Lab Control Sample	Total/NA	Solid	3540C	
LCS 240-406866/27-A	Lab Control Sample	Total/NA	Solid	3540C	

Analysis Batch: 407324

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	8082A	406866
240-120732-2	CF-FSP-02	Total/NA	Solid	8082A	406866
240-120732-3	CF-FSP-03	Total/NA	Solid	8082A	406866
MB 240-406866/25-A	Method Blank	Total/NA	Solid	8082A	406866

GC Semi VOA (Continued)

Analysis Batch: 407324 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 240-406866/26-A	Lab Control Sample	Total/NA	Solid	8082A	406866

Analysis Batch: 407801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-406866/25-A	Method Blank	Total/NA	Solid	8081A	406866
LCS 240-406866/27-A	Lab Control Sample	Total/NA	Solid	8081A	406866

Analysis Batch: 408541

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	8081A	406866
240-120732-2	CF-FSP-02	Total/NA	Solid	8081A	406866
240-120732-3	CF-FSP-03	Total/NA	Solid	8081A	406866

Metals

Prep Batch: 407118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	3050B	
240-120732-2	CF-FSP-02	Total/NA	Solid	3050B	
240-120732-3	CF-FSP-03	Total/NA	Solid	3050B	
MB 240-407118/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 240-407118/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Prep Batch: 407129

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	7471A	
240-120732-2	CF-FSP-02	Total/NA	Solid	7471A	
240-120732-3	CF-FSP-03	Total/NA	Solid	7471A	
MB 240-407129/1-A	Method Blank	Total/NA	Solid	7471A	
LCS 240-407129/2-A	Lab Control Sample	Total/NA	Solid	7471A	

Analysis Batch: 407358

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	7471A	407129
240-120732-2	CF-FSP-02	Total/NA	Solid	7471A	407129
240-120732-3	CF-FSP-03	Total/NA	Solid	7471A	407129
MB 240-407129/1-A	Method Blank	Total/NA	Solid	7471A	407129
LCS 240-407129/2-A	Lab Control Sample	Total/NA	Solid	7471A	407129

Analysis Batch: 407367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	6010B	407118
240-120732-2	CF-FSP-02	Total/NA	Solid	6010B	407118
240-120732-3	CF-FSP-03	Total/NA	Solid	6010B	407118
MB 240-407118/1-A	Method Blank	Total/NA	Solid	6010B	407118
LCS 240-407118/2-A	Lab Control Sample	Total/NA	Solid	6010B	407118

General Chemistry

Analysis Batch: 406698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 406698 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-2	CF-FSP-02	Total/NA	Solid	Moisture	
240-120732-3	CF-FSP-03	Total/NA	Solid	Moisture	

Prep Batch: 406849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	9012A	
240-120732-2	CF-FSP-02	Total/NA	Solid	9012A	
240-120732-3	CF-FSP-03	Total/NA	Solid	9012A	
MB 240-406849/1-A	Method Blank	Total/NA	Solid	9012A	
LCS 240-406849/2-A	Lab Control Sample	Total/NA	Solid	9012A	

Analysis Batch: 406941

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	9012A	406849
240-120732-2	CF-FSP-02	Total/NA	Solid	9012A	406849
240-120732-3	CF-FSP-03	Total/NA	Solid	9012A	406849
MB 240-406849/1-A	Method Blank	Total/NA	Solid	9012A	406849
LCS 240-406849/2-A	Lab Control Sample	Total/NA	Solid	9012A	406849

Prep Batch: 408279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	3060A	
240-120732-2	CF-FSP-02	Total/NA	Solid	3060A	
240-120732-3	CF-FSP-03	Total/NA	Solid	3060A	
MB 240-408279/9-A	Method Blank	Total/NA	Solid	3060A	
LCSI 240-408279/11-A	Lab Control Sample	Total/NA	Solid	3060A	
LCSS 240-408279/10-A	Lab Control Sample	Total/NA	Solid	3060A	

Analysis Batch: 408753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	7196A	408279
240-120732-2	CF-FSP-02	Total/NA	Solid	7196A	408279
240-120732-3	CF-FSP-03	Total/NA	Solid	7196A	408279
MB 240-408279/9-A	Method Blank	Total/NA	Solid	7196A	408279
LCSI 240-408279/11-A	Lab Control Sample	Total/NA	Solid	7196A	408279
LCSS 240-408279/10-A	Lab Control Sample	Total/NA	Solid	7196A	408279

Analysis Batch: 408929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120732-1	CF-FSP-01	Total/NA	Solid	7196A	
240-120732-2	CF-FSP-02	Total/NA	Solid	7196A	
240-120732-3	CF-FSP-03	Total/NA	Solid	7196A	

Lab Chronicle

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-01
Date Collected: 10/10/19 10:00
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	408929	11/03/19 17:49	KLC	TAL CAN
Total/NA	Analysis	Moisture		1	406698	10/21/19 13:23	JMB	TAL CAN

Client Sample ID: CF-FSP-01
Date Collected: 10/10/19 10:00
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-1
Matrix: Solid
Percent Solids: 97.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030A			406689	10/21/19 13:03	SAM	TAL CAN
Total/NA	Analysis	8260B		1	406670	10/21/19 20:04	SAM	TAL CAN
Total/NA	Prep	3540C			406870	10/22/19 09:39	ZMF	TAL CAN
Total/NA	Analysis	8270D		1	407667	10/26/19 19:35	MRU	TAL CAN
Total/NA	Prep	3540C			406866	10/22/19 09:06	ZMF	TAL CAN
Total/NA	Analysis	8081A		1	408541	10/31/19 14:41	BPM	TAL CAN
Total/NA	Prep	3540C			406866	10/22/19 09:06	ZMF	TAL CAN
Total/NA	Analysis	8082A		1	407324	10/24/19 14:02	LSH	TAL CAN
Total/NA	Prep	3050B			407118	10/23/19 14:00	DEE	TAL CAN
Total/NA	Analysis	6010B		1	407367	10/24/19 16:36	WKD	TAL CAN
Total/NA	Prep	7471A			407129	10/23/19 16:00	DEE	TAL CAN
Total/NA	Analysis	7471A		1	407358	10/24/19 11:33	SLD	TAL CAN
Total/NA	Prep	3060A			408279	10/30/19 09:38	MMM	TAL CAN
Total/NA	Analysis	7196A		1	408753	11/01/19 10:52	MMM	TAL CAN
Total/NA	Prep	9012A			406849	10/22/19 08:22	JR	TAL CAN
Total/NA	Analysis	9012A		1	406941	10/22/19 14:24	JR	TAL CAN

Client Sample ID: CF-FSP-02
Date Collected: 10/10/19 10:25
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	408929	11/03/19 17:49	KLC	TAL CAN
Total/NA	Analysis	Moisture		1	406698	10/21/19 13:23	JMB	TAL CAN

Client Sample ID: CF-FSP-02
Date Collected: 10/10/19 10:25
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-2
Matrix: Solid
Percent Solids: 97.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030A			406689	10/21/19 13:03	SAM	TAL CAN
Total/NA	Analysis	8260B		1	406670	10/21/19 20:30	SAM	TAL CAN
Total/NA	Prep	3540C			406870	10/22/19 09:39	ZMF	TAL CAN
Total/NA	Analysis	8270D		1	407667	10/26/19 19:58	MRU	TAL CAN
Total/NA	Prep	3540C			406866	10/22/19 09:06	ZMF	TAL CAN
Total/NA	Analysis	8081A		1	408541	10/31/19 14:54	BPM	TAL CAN

Lab Chronicle

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Client Sample ID: CF-FSP-02

Date Collected: 10/10/19 10:25
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-2

Matrix: Solid
Percent Solids: 97.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			406866	10/22/19 09:06	ZMF	TAL CAN
Total/NA	Analysis	8082A		1	407324	10/24/19 14:14	LSH	TAL CAN
Total/NA	Prep	3050B			407118	10/23/19 14:00	DEE	TAL CAN
Total/NA	Analysis	6010B		1	407367	10/24/19 16:40	WKD	TAL CAN
Total/NA	Prep	7471A			407129	10/23/19 16:00	DEE	TAL CAN
Total/NA	Analysis	7471A		1	407358	10/24/19 11:40	SLD	TAL CAN
Total/NA	Prep	3060A			408279	10/30/19 09:38	MMM	TAL CAN
Total/NA	Analysis	7196A		1	408753	11/01/19 10:54	MMM	TAL CAN
Total/NA	Prep	9012A			406849	10/22/19 08:22	JR	TAL CAN
Total/NA	Analysis	9012A		1	406941	10/22/19 14:26	JR	TAL CAN

Client Sample ID: CF-FSP-03

Date Collected: 10/10/19 10:50
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7196A		1	408929	11/03/19 17:49	KLC	TAL CAN
Total/NA	Analysis	Moisture		1	406698	10/21/19 13:23	JMB	TAL CAN

Client Sample ID: CF-FSP-03

Date Collected: 10/10/19 10:50
Date Received: 10/17/19 16:30

Lab Sample ID: 240-120732-3

Matrix: Solid
Percent Solids: 97.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030A			406689	10/21/19 13:03	SAM	TAL CAN
Total/NA	Analysis	8260B		1	406670	10/21/19 22:14	SAM	TAL CAN
Total/NA	Prep	3540C			406870	10/22/19 09:39	ZMF	TAL CAN
Total/NA	Analysis	8270D		1	407667	10/26/19 20:21	MRU	TAL CAN
Total/NA	Prep	3540C			406866	10/22/19 09:06	ZMF	TAL CAN
Total/NA	Analysis	8081A		1	408541	10/31/19 15:07	BPM	TAL CAN
Total/NA	Prep	3540C			406866	10/22/19 09:06	ZMF	TAL CAN
Total/NA	Analysis	8082A		1	407324	10/24/19 14:27	LSH	TAL CAN
Total/NA	Prep	3050B			407118	10/23/19 14:00	DEE	TAL CAN
Total/NA	Analysis	6010B		1	407367	10/24/19 16:52	WKD	TAL CAN
Total/NA	Prep	7471A			407129	10/23/19 16:00	DEE	TAL CAN
Total/NA	Analysis	7471A		1	407358	10/24/19 11:42	SLD	TAL CAN
Total/NA	Prep	3060A			408279	10/30/19 09:38	MMM	TAL CAN
Total/NA	Analysis	7196A		1	408753	11/01/19 10:56	MMM	TAL CAN
Total/NA	Prep	9012A			406849	10/22/19 08:22	JR	TAL CAN
Total/NA	Analysis	9012A		1	406941	10/22/19 14:27	JR	TAL CAN

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: ENVi Environmental, LLC
Project/Site: Cumberland Foundry

Job ID: 240-120732-1

Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19 *
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19 *
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

29/C3.6

Chain of Custody Record

281836

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Brandon Smith	Site Contact: Debbie O.	Date:	COC No:
Company Name: ENVI ENVIRONMENTAL	Tel/Fax: 440·742·8309	Lab Contact:	Carrier:	1 of 1 COCs
Address: 10247 DEWHURST SUITE 102	Analysis Turnaround Time			Sampler:
City/State/Zip: ELYRIA, OHIO 44035	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 440·742·8309	TAT if different from Below _____			Walk-in Client:
Fax: —	☒ 2 weeks			Lab Sampling:
Project Name: CUMBERLAND FOUNDRY	☐ 1 week			
Site: CUMBERLAND, RI	☐ 2 days			Job / SDG No.:
PO#	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	SEE ATTACHED *DIRECT CONTACT RESIDENTIAL	Sample Specific Notes:
CF-FSP-01	10/10/19	10:00	C	S	1	N	N		
CF-FSP-02	10/10/19	10:25	C	S	1	N	N		
CF-FSP-03	10/10/19	10:50	C	S	1	N	N		

240-120732 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other 1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for 1 Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Brady Stryder	ENVI ENVIRONMENTAL	10/17 11:15	[signature]	ETAL	10/17/19 1115
[signature]	ETAL 1630	10/17/19	[signature]	ETAL	10/17/19 1630
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

* PLEASE USE RESIDENTIAL LIMITS -

TABLE 1

DIRECT EXPOSURE CRITERIA		
Substance	* **Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
* **Volatile Organics**		
Acetone	7,800	10,000
Benzene	2.5	200
Bromodichloromethane	10	92
Bromoform	81	720
Bromomethane	0.8	2900
Carbon tetrachloride	1.5	44
Chlorobenzene	210	10,000
Chloroform	1.2	940
Dibromochloromethane	7.6	68
1,2- Dibromo-3-chloropropane (DBCP)	0.5	4.1
1,1-Dichloroethane	920	10,000
1,2-Dichloroethane	0.9	63
1,1-Dichloroethene	0.2	9.5
cis-1,2-Dichloroethene	630	10,000
Trans-1,2-Dichloroethene	1,100	10,000
1,2-Dichloropropane	1.9	84
Ethylbenzene	71	10,000
Ethylene dibromide (EDB)	0.01	0.07
Isopropyl benzene	27	10,000
Methyl ethyl ketone	10,000	10,000
Methyl isobutyl ketone	1200	10,000
Methyl tertiary-butyl ether (MTBE)	390	10,000
Methylene chloride	45	760

TABLE 1

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Styrene	13	190
1,1,1,2-Tetrachloroethane	2.2	220
1,1,2,2-Tetrachloroethane	1.3	29
Tetrachloroethene	12	110
Toluene	190	10,000
1,1,1-Trichloroethane	540	10,000
1,1,2-Trichloroethane	3.6	100
Trichloroethene	13	520
Vinyl chloride	0.02	3.0
Xylenes (Total)	110	10,000
Semivolatiles		
Acenaphthene	43	10,000
Acenaphthylene	23	10,000
Anthracene	35	10,000
Benzo(a)anthracene	0.9	7.8
Benzo(a)pyrene[a]	0.4	0.8
Benzo(b)fluoranthene	0.9	7.8
Benzo(g,h,i)perylene	0.8	10,000
Benzo(k)fluoranthene	0.9	78
1,1-Biphenyl	0.8	10,000
Bis(2-ethylhexyl)phthalate	46	410
Bis(2-chloroethyl)ether	0.6	5.2
Bis(2-chloroisopropyl)ether	9.1	82
4-Chloroaniline (p-)	310	8200

TABLE 1

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
2-Chlorophenol	50	10,000
Chrysene	0.4	780
Dibenzo(a,h)anthracene[a]	0.4	0.8
1,2-Dichlorobenzene (o-DCB)	510	10,000
1,3-Dichlorobenzene (m-DCB)	430	10,000
1,4-Dichlorobenzene (p-DCB)	27	240
3,3-Dichlorobenzidine	1.4	13
2,4-Dichlorophenol	30	6,100
Diethyl phthalate	340	10,000
2,4-Dimethyl phenol	1,400	10,000
Dimethyl phthalate	1900	10,000
2,4-Dinitrophenol	160	4,100
2,4-Dinitrotoluene	0.9	8.4
Fluoranthene	20	10,000
Fluorene	28	10,000
Hexachlorobenzene	0.4	3.6
Hexachlorobutadiene	8.2	73
Hexachloroethane	46	410
Indeno(1,2,3-cd)pyrene	0.9	7.8
2-Methyl naphthalene	123	10,000
Naphthalene	54	10,000
Pentachlorophenol	5.3	48
Phenanthrene	40	10,000
Phenol	6,000	10,000
Pyrene	13	10,000

TABLE 1

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
1,2,4-Trichlorobenzene	96	10,000
2,4,5-Trichlorophenol	330	10,000
2,4,6-Trichlorophenol	58	520
Pesticides/PCBs		
Chlordane	0.5	4.4
Dieldrin	0.04	0.4
Polychlorinated biphenyls (PCBs)[b]	10	10
Inorganics		
Antimony	10	820
Arsenic[c]	7.0	7.0
Barium	5,500	10,000
Beryllium[c]	1.5	1.5
Cadmium	39	1,000
Chromium III (Trivalent)	1,400	10,000
Chromium VI (Hexavalent)	390	10,000
Copper	3,100	10,000
Cyanide	200	10,000
Lead[d]	150	500
Manganese	390	10,000
Mercury	23	610
Nickel	1,000	10,000
Selenium	390	10,000
Silver	200	10,000
Thallium	5.5	140

TABLE 1

DIRECT EXPOSURE CRITERIA		
Substance	**Residential (mg/kg)**	**Industrial/Commercial (mg/kg)**
Vanadium	550	10,000
Zinc	6,000	10,000

a Estimated quantitation limits.
b Direct Exposure Criteria for PCBs consistent with the Toxic Substance Control Act (TSCA)
c Background Levels of Priority Pollutant Metals In Rhode Island Soils, T. O'Connor, RIDEM – Standard set @ statistical 95% upper confidence limit of natural background data across State. For arsenic, see also Section 12.0
d Direct Exposure Criteria for Lead consistent with the Rhode Island Department of Health Rules and Regulations for Lead Poisoning Prevention [R23-24.6-PB], as amended

TABLE 2

LEACHABILITY CRITERIA		
Substance	**GA Leachability (mg/kg except as otherwise noted)**	**GB Leachability (mg/kg)**
Volatile Organics		
Benzene	0.2	4.3
Carbon tetrachloride	0.4	5.0
Chlorobenzene	3.2	100
1,2-Dichloroethane	0.1	2.3
1,1-Dichloroethene	0.7	0.7
cis-1,2-Dichloroethene	1.7	60
Trans-1,2-Dichloroethene	3.3	92
1,2-Dichloropropane	0.1	70
Ethylbenzene	27	62
Ethylene dibromide (EDB)	5E-04	-
Methyl–tertiary-butyl-ether (MTBE)	0.9	100
Styrene	2.9	64
Tetrachloroethene	0.1	4.2

Eurofins TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : 120732

Client ENVI Environmental Site Name _____

Cooler Received on 10-17-19 Opened on 10-17-19

Cooler unpacked by: Ryan Cribler

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off (TestAmerica Courier) Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other _____

COOLANT: (Wet Ice) (Blue Ice) Dry Ice Water None

☐ See Multiple Cooler Form

1. Cooler temperature upon receipt
   IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. 2.9 °C Corrected Cooler Temp. 3.6 °C
   IR GUN #IR-11 (CF +0.9°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____ Yes (No)
   -Were the seals on the outside of the cooler(s) signed & dated? Yes No (NA)
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
   -Were tamper/custody seals intact and uncompromised? Yes No (NA)
3. Shippers' packing slip attached to the cooler(s)? Yes (No)
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? (Yes) No
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? Yes (No)
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No (NA) pH Strip Lot# **HC991818**
13. Were VOAs on the COC? Yes (No)
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No (NA)
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes (No)
16. Was a LL Hg or Me Hg trip blank present? _____ Yes (No)

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

APPENDIX F

Sampling and Analysis Plan

I. Objective

The overall purpose of sampling and analyzing spent foundry sand generated from Cumberland Foundry operations is to demonstrate acceptability for the beneficial use of the material through a request for a Beneficial Use Determination (BUD), which provides a variance from the Rhode Island Solid Waste Regulations. This Sampling and Analysis Plan (SAP) is part of a BUD Application, which must be submitted to the Rhode Island Department of Environmental Management (DEM) Office of Waste Management.

The scope of services for this SAP were performed in general accordance with the Rhode Island General Laws Chapter 23-18.9, entitled "Refuse Disposal," the *Rules and Regulations for Composting Facilities and Solid Waste Management Facilities*, January 1997, (Solid Waste Regulations), the *Rules and Regulations for Reduction and Recycling of Municipal Solid Waste*, March 1997, the *Rules and Regulations for Reduction and Recycling of Commercial and Non-Municipal Residential Solid Waste*, September 1996 (Recycling Regulations), the DEM Office of Waste Management *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases*, March 3, 1993, as amended November 2011, (*Remediation Regulations*), and the DEM Office of Waste Management *Guidelines on Beneficial Use Determinations ("BUDs") for Source Segregated Solid Waste*, effective date March 1, 2007.

II. Sample Locations

Samples were collected from a stockpile of spent foundry sand staged at Cumberland Foundry. Spent foundry sand samples were collected from multiple locations and depths (greater than 6 inches) of the stockpile, which were then mixed in new re-sealable plastic bags to obtain three (3) composite samples.

III. Sampling Equipment

Stainless steel trowel/auger/scoop, water/wipes, sample containers/labels, nitrile gloves, and Chain of Custody form.

III. Sampling Procedures

Samples were collected using a strategy to obtain representative samples in accordance with United States Environmental Protection Agency (USEPA) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW- 846)*.

The three (3) composite samples were containerized in 32-ounce glass wide-mouth jars with plastic screw top lids and Teflon liners. The samples were marked with the date and time of sampling including a unique identification name on labels affixed to the glass sample jars. No preservatives were required for the samples. The sample were placed on ice in a cooler for transport to Eurofins Test America of North Canton, Ohio for analysis.

Typically, specialized sampling quality control procedures are used to document the accuracy and precision of sampling. However due to the nature of this activity, the following sample collection was not required: trip blanks, field blanks, field duplicates, and field spikes.

IV. Sample Identification

Sample ID	Sample Location	Date	Generator Name	Method
CF-FSP-01	Stockpile	10/10/2019	Cumberland Foundry	VOCs (Method 8260), SVOCs (Method 8270D), Organochlorine Pesticides (Method 8081A), PCBs (Method 8082A), Total Metals (Methods 6010B and 7174A), and General Chemistry (Methods 7196A, 9012A, and Moisture)
CF-FSP-02				
CF-FSP-03				

VOCs – Volatile Organic Compounds
SVOCs – Semi-volatile Organic Compounds
PCBs – Polychlorinated Biphenyls

V. Laboratory Analysis

The samples were submitted for laboratory analysis of the *Remediation Regulations*, *Table 1 Direct Exposure Criteria* for soil.

Copies of the laboratory analysis and Chain of Custody are be presented in **Appendix E** of the BUD Application.

VI. Results Evaluation

The sample concentrations were compared to the *Remediation Regulations*, *Table 1 Direct Exposure Criteria* for soil. No parameters were detected in concentrations greater than respective Table 1 Direct Exposure Criteria.

VII. Annual Sampling

The spent foundry sand will be sampled whenever a change in the foundry process is expected to increase the level of a potential pollutant in the spent foundry sand or when a change in the foundry process is expected to add a new potential pollutant to the spent foundry sand.

VIII. Recordkeeping

The following information will be retained for recordkeeping purposes for the period of five (5) years by Cumberland Foundry:

- Name/Address/Contact information of User(s).
- Volume of spent foundry sand beneficially used.
- Location of beneficial use of spent foundry sand.
- SAP as well as details/dates of sampling and corresponding analysis reports.

APPENDIX G

Effective Date: March 31, 2017
Expiration Date: March 31, 2022

OHIO ENVIRONMENTAL PROTECTION AGENCY

GENERAL PERMIT AUTHORIZATION TO BENEFICIALLY USE FOUNDRY SAND FROM IRON, STEEL AND ALUMINUM FOUNDRIES FOR ROAD CONSTRUCTION SUB-BASE, AS A COMPONENT IN STRUCTURAL FILL, AND AS PIPE BEDDING

Upon receipt of written notification from the Director of the Ohio Environmental Protection Agency (Director) that coverage is granted, the Applicant, as defined in Section B of this Permit, is authorized by the Director to beneficially use foundry sand in accordance with the conditions specified in this Permit and applicable provisions of Ohio Administrative Code (OAC) Chapter 3745-599. Only foundry sand as defined in Section B of this Permit and as identified in the Applicant's Notice of Intent (NOI) is authorized under this Permit for beneficial use by placement on land for road construction sub-base, as a component in structural fill, and as pipe bedding. All other beneficial uses of foundry sand must be separately approved by the Director.

Foundry sand is an industrial byproduct generated by the metal-casting industry. Foundry sand generated by iron (gray and ductile), steel, and aluminum foundries using silica sand with chemical or clay binders can be beneficially used for road construction sub-base, as a component in structural fill, and as pipe bedding.

Coverage under this Permit may be authorized only upon payment of applicable fees and the submittal of a complete and accurate NOI, a sampling plan, and an analysis demonstrating the foundry sand is eligible for beneficial use under this Permit. Permit coverage does not become effective until the Permittee receives written notification from the Director that coverage is authorized.

Coverage under this Permit shall expire at midnight on this Permit's expiration date. A Permittee may continue activities authorized by this Permit beyond the date of expiration, only as provided in OAC Rule 3745-599-220(G).

Pursuant to the authority of the Director under Ohio Revised Code (ORC) Chapters 6111 and 3734 and OAC Chapter 3745-599, any coverage granted under this Permit is subject to compliance with applicable provisions of OAC Chapter 3745-599 and all terms and conditions contained within this Permit. The Permittee's beneficial use of foundry sand in accordance with this Permit and in compliance with OAC Chapter 3745-599 and other applicable laws is unlikely to adversely impact the public health or safety or the environment.

Coverage under this Permit does not relieve the Permittee of the duty to comply with all applicable federal, state, and local laws, ordinances, and regulations. Nothing herein shall be construed to release any person, including but not limited to the owner(s) of the land upon which the foundry sand is placed, from the obligation to comply with all applicable laws governing the placement or use of the foundry sand on the property.

Ohio EPA MAR 31 '17
Entered Directors Journal

Craig W. Butler
Director

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: Terry Lessler Date: 3-31-17

A. Description and Eligibility Requirements

1. This Permit authorizes the beneficial use of foundry sand by placement on the land for road construction sub-base, as a component in structural fill, and as pipe bedding.

2. Only foundry sand that meets all of the following criteria is eligible for beneficial use under this Permit:

   a. The material conforms to the definition of "foundry sand" in Section B of this Permit;

   b. The material does not contain constituents that exceed any of the limits specified in Table 1 of this Permit (Table 1);

   c. The material is not a hazardous waste as defined by ORC Chapter 3734.01, OAC Rule 3745-50-10(A), and OAC Rule 3745-51-03.

3. For the purposes of this Permit, foundry sand that satisfies the constituent concentration limits set forth in Table 1 of this Permit is a beneficial use byproduct as defined in OAC Rule 3745-599-02(B)(2).

4. An applicant may apply for another General Permit in accordance with OAC Rule 3745-599-200 or an individual beneficial use permit in accordance with OAC Rule 3745-599-310 for beneficial use of foundry sand not eligible for coverage under this General Permit.

B. Definitions

OAC Rule 3745-599-02 contains definitions applicable to the Beneficial Use Rules (OAC Chapter 3745-599) and this Permit. The following definitions are specific to this Permit.

"Applicant" means the person applying for coverage under this Permit.

"Chemical binder" means bonding agents in core sand and molding sand. Chemical binders include Alkyd Oil, Acrylic/Epoxy/SO2, Furan Hotbox, Furan Nobake, Furan/SO2, Furan Warmbox, Phenolic Baking, Phenolic Ester Nobake, Phenolic Ester Coldbox, Phenolic CO2, Phenolic Hotbox, Phenolic Nobake-Acid Catalyzed, Phenolic Novolac Flake-Resin Coated Sand, Phenolic Urethane, Phenolic Urethane Coldbox, and sodium silicate. Chemical binders are typically used when it is important for the sand to maintain strength during handling and pouring, but have the ability to collapse once the casing has solidified.

"Clay binder" is either bentonite clay (montmorillonite) or fireclay (kaolinite) that is used as a bonding agent for green sand in the metal casting industry. Green sands typically contain five percent to twelve percent clay binder based on the weight of the sand.

"Foundry sand" means silica sand and binders from sand molds and cores that have been through the production process from foundries that use iron (gray and ductile), steel, and aluminum metals, and either can no longer be reused to cast products, or are in excess of the existing sand system storage capacity.

"Notice of Intent" (NOI) means the form prescribed by the Director for use when requesting coverage under a beneficial use general permit.

"Permittee" means an applicant for whom the Director has approved coverage under this Permit.

"Pipe Bedding" means an aggregate material placed under and around pipes to provide equal support along the length of pipe installed underground in a trench.

"Structural fill" means a screened material used to create a stable base meeting engineering specifications for use as engineered fill, mechanically stabilized earthen (MSE) walls, or earthen mounds, or road base. Structural fill does not include material used for filling limestone or sandstone quarries, gravel pits, valleys, open pits or other industrial mineral mining excavations.

C. Application Requirements

1. Prior to submission of an NOI, the Applicant shall develop and implement a sampling plan in accordance with Section C.4, determine the concentration of the constituents listed in Table 1 (results of sampling analysis), and perform a statistical evaluation of the sampling analysis, for the foundry sand from each generator from which the Applicant intends to obtain foundry sand for beneficial use under this Permit.

2. To obtain coverage under this Permit, an Applicant shall, in accordance with OAC Rule 3745-599-210, submit an application package to the Director containing the following:

   a. One copy of a complete and accurate NOI on a form provided by the Director. Each NOI form shall be signed by the Applicant;

   b. The sampling plan developed and implemented in accordance with Section C.4 for the foundry sand from each generator from which the Applicant intends to obtain foundry sand for beneficial use under this Permit;

   c. The results of the sampling analysis and the statistical evaluation of the sampling analysis performed in accordance with the sampling plan for the foundry sand from each generator from which the Applicant intends to obtain foundry sand for beneficial use under this Permit; and

   d. The application fee of $200.

3. The application package shall be submitted to the following address:

   Ohio Environmental Protection Agency
   Division of Materials and Waste Management
   Attn: Beneficial Use Unit
   P.O. Box 1049
   Columbus, Ohio 43216-1049

4. The sampling plan at a minimum shall contain the following requirements:

   a. Samples of the foundry sand from each generator shall be collected using a strategy to obtain representative samples as described in *Test Methods for Evaluating Solid Waste,*

Physical/Chemical Methods (SW 846)[1]. The samples from each generator shall be separately analyzed.

b. Each sample shall be analyzed for total metals as described in SW 846, for the constituents listed in Table 1.

c. Each sample shall be analyzed for leaching potential using the Toxicity Characteristic Leaching Procedure (TCLP) Method 1311 or the Synthetic Precipitation Leaching Procedure (SPLP) Method 1312 as described in SW 846, for the constituents specified in Table 1.

d. The sample result for each constituent shall be included in a statistical evaluation. In order to be eligible for beneficial use under this Permit, the Applicant shall demonstrate that the 95% Upper Confidence Limit (UCL) of the mean for each constituent in the foundry sand does not exceed the limits specified in Table 1.

Table 1: Constituent Limits

Constituent[2,3]	Totals Analysis (mg/kg)	Leaching Analysis (mg/L)
Aluminum (Al)[4]	77000	4.0
Antimony (Sb)	31	0.12
Barium (Ba)	15000	40
Cadmium (Cd)	39	0.1
Copper (Cu)	1500	26
Iron (Fe)	55000	6.0
Lead (Pb)	300	0.3
Selenium (Se)	100	0.2
Zinc (Zn)	2800	100

5. Coverage under this Permit becomes effective when the Applicant receives written notification from the Director that coverage is granted. The Permittee shall conduct all activities authorized by this Permit in accordance with this Permit, the NOI, and OAC Chapter 3745-599.

D. Operating Conditions

1. When there is a change in the generating process, the Permittee shall determine constituent concentrations listed in Table 1 through additional sampling and analysis, performed in

[1] EPA publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)," as amended through July 2016.

[2] Al, Sb, Ba, Fe: US EPA Regional Screening Levels, Residential Soil; Cd, Cu, Pb, Se, Zn: US EPA 40 Code of Federal Regulations Part 503 Pollutant Concentrations (Table 3 of 503.13).

[3] Al, Sb, Ba, Cd, Cu, Fe, Pb, Zn: TCLP Analysis limits for beneficial use of foundry sand are 20 times the drinking water standard (Maximum Contaminant Levels (MCLs) or Secondary MCLs); Se is 5 times the drinking water standard.

accordance with the sampling plan developed pursuant to section C.4. of this Permit, and demonstrate through a statistical evaluation that the 95% UCL of the mean for each constituent does not exceed the limits specified in Table 1.

2. The Permittee shall cease beneficial use of the foundry sand pursuant to this Permit if it is determined that the concentrations of constituents in the foundry sand exceed the limits for any of the constituents listed in Table 1.

3. After coverage under this Permit is granted, the Permittee shall provide to the Director an NOI and analytical results of the foundry sand for any additional generators from which foundry sand is to be obtained for beneficial use.

4. The Permittee shall retain the following information for a minimum of five years after beneficial use of the foundry sand has occurred and the Permittee shall make the information available to the Director or an authorized representative of Ohio EPA upon request:

   a. Records of the name, address, and telephone number of each generator;

   b. The annual volume of foundry sand from each generator managed, and the volume of foundry sand from each generator actually beneficially used annually;

   c. Records of the location(s) where the foundry sand is stored or placed on land by the Permittee;

   d. The sampling plan detailing where and how samples of foundry sand from each generator were collected, dates that the samples were collected, and the list of constituents for which samples were analyzed;

   e. All laboratory analyses of the constituent concentrations in the foundry sand from each generator.

5. Not later than April first of each year the Permittee shall submit to the Director an annual report. The annual report shall be sent to the following address:

   Ohio Environmental Protection Agency
   Division of Materials and Waste Management
   Attn: Beneficial Use Unit
   PO Box 1049
   Columbus, OH 43216-1049

6. The annual report shall include the following information for the previous calendar year:

   a. Volume of foundry sand beneficially used under this Permit

   b. Volume of foundry sand stored for beneficial use under this Permit;

   c. Sampling analyses and results of foundry sands beneficially used under this Permit.

7. The Permittee shall use Best Management Practices, as defined in OAC Rule 3745-599-02, when storing or beneficially using foundry sand pursuant to this Permit. The Best Management Practices shall include, at a minimum, the following:

a. Storage, blending, and beneficial use locations shall be at least 300 feet from wells and surface waters used for drinking water or watering livestock;

b. Storage, blending, and beneficial use locations shall be at least 100 feet from other surface waters of the state as defined in ORC Section 6111.01(H);

c. The Permittee shall create surface diversions to catch any solids in runoff or to divert runoff away from waters of the state at sites where foundry sand is placed on land.

d. Storage, blending, and beneficial use locations shall not occur within a drinking water source protection area as defined in OAC Rule 3745-9-01;

e. Storage, blending, and beneficial use locations shall not be within 1000 feet of a sensitive groundwater area, such as karst terrain, a sand and gravel pit, a limestone, or sandstone quarry;

f. Storage, blending, and beneficial use locations shall not be in a wellhead protection area with less than ten feet of low permeable clayey glacial till, or a one hundred gallon-per-minute aquifer with less than ten feet of low permeable clayey glacial till;

g. The Permittee shall take measures to control fugitive dust and other air emissions that may result from activities authorized through this Permit.

8. The Permittee shall store and beneficially use foundry sand pursuant to this Permit in such a manner that the activities will neither cause a nuisance nor adversely affect public health, safety or the environment. The Director may revoke coverage under this Permit if the Director determines that a nuisance condition or a threat to human health, safety or the environment exists. Immediately upon the effective date of any written notification from the Director of revocation of coverage under this Permit, the Permittee shall cease beneficial use under this Permit. The Director may require the Permittee to remove the material, remediate the site, or to take other action as appropriate to eliminate the nuisance or threat.

9. The Permittee shall conduct all activities in compliance with all applicable local, state, and federal laws and regulations pertaining to environmental protection, including but not limited to the control of air pollution, leachate, and storm water run-on and run-off and protection of ground water and surface water.

10. The Permittee shall conduct all activities in compliance with all other applicable local, state, and federal laws and regulations not explicitly identified in this Permit.

11. The Permittee shall not cause pollution or cause to be placed any foundry sand that has been or is intended to be beneficially used by placement on the land for road construction sub-base, as a component in structural fill, or as pipe bedding in a location where it causes pollution to waters of the state, except in accordance with an effective National Pollutant Discharge Elimination System (NPDES) permit. Any unauthorized discharge to waters of the state must be reported to Ohio EPA (call 1-800-282-9378) within twenty-four (24) hours of discovery.

12. The Permittee shall furnish to the Director or an authorized representative of Ohio EPA, within 30 days of receiving a written request, any information that the Director or an authorized representative of Ohio EPA requests to determine whether cause exists for revoking coverage under or determining compliance with this Permit.

13. When the Permittee becomes aware that relevant facts were omitted or that incorrect information was included in the NOI to the Director, the Permittee shall promptly submit such facts or correct information.

14. The Permittee shall comply with OAC Rules 3745-599-05 (general exclusions), 3745-599-20 (prohibitions), 3745-599-25 (signatures), 3745-599-35 (legitimacy criteria), 3745-599-60 (approved sampling and characterization procedures), 3745-599-210 (notice of intent to obtain coverage under a general beneficial use permit), and 3745-599-220 (coverage under a general beneficial use permit). If there is a conflict between a requirement in a rule and a condition of this Permit that cannot be reconciled, the Permittee shall notify the Director in writing of the conflict and shall comply with the Permit condition unless directed otherwise by the Director.

E. Site Access

The Permittee shall allow the Director or an authorized representative of Ohio EPA to:

1. Enter upon the site where a regulated facility or activity is located or conducted or where records are retained by the Permittee under OAC Chapter 3745-599 or the terms and conditions of this Permit.

2. Have access to and copy any records that must be kept under OAC Chapter 3745-599 or the terms and conditions of this Permit.

3. Collect samples, take photographs, perform measurements, surveys and other tests, and inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under OAC Chapter 3745-599 or this Permit.