

Subsurface Exploration and Laboratory Testing Plan

# Landfill Development and Ash Basin Closure

for

## Asheville Steam Electric Generating Plant (Asheville Plant)



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## 1.0 INTRODUCTION

This document describes the subsurface exploration and laboratory testing program to be implemented for the landfill design and ash basin closure components of the project. The subsurface exploration and laboratory testing information will be utilized for multiple work products and deliverables including the Site Suitability Report, the Landfill Design Hydrogeologic Report, the Landfill Permit to Construct Application, and the Ash Basin Closure Design. Due to the inter-related nature of the project, one subsurface exploration and laboratory testing program has been developed. The program will serve multiple purposes, including:

- Evaluating depths of ash in the ash basins;
- Evaluating extents of ash in the ash basin areas;
- Characterizing on-site soil and ash;
- General characterization of subsurface stratigraphic sequences;
- Evaluation of geologic impediments within the landfill area such as faults, dikes and sills from existing maps and internet based sources
- Evaluation of top of bedrock.

Amec Foster Wheeler anticipates mobilizing two drill rigs and two field geologists to conduct the subsurface exploration in a timely fashion. A Site Manager and Site Safety Officer will also be provided.

Laboratory testing will be performed on materials retrieved during the subsurface exploration to achieve the following goals:

- Characterize the soil within the vicinity of the landfill and develop geotechnical engineering soil parameters for design;
- Characterize the soil available for borrow; and
- Characterize the soil and ash at the site and develop geotechnical engineering soil parameters for design;

Laboratory soils testing will be coordinated as samples are provided to Amec Foster Wheeler, anticipated to be on a weekly basis during the subsurface exploration. Soils testing will be performed by Amec Foster Wheeler. Sample handling protocols are included in Appendix 2

Please note that this draft document is subject to change pending the outcome of the following items:

- Review of existing subsurface exploration and laboratory test data;
- Site reconnaissance;
- Comments to the landfill subsurface exploration approach by the North Carolina Department of Environment and Natural Resources (NCDENR) Solid Waste Section (SWS); and
- Comments to the ash basin subsurface exploration approach from the NCDENR Division of Energy, Mineral, and Land Resources, Land Quality Section (Dam Safety);

## 1.1 Roles and Responsibilities

The roles and responsibilities for subsurface exploration and laboratory testing are as follows:

**Site Manager:** Oversees daily operation, provides reports and interface with onsite Duke Personnel. In conjunction with Lead Field Geologist coordinates scheduled work activities with Charah.

**Lead Geotechnical Engineer:** Develops subsurface exploration and testing plan, reviews data, and provides direction to Site Manager and Lead Field Geologist if unexpected conditions are encountered.

**Lead Field Geologist:** Performs duties of rig geologists and reviews work of Rig Geologists/Engineers.

**Rig Geologist/Engineer:** Observes drilling and sampling activities, makes sure work package instructions are followed, and prepares field logs.

## 1.2 Site Safety Officer (SSO)

A Site Safety Officer (SSO) will be present during field work activities. The SSO will have no other responsibilities other than safety. The responsibilities of the SSO are described in the Health and Safety Plan (HASP). The SSO will be on site when subcontractors are working. If the SSO is unavailable, the Project Manager or Geotechnical Lead will substitute.

In addition to the responsibilities of the SSO as described in the HASP, the following items should also be included and/or verified before work proceeds by the SSO:

- All field activities will be finished and demobilization will begin in sufficient time to allow for all work to be completed before daylight ends each day.
- All mobile equipment must maintain the minimum required clearance of 10' +.4" for each 1 kV greater than 50 kV, when operating near overhead power lines.

- A drillers equipment inspection form should be completed daily which includes a 360 degree walk around and inspection. If mechanical repairs are necessary that require the equipment to be placed “out of service”, the equipment shall be tagged accordingly and the ESH Manager shall be notified.
- Attach hazard information tags and name of supervisory personnel responsible for work on all barricade tape areas. A rigid barricade shall be used to protect high hazard areas unless otherwise approved by the owner.
- General use work gloves shall have orange tipped finger tips.
- All vehicles, mobile equipment and wheeled equipment not equipped with an emergency brake must have wheel chocks in place anytime the potential exists for it rolling out of position.

### 1.3 List of Subcontractors

Amec Foster Wheeler anticipates utilizing subcontractors to assist with various aspects of the subsurface exploration and laboratory testing. The anticipated list of subcontractors is shown in the following table:

Company Name	Description of Services	Contact Person	Phone No.	Email
M&W Drilling	Soil borings	Jay Hocutt	865 806 9985	<a href="mailto:jhocutt@mwdrillingllc.com">jhocutt@mwdrillingllc.com</a>
McKin&Creed	surveying/utility locate	Mike Shinn	919 233 5261	<a href="mailto:MShinn@mckincreed.com">MShinn@mckincreed.com</a>

### 1.4 Site Reconnaissance

Amec Foster Wheeler will coordinate a site reconnaissance visit with at least one of our staff geologists and drilling subcontractors. The purpose of the site visit is to observe existing conditions from a geologic perspective, discuss methods of drilling access, and coordinate with the current on site excavation contractor, Charah, who is removing ash from the 1982 Basin Area for access to the locations of the proposed borings.

### 1.5 Field Work Kick-Off

Amec Foster Wheeler will confirm the exploration plans and conduct a field work kick-off meeting with subcontractors.

## 2.0 SITE PREPARATION

Site preparation will begin in advance of drill rig mobilization. Site preparation activities may overlap drilling activities.

### 2.1 Boring Layout

Amec Foster Wheeler anticipates that the lead field geologist will mobilize to the site at least two days in advance of drill rig mobilization at the landfill site. Site preparatory

work is anticipated to consist of coordinating access to boring locations at the site. Boring locations can be found in Figure 2.

Due to existing infrastructure and site conditions, Amec Foster Wheeler assumes that boring layout at the Asheville site will be relatively easy and require no clearing or preparatory work in the 1964 Ash Basin. Coordination with Charah will be required for locations in the current 1982 Ash Basin.

Due to existing infrastructure and site conditions, Amec Foster Wheeler assumes that no localized grading will be required in the 1964 Ash Basin. Coordination with Charah will be required to access borings in the 1982 Ash Basin where ash removal is currently in progress.

## **2.2 Erosion and Sediment Control**

Amec Foster Wheeler anticipates that no Erosion and Sediment Control Plan will be required for this work as all work is to be completed within an NPDES permitted wastewater treatment unit.

## **3.0 SUBSURFACE EXPLORATION**

Amec Foster Wheeler anticipates mobilizing up to two drill rigs to perform subsurface exploration tasks, including soil test borings, and sample collection. Subsurface exploration activities for the various project areas are described in the following sections. Refer to Appendix I for detailed tables describing the soil test borings, sample collection, and laboratory testing. Further description of the drilling and sample handling process is given in Appendix 2. Any changes identified to this Subsurface Exploration and Laboratory Testing Plan during the performance of the work will be addressed through the Change Order process.

### **3.1 Proposed Landfill Area (within the current footprint of the 1982 Ash Basin)**

The subsurface exploration at the landfill area is anticipated to be conducted by up to two drill rigs; each drill rig will be overseen by an Amec Foster Wheeler field geologist. The Amec Foster Wheeler lead field geologist will also be available to answer field questions and provide additional assistance. Subsurface exploration activities at the landfill are anticipated to include: Performance of 30 soil test borings to provide additional subsurface soil samples and stratigraphy information. Soil test borings will be abandoned by grouting.

### **3.2 The 1964 Ash Basin**

The subsurface exploration at the 1964 Ash Basin is anticipated to be conducted by one track or truck mounted drill rig overseen by an Amec Foster Wheeler field geologist. The Amec Foster Wheeler lead field geologist will also be available to answer field questions and provide additional assistance. Subsurface exploration activities are anticipated to include:

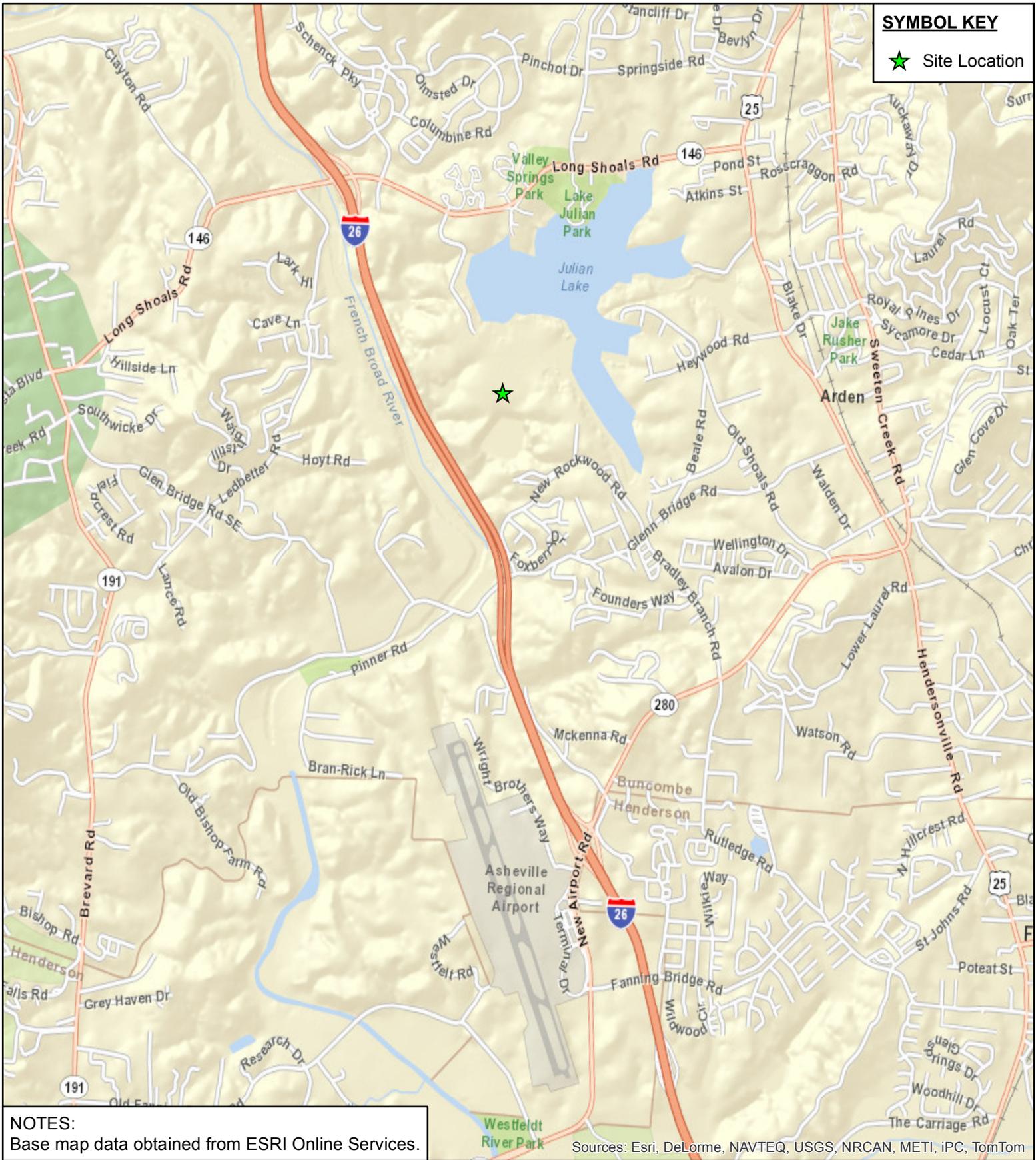
- Performance of 10 soil test borings to provide subsurface ash and soil samples and stratigraphy information. Soil test borings will be abandoned by grouting.

#### **4.0 LABORATORY TESTING**

Laboratory soils testing will be coordinated as samples are provided to Amec Foster Wheeler, anticipated to be on a weekly basis during the subsurface exploration. Soils testing may be performed by Amec Foster Wheeler.

Refer to Appendix I of this Plan for detailed tables describing the proposed monitoring wells, soil test borings, sample collection, and laboratory testing.

## FIGURES



NOTES:  
Base map data obtained from ESRI Online Services.

Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, IPC, TomTom

<p><b>Duke Energy</b></p> <p>Asheville Plant AMEC Proposal No.:</p>		<p><b>FIGURE 1</b></p> <p><b>Asheville Plant Location</b></p>
<p>0 1250 500 750 1,000 1,250 1,500 1,750 2,000 2,250 2,500</p> <p>Meters</p>	<p>0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000</p> <p>Feet</p>	<p>12/12/2014</p> <p>Arden_NC_Duke</p>
		<p>PROJ:</p> <p>Drawn: KAN</p>

Plotted By: Wiers, William Sheet Set: N/A Layout: 22x34 June 02, 2015 08:51:23am P:\CAD\Projects\7810\7810150250 Asheville Pond\Geotechnical\Asheville All Sample Loc with Prop Borings Plan A.dwg



**LEGEND**

- MW-3D, MW-3BR SYNTERRA SOIL BORING AND MONITORING WELL LOCATION
- ABMW-2, ABMW-2BR PROPOSED ASH BORING, PORE WATER, AND GROUNDWATER MONITORING WELL LOCATION
- AB-1 PROPOSED ASH BORING LOCATION
- CB-1 EXISTING BACKGROUND MONITORING WELL (SURVEYED)
- CB-4 EXISTING COMPLIANCE MONITORING WELL (SURVEYED)
- GW-5 EXISTING MONITORING WELL (APPROXIMATE)
- PZ-16 EXISTING PIEZOMETER (APPROXIMATE)
- NPDES OUTFALL 001 NPDES OUTFALL
- PROPOSED LANDFILL BORING LOCATIONS
- PROPOSED CLOSURE BORING LOCATIONS
- HISTORICAL BORING/WELL LOCATIONS
- DUKE ENERGY PROPERTY BOUNDARY
- PARCEL LINES
- FLOW DIRECTION
- 1 ACRE GRID
- STAGING AREA

**MAP SOURCES:**

1. 2014 AERIAL PHOTOGRAPH OBTAINED FROM WSP FLOWN ON APRIL 17, 2014.
2. 2012 AERIAL PHOTOGRAPH OBTAINED FROM THE NRCS GEOSPATIAL DATA GATEWAY AT <http://datagateway.nrcs.usda.gov/>
3. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD 83, NAVD88).
4. PARCEL BOUNDARY WAS OBTAINED FROM BUNCOMBE COUNTY GIS DATA AT [http://gis.buncombecounty.org/buncomap/Map\\_All.html](http://gis.buncombecounty.org/buncomap/Map_All.html)
5. COMPLIANCE MONITORING WELL LOCATIONS AND WASTE BOUNDARY FROM FCA OF NC, SURVEY DATED MARCH 2009. COMPLIANCE WELLS CB-3R, CB-9 AND SG-1 SURVEYED BY FCA OF NC, SURVEY DATED 2012-11-28.
6. ADDITIONAL MONITORING WELL AND PIEZOMETER LOCATIONS WERE BASED ON DATA PROVIDED BY DUKE ENERGY PROGRESS.

GRAPHIC SCALE

PRELIMINARY  
NOT FOR CONSTRUCTION

REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.

**DUKE ENERGY**

**CLIENT:**

DUKE ENERGY CAROLINAS  
BUNCOMBE COUNTY, NORTH CAROLINA

**CLIENT LOGO:**

**amec foster wheeler**

Amec Foster Wheeler Environment & Infrastructure, Inc.  
9725 COGDILL ROAD  
KNOXVILLE, TN 37932  
TEL: (865) 671-6774 FAX: (865) 671-6254

DATUM: WGS84 PROJECTION: STATE PLANE 83 DRAWN BY: WRW REVIEWED BY: CB SCALE: AS NOTED	<b>PROJECT:</b> ASHEVILLE PLANT 1982 POND LANDFILL BUNCOMBE COUNTY, NORTH CAROLINA  <b>TITLE:</b> ASHEVILLE PLANT BORING LOCATIONS	<b>PROJECT NO.:</b> 7810150250 <b>REVISION NO.:</b> NA <b>DATE:</b> 06-02-2015 <b>DRAWING NO.:</b> <span style="font-size: 24pt; font-weight: bold;">02</span>
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## **APPENDIX I**

### **Subsurface Exploration and Laboratory Testing Plan Tables**





**APPENDIX II**  
**Drilling and Sampling Procedures**

## **DRILLING AND SAMPLING PROCEDURES**

### General Tasks

Drilling and sampling of soil is anticipated on this site. The boring designation and location are shown on the Boring Plan (Figure 2). The borings will be initially located by the Surveyor. The initial location will be cleared of utilities. Boreholes will be drilled and sampled with truck or all-terrain vehicle mounted drill rigs.

### Pre-Mobilization Activities

Drill equipment will be inspected by the Amec Foster Wheeler Site Manager and Lead Geologist in conjunction with the drill crew prior to drilling to ensure materials and equipment are suitably clean and in visually good condition. The field inspection will be documented by the Rig Geologist.

### Designation of Borehole ID

The designations and names of boreholes and all other test locations will be those contained in the Boring Plan.

### Field Boring Location and Pre-Drilling Activities

Each drill rig will be equipped with an emergency spill kit. Drill rigs will be set up on tarps at each borehole location for spill containment.

The Amec Foster Wheeler drilling subcontractor will provide at the start of work, for each rig that is to perform SPT testing, a Certification of Calibration. As a minimum, this certification will include the following:

- General and unique equipment identification (name and serial or ID number).
- Name and signature of person performing calibration and date performed.
- Acceptance criteria (calibration limits) and, if required, conversion tables or curves.
- Date recalibration is due.
- Calibration equipment used and its traceability to the NIST or a natural physical constant.

### Drilling of Boreholes

Hand augering will be performed to a depth of five feet bgs for all borings. This step will be performed after GPR utility clearance has been performed and before drilling operations are to begin.

Hollow stem augers or rotary drilling methods may be used to drill in the soil until refusal or the specified depth is reached. Refusal is defined as 50 blows for 6 inches or less penetration. Rotary drilling should be conducted in accordance with ASTM D 5783-95 (2006). Drill string advance will be carefully controlled to minimize disturbance to formation soils.

The depth of each sample interval should be established by measurements of the downhole drilling rod length to within 3-inches, and measured from a fixed reference point (such as the top of drill casing or mud tank) with a measuring tape. These measurements will be recorded by the Rig Geologist/Engineer on the borehole log. The measurement will be made after the sampler is lightly seated in the bottom of the hole.

Upon retrieval, samples will be inspected, logged, and photographed by the Rig Geologist/Engineer, and transferred into suitable containers for storage. Sample handling will be performed in accordance with ASTM D 4220 (2007) and in accordance with the section on "Transportation and Storage of Samples".

### Sampling of Boreholes

Overburden soils may be sampled by SPT sampling, rotational pitcher sampling, and/or hydraulic push sampling. The equipment specified in the following paragraphs is to be used for these techniques.

SPT sampling equipment will meet ASTM D1586-08a, and include:

- Delivery system: Automatic-trip hammer; and
- SPT Sampler: 2.0-inch O.D., 1.375-inch I.D., 24-inch to 30-inch interior length, split-barrel sampler. Brass liners will not be used in SPT samplers.
- Drill Rods: The same size drill rods will be used throughout the boring. A- or N-sized rods will be used for borings up to 200 feet in depth. N-sized rods will be used for borings specified to be deeper than 200 feet.

Dimensions are standard for this type of sampler. Drive sampler shoes should be in good condition, i.e. not contain visible deformations, dings, or excessively worn edges. Worn drive shoes will be replaced as directed by the Rig Geologist/Engineer. Metal or plastic baskets can be used to retain soil samples. Undisturbed (intact) samples obtained using hydraulic push techniques will be obtained using procedures of ASTM D1587-08 at depths determined by the Project Principal. Recovered samples will be handled as described below:

If difficult drilling conditions are encountered, the sampling program may be modified at the driller's and Rig Geologist/Engineer's joint recommendation to allow completion of the hole. If this is necessary, a modification to the Work Instruction may be necessary to document the authorized changes made.

### Borehole Logging

Exploratory borings will be logged on a Geotechnical Field Boring Log that includes descriptions of drilling procedures, sampling, geologic materials, and general subsurface information. The following data, as applicable, is to be included on the field logs:

- Project name and job number;
- Date started and completed;
- Description of drill rig and name of Driller;
- Boring number;
- Type & diameter of boring;
- Elevation of top of hole (will not generally be available until the as-built survey is done);
- Boring location if significantly different from the location on the Boring Location Plan in the Subsurface Investigation Location Plan (may be shown on accompanying sketch with measurements from fixed reference features with a measuring tape and compass); location data to be understood as approximate until provided by the project surveyor (after drilling);
- Sampling method: including all samplers used;
- Sample driving hammer type and drop (ASTM standards for SPT sampling require a 140 lb. hammer with a 30 inch drop);
- Name of geologist/engineer logging the hole;
- Hammer sample blows per 6-inch (0.5 ft) drive;
- Description of soil
- Specific notes, as applicable, regarding drilling fluid circulation, casing dimensions, type of grout backfill, etc., and
- ASTM Test Method

### Soil Descriptions/Nomenclature

Descriptive terms and geologic classification of overburden material will be based on the following sources:

Soil and overburden description:

- ASTM D 2488-09a, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*; and
- Munsell soil color charts, 1994.

During drilling, the Rig Geologist will keep records of drilling conditions such as rod drop, water loss or drill chatter, standard penetration resistance, sample locations, material types, or any materials or occurrences, which may require additional investigation. Comments from the driller regarding drilling will also be noted.

The Daily Field Report for field activities will be maintained by the Rig Geologist and submitted to the Site Manager on a daily basis.

### Collection and Transportation of Samples

Collected samples will be stored in a manner that will allow future retrieval for examination and laboratory testing. The following procedures will be followed to preserve the sample integrity.

- a. ASTM standards D 4220 (2007) “Standard Practices for Preserving and Transporting Soil Samples”.
- b. Samples should be clearly labeled with the job name, job number, borehole number, depth and date collected.
- c. SPT sample specimens will be placed in glass sample jars/bottles fitted with moisture-resistant lids and the jars/bottles placed in cardboard boxes. Sample jars will be clearly marked with the following information in indelible ink:
  - Job Name and Project Number
  - Date of Sampling
  - Borehole Number
  - Depth Interval
  - Sample Number

Pre-printed adhesive labels will be placed on the sides of the glass sample jars to accommodate the above pertinent information. Boxes of sample jars (SPT samples) will have the job name, project number, boring number, and range of sample numbers, written on the side of the box in indelible ink.

- d. Intact sample tubes will be clearly marked with the following information using an indelible marker:
  - Job Name and Project Number
  - Date of Sampling
  - Borehole Number
  - Depth Interval
  - Sample Number

- e. Bulk sample buckets will be clearly marked with the following information using an indelible marker:
  - Job Name and Project Number
  - Date of Sampling
  - Borehole Number
  - Depth Interval
  - Sample Number

Field Samples consisting of full boxes of sample jars (SPT samples) will be stored to the On-Site Storage Facility on a daily basis. Partially filled boxes containing sample jars (SPT samples) may be stored in the drill rig cab or truck cab to remain on-site for continued use on the following working day until the box is full and sample container labeling can be properly completed.

### **Access to Field Records and Samples**

The Site Manager will control access to the On-Site Storage Facility and the Field Records stored in the office facility. The general public will not have access to the On-Site Storage or the office facility.

### **Transportation of Samples to Off-Site Locations**

When transfer to an off-site facility (e.g., the testing laboratory of Amec Foster Wheeler.) is required, the Amec Foster Wheeler Site Manager or Project Manager will determine when the transfer can be performed. Samples will be prepared for transportation and documented accordingly using a Chain-of-Custody (COC) form. The parties involved in sample transportation will fill in the COC form to completely document the transportation process. The Site Manager or his designee will collect the associated chain of custody forms and arrange for transport of the sample containers. Weather protection of the sample containers will be maintained during the transfer. The Site Manager or his designee will retain copies of the chain of custody form after relinquishing control to the testing laboratory or to Amec Foster Wheeler at the off-site facility.

### Unexpected Conditions

In the event of a changed condition at the drilling/sampling site – above or below grade (i.e., oil spills, injuries, and encounters with potentially hazardous material), the Site Manager will stop the work and notify the on-site Amec Foster Wheeler representative for the purposes of organizational notification. These changes in conditions can include but not be limited to encounters with unexpected concrete, unexpected metal, or unusual material returned in the wash water or drill cuttings. For any of the above, operations will cease regardless of depth of drilling or sampling.

### SPT Energy Measurement

Energy measurements shall be performed on each hammer, in general accordance with ASTM D 4633-10, no later than 2 weeks following mobilization of the last drill rig to the job site. In addition, energy measurements shall be made on a rig prior to the first shift following any repair to the hammer system. The measurements may be made at depths other than those specified in ASTM D 4633-10 if required to accommodate site subsurface soil conditions. Energy measurements shall be performed for each rod size used with a particular SPT hammer. The SUBCONTRACTOR shall prepare and submit an energy measurement report containing, at a minimum, the information described in Section 8 of ASTM D 4633-10.

**APPENDIX III**  
**Work Packages**

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

1.

Boring No.	Scope of Work
<b>BC-1</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-2</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-3</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-4</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-5</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 100 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-6</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 100 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-7</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 100 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**DRILLING WORK INSTRUCTION**

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-8</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 100 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-9</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 30 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**DRILLING WORK INSTRUCTION**

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BC-10</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the 1964 Pond area of the plant. Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. Conduct Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 30 feet)		
Termination Criteria	SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

## DRILLING WORK INSTRUCTION

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>• Standard setup.</li> <li>• Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>• Abandon hole with grout after obtaining water levels</li> <li>• Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-1</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

#### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**DRILLING WORK INSTRUCTION**

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-2</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-3</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure e

Boring No.	Scope of Work
<b>BL-4</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

## DRILLING WORK INSTRUCTION

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>• Standard setup.</li> <li>• Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>• Abandon hole with grout after obtaining water levels</li> <li>• Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-5</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-6</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-7</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-8</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-9</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-10</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-11</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-12</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-13</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-14</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-15</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-16</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**DRILLING WORK INSTRUCTION**

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-17</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-18</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-19</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-20</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-21</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-22</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-23</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-24</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-25</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-26</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-27</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-28</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
3	Ergonomics
4	Field General
5	Haz Com
6	Housekeeping
7	Insect Stings and Bites and Poisonous Plants
8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-29</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
Enhanced Setup	Standard supplies plus silt fencing between drilling and pond.
Critical	Standard and enhanced supplies plus Safety watch during drilling.

AHA No.	AHA Description
1	Drilling and Well Installation
2	Emergency Preparedness and Shower/Eyewash Use
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8	Machine Guarding and Portable Hand Tools
9	Means of Egress, Fire Prevention and Protection
10	Mobilization – Demobilization
11	PPE Use
12	Soil Sampling
15	Vehicle Travel
16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use

## DRILLING WORK PACKAGE

### Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure

Boring No.	Scope of Work
<b>BL-30</b>	<ul style="list-style-type: none"> <li>• This boring is being advanced in the proposed landfill area (approximate footprint of the 1982 pond). Emergency grout mix must be readily available at the boring location throughout field activities. The site map and boring location figures are included in the exploration plan.</li> <li>• Advance drilling/sampling equipment through subsurface materials to termination depth. If ash is present at the surface, advance auger to the top of natural ground where Standard Penetration Testing (SPT) using 1.5-foot split spoon samples collected on 5-foot centers to the target total depth. Collect bulk and/or undisturbed samples where applicable as designated in the exploration plan</li> <li>• Abandon boring with cement-bentonite grout to the ground surface. The grout will be pumped to the bottom of the boring through a PVC tremie pipe.</li> </ul>

### Boring Specifications

Work Item	Specified (Geotechnical Engineer)	Actual (Geo/Env)	Comment
Drilling Setup/ Environmental	Standard (see below)		
Target Total Depth	Top of bedrock (estimated as 50 feet)		
Termination Criteria	Drill to SPT refusal (determined as SPT N-value of 50 blows for 6")		
Drilling Methods	Hand auger first 5 feet. Then use Hollow stem augers, or designated drilling method per the lead geotechnical engineer, to target total depth.		
Sampling	If ash is present at the surface, advance auger to the top of natural ground where Split-spoon samples will be collected on 5-foot centers to the target total depth. Bulk and/or undisturbed samples will be collected as designated in the exploration plan.		
Surface casing Installation	Not applicable.		
Piezometer Casing Installation	Not applicable.		
Well Installation Depth	Not applicable		
Well Development	Not applicable		
Boring Grout Mix (For Abandoning Borehole)	2.5-lbs Bentonite 94-lbs Portland Cement 10 gallons of water		
Emergency Grouting Mix	2.5 to 4.5-lbs Bentonite 94-lbs Portland Cement 7.5-8.5 gallons potable water		
Well Completion/Bollards	Not applicable		

**Duke Energy- Asheville Plant: Landfill Development and Ash Basin Closure**

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	<ul style="list-style-type: none"> <li>Standard setup.</li> <li>Hand auger the first 5 feet, then use specified drilling method through soil and/or ash, collect standard split spoon, bulk, and/or undisturbed samples where applicable</li> </ul>	1 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 20, 21, 22						
2	<ul style="list-style-type: none"> <li>Abandon hole with grout after obtaining water levels</li> <li>Demobilization</li> </ul>	1, 4 7, 9, 10, 11, 15, 17						

Drilling Setup/Environmental (Depends on boring location relative to water ways)	
Standard Setup	Verify utility clearance Drill rig and grout equipment on Visquene plastic sheeting Emergency spill kit available Pumps with leak-free hoses Emergency grouting materials and water for mix Spread cuttings at boring location or other designated area specified by Duke Energy Spread Straw/Seed for stabilization
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16	Working over or near water
17	Drilling in an Ash Basin
18	Crane Mats
20	Drum soil transfer to roll off
21	Direct push soil sampling
22	Hand Auger Use