

Execution Plan

Landfill Development for Dan River Steam Station



Prepared by: Amec Foster Wheeler
Environment and Infrastructure, Inc.
2801 Yorkmont Road, Suite 100
Charlotte, NC 28208
Tel: 704 357 8600
Fax: 704 357 8638

CONTENTS

INTRODUCTION 1
SITE SAFETY PERSONNEL 2
EXECUTION PLAN 2

FIGURES

- 1 Potential On-Site Landfill Boring Location Plan

ATTACHMENTS

- A Execution Plan

INTRODUCTION

Field activities which were scheduled to be conducted to support design of an off-site landfill will now be conducted on Dan River Steam Station property (on-site option). These field activities consist of general field reconnaissance, utility location, surveying, geophysical survey, tree clearing, geotechnical borings, installation of observation wells, water level monitoring, and abandonment of wells.

The change in scheduled field activities is documented by this revised Execution Plan. Previously scheduled field activities including subsurface exploration have already been conducted at Dan River Steam Station.

The general scope of this Execution Plan is to describe proposed field activities to support design of a landfill on Dan River Steam Station property. The proposed on-site landfill is anticipated to be constructed within the Ash Fill 1 footprint as shown in Figure 1. The field activities associated with this project can generally be divided into the following objectives:

- Subsurface Exploration and Laboratory Testing; and
- General.

Field work supporting subsurface exploration is proposed for the Dan River Steam Station. General field activities will be performed as described in a later section of this document. Field work specific to subsurface exploration for the Dan River Steam Station may include the following activities:

- Clearing with a forestry grinder;
- Installation of erosion control measures anticipated to include compost socks;
- Localized grading with a bulldozer to provide drilling pads for drill rigs and promote drainage as necessary;
- Geophysical survey anticipated to be conducted with an All Terrain Vehicle (ATV) or other off-road vehicle;
- Drilling geotechnical borings;
- Installation of observation wells;
- Abandonment of geotechnical borings; and
- Abandonment of observation wells.

General field activities will be performed at multiple project locations throughout the duration of the project and may include the following activities:

- Utility location;
- General field reconnaissance;
- Obtaining water level measurements at observation wells;
- Surveying.

SITE SAFETY PERSONNEL

A Site Safety Officer (SSO) will be present during field work activities. The SSO will have no other responsibilities other than safety during field work specific to subsurface exploration. The responsibilities of the SSO are described in the Health and Safety Plan (HASP).

CUTTINGS FROM DRILLING ACTIVITIES

Prior to drilling, a drill cutting secondary containment area consisting of tarped containment and erosion control measures and/or roll-off container will be located/constructed as acceptable to Site Safety and Environmental personnel.

During drilling, cuttings that consist of soil and do not appear to have suspicious characteristics can be spread on the ground at the boring location. If cuttings are ash and can't be put back down the borehole they will be containerized as directed by Site Safety & Environmental personnel and stored in the secondary containment area. Site Safety and Environmental personnel will be notified immediately if suspicious soil is identified in cuttings or split spoon samples.

EXECUTION PLAN

The Execution Plan is provided to describe utility clearance, access, drilling, sampling, well construction methods, and potential hazards at each subsurface exploration location. The Execution Plan is included in Attachment A.

FIGURES

Potential On-Site Landfill Boring Location Plan

ATTACHMENT A

Execution Plan

ACCESS WORK SHEET

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID	Boring Type & Location																																																																
<p>Borings:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">B-451</td> <td style="width: 25%;">B-457</td> <td style="width: 25%;">B-464</td> <td style="width: 25%;"></td> </tr> <tr> <td>B-452</td> <td>B-458</td> <td></td> <td></td> </tr> <tr> <td>B-453</td> <td>B-459</td> <td></td> <td></td> </tr> <tr> <td>B-454</td> <td>B-460</td> <td></td> <td></td> </tr> <tr> <td>B-455</td> <td>B-462</td> <td></td> <td></td> </tr> <tr> <td>B-456</td> <td>B-463</td> <td></td> <td></td> </tr> </table> <p>Wells:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 16.6%;">OW-401S</td> <td style="width: 16.6%;">OW-406S</td> <td style="width: 16.6%;">OW-410S</td> <td style="width: 16.6%;">OW-415S</td> <td style="width: 16.6%;">OW-419S</td> </tr> <tr> <td>OW-401D</td> <td>OW-406D</td> <td>OW-410D</td> <td>OW-415D</td> <td></td> </tr> <tr> <td>OW-403S</td> <td>OW-407S</td> <td>OW-411S</td> <td>OW-416S</td> <td></td> </tr> <tr> <td>OW-403D</td> <td>OW-407D</td> <td>OW-411D</td> <td>OW-416D</td> <td></td> </tr> <tr> <td>OW-404S</td> <td>OW-408S</td> <td>OW-412S</td> <td>OW-417S</td> <td></td> </tr> <tr> <td>OW-404D</td> <td>OW-408D</td> <td>OW-413S</td> <td>OW-417D</td> <td></td> </tr> <tr> <td>OW-405S</td> <td>OW-409S</td> <td>OW-414S</td> <td>OW-418S</td> <td></td> </tr> <tr> <td>OW-405D</td> <td>OW-409D</td> <td>OW-414D</td> <td>OW-418D</td> <td></td> </tr> </table>	B-451	B-457	B-464		B-452	B-458			B-453	B-459			B-454	B-460			B-455	B-462			B-456	B-463			OW-401S	OW-406S	OW-410S	OW-415S	OW-419S	OW-401D	OW-406D	OW-410D	OW-415D		OW-403S	OW-407S	OW-411S	OW-416S		OW-403D	OW-407D	OW-411D	OW-416D		OW-404S	OW-408S	OW-412S	OW-417S		OW-404D	OW-408D	OW-413S	OW-417D		OW-405S	OW-409S	OW-414S	OW-418S		OW-405D	OW-409D	OW-414D	OW-418D		<ul style="list-style-type: none"> ● B-451 through B-463: SPT borings backfilled upon completion at various locations on and around Ash Fill 1. Boring B-464 converted to OW-419S ● OW-401S through OW-419S ("S" designation locations only): Auger borings with observation well installed at various locations on and around Ash Fill 1 ● OW-401D through OW-418D ("D" designation locations only): SPT & NQ rock core borings with observation well installed at various locations on and around Ash Fill 1 <p>Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan</p>
B-451	B-457	B-464																																																															
B-452	B-458																																																																
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OW-405D	OW-409D	OW-414D	OW-418D																																																														

Access Specifications			
Work Item	Anticipated	Actual	Comment
Access to locations at Toe Perimeter of Ash Fill 1	Established station roadways-paved, gravel, earth Turnaround: Yes		
Clearing Required	No		
Clearing Method	Not Applicable		
Access to locations at Crest of Ash Fill 1	Established station roadways-paved, gravel, earth Turnaround: Yes		
Clearing Required	No		
Clearing Method	Not Applicable		
Access to locations at Outside Perimeter of Ash Fill 1	Established station roadways-paved, gravel, earth; then cleared pathways Turnaround: Yes		
Clearing Required	Yes		
Clearing Method	Forestry Grinder		
Equipment/Supply Storage	Dedicated staging areas located near ash fills; flat, dry area. Spill containment must be placed and maintained for required equipment and supplies as directed by Site Safety and Environmental personnel.		
REFER TO DRILLING/SURVEY WORK PACKAGE FOR APPLICABLE MATERIALS REQUIREMENTS, ENVIRONMENTAL SETUP, ASSIGNMENTS, & AHA			

BORING LOCATION WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID						Scope of Work
Borings:	B-451	B-457	B-464			•Locate proposed boring and excavation locations using GPS and stake/flag in the field. Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan
	B-452	B-458				
	B-453	B-459				
	B-454	B-460				
	B-455	B-462				
	B-456	B-463				
Wells:	OW-401S	OW-406S	OW-410S	OW-415S	OW-419S	
	OW-401D	OW-406D	OW-410D	OW-415D		
	OW-403S	OW-407S	OW-411S	OW-416S		
	OW-403D	OW-407D	OW-411D	OW-416D		
	OW-404S	OW-408S	OW-412S	OW-417S		
	OW-404D	OW-408D	OW-413S	OW-417D		
	OW-405S	OW-409S	OW-414S	OW-418S		
	OW-405D	OW-409D	OW-414D	OW-418D		

Utility Clearance Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify proposed boring locations; set GPS precision to high		
Boring Location Criteria	Stake/flag boring within 25 ft of proposed location; Contact Project Manager if location cannot be staked/flagged within 25 ft of proposed location due to access or known overhead/underground utilities, or other obstruction. Project Manager must obtain written approval of shifted boring location from Duke Engineering.		
Boring Location Method	GPS/wooden stakes		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
1	Standard Setup & GPS Boring Location	3	GPS Operator				
		6					
		7					
		9					
		13	Location Marker				
		15					
		16					
		24					

AHA No.	AHA Description
3	Clearing Brush and Trees
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

E&SC MEASURE INSTALLATION WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID					Scope of Work	
Borings:	B-451	B-457	B-464		●Install compost SOXX on downhill side of boring and well locations.	
	B-452	B-458				
	B-453	B-459				
	B-454	B-460				
	B-455	B-462				
	B-456	B-463				
Wells:	OW-401S	OW-406S	OW-410S	OW-415S		OW-419S
	OW-401D	OW-406D	OW-410D	OW-415D		
	OW-403S	OW-407S	OW-411S	OW-416S		
	OW-403D	OW-407D	OW-411D	OW-416D		
	OW-404S	OW-408S	OW-412S	OW-417S		
	OW-404D	OW-408D	OW-413S	OW-417D		
	OW-405S	OW-409S	OW-414S	OW-418S		
	OW-405D	OW-409D	OW-414D	OW-418D		

Utility Clearance Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify specifications and locations prior to installation.		
E&SC Measure Installation	Prior to Drilling		
Installation Method	Stake with wooden stakes placed at 5-feet on center.		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
1	Standard Setup; Install E&SC Measures	6	Crew Supervisor(s)				
		9					
		13					
		15					
		16					
		18					
		24					
37							

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
9	Field General
13	Insect Stings and Bites and Poisonous Plants
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
37	Handling & Deploying Compost Filter Soxx

CLEARING & GRADING WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID		Scope of Work
Borings: B-451 B-452 B-453 B-463 Wells: OW-401S OW-409S OW-401D OW-409D OW-403S OW-403D OW-404S OW-404D OW-405S OW-405D	•Clear brush and trees required for drill rig access to boring locations. Tree clearing will be performed prior to April 1, 2015. •Grade or "bench-in" drill rig pads as needed at drill locations with uneven slopes.	
		Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan

Utility Clearance Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify boring locations. If benching required, verify utility clearance prior to grading. Daily equipment check performed and acceptable. Spill kit available on equipment.		
Land Clearing Criteria	Clear ~10-ft wide paths to boring locations considering both shortest distance and paths of least resistance (i.e. thinner vegetation and shallower slope). Clear ~50-ft diameter "culda-sacs" at boring locations suitable for equipment turnaround.		
Land Clearing Method	Forestry Grinder (mulcher)		
Grading Method	Bucket attachment to forestry grinder		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
1	Standard Setup & Land Clearing with Forestry Grinder	3	Equipment Operator				
		6	GPS Operator				
		9					
		13					
		15					
		16					
		18					
		24					
30							

AHA No.	AHA Description
3	Clearing Brush and Trees
6	Emergency Preparedness and Shower/Eyewash Use
9	Field General
13	Insect Stings and Bites and Poisonous Plants
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
30	Grading

UTILITY CLEARANCE WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID					Scope of Work	
<i>Borings:</i>	B-451	B-457	B-464		●Evaluate the proposed boring for the presence of underground utilities using Electromagnetic (EM) and Ground Penetrating Radar (GPR) methods. Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan	
	B-452	B-458				
	B-453	B-459				
	B-454	B-460				
	B-455	B-462				
	B-456	B-463				
<i>Wells:</i>	OW-401S	OW-406S	OW-410S	OW-415S		OW-419S
	OW-401D	OW-406D	OW-410D	OW-415D		
	OW-403S	OW-407S	OW-411S	OW-416S		
	OW-403D	OW-407D	OW-411D	OW-416D		
	OW-404S	OW-408S	OW-412S	OW-417S		
	OW-404D	OW-408D	OW-413S	OW-417D		
	OW-405S	OW-409S	OW-414S	OW-418S		
	OW-405D	OW-409D	OW-414D	OW-418D		

Utility Clearance Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify boring location		
Utility Clearance Criteria	Evaluate the ground surface within 25 feet of the boring location. Mark utilities using standard identifying colors. Anomalies to be marked in white. Documentation of findings to be provided to SSO and Duke Project Manager for inclusion on LOTO verification form and Trenching/Excavation permit.		
Utility Clearance Method	Electromagnetic (EM) and Ground Penetrating Radar (GPR)		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
1	Standard Setup; EM & GPR Utility Clearance	6	Technician(s)				
		7					
		9					
		13					
		15					
		16					
		18					
		23					
		24					

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
23	Utility Clearance
24	Vehicle Travel

GEOPHYSICAL SURVEY WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID	Scope of Work
<p>Borings: B-451 B-457 B-464 B-452 B-458 B-453 B-459 B-454 B-460 B-455 B-462 B-456 B-463</p> <p>Wells: OW-401S OW-406S OW-410S OW-415S OW-419S OW-401D OW-406D OW-410D OW-415D OW-403S OW-407S OW-411S OW-416S OW-403D OW-407D OW-411D OW-416D OW-404S OW-408S OW-412S OW-417S OW-404D OW-408D OW-413S OW-417D OW-405S OW-409S OW-414S OW-418S OW-405D OW-409D OW-414D OW-418D</p>	<p>● Perform geophysical survey along available access paths.</p> <p>Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan</p>

Utility Clearance Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Attach geophysical survey equipment to UTV		
Geophysical Survey Criteria	Drive UTV along access paths with geophysical survey equipment recording during travel. Goal is to cover as much of the site vicinity as practical using existing paths.		
Geophysical Survey Method	Magnetometer		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
		6	Equipment Operator(s)				
		7					
		9					
		13					
		15					
		16					
		18					
		24					

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID	Scope of Work
B-451 B-452 B-453 B-454 B-455 B-456 B-457	B-458 B-459 B-460 B-462 B-463 B-464
<ul style="list-style-type: none"> • SPT auger drill through soil/ash to equipment refusal depths and collect split-spoon samples and bulk samples as described below. • Install temporary PVC standpipe and obtain 24-hour water level measurement. • Abandon boring with boring grout mix to ground surface as described below except for B-464 (converted to OW-419S) <p style="text-align: center;"><i>Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan</i></p>	

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Termination Criteria	Drill to equipment refusal depth		
Drill Methods	Hollow-Stem Auger		
Water Hauling	Portable tanks or water truck filled from hydrant at Massood Logistics adjacent to Hopkins property		
Sampling	<ul style="list-style-type: none"> • Collect split-spoon samples using 1.5-ft sampler; samples collected every 5 ft starting at 3.5 ft bgs and continue until boring termination 		
	<ul style="list-style-type: none"> • Collect bulk sample from composite drill cuttings from residual soils (depth intervals will vary among borings) in 5-gallon plastic buckets with lids 		
IDW Handling	If cuttings are ash and can't be put back down the borehole or suspicious soil, they will be containerized as directed by Site Safety & Environmental personnel. If cuttings are soil and do not appear to have suspicious characteristics, they can be spread on ground at boring location.		
Surface Casing Installation	Not Applicable		
Well Casing Installation	Not Applicable		
Well Installation Depth	Not Applicable		
Well Development	Not Applicable		
Boring Grout Mix (for borehole abandonment)	2.5 lbs bentonite; 94 lbs portland cement; 10 gallons water; Grout mix will be pumped to bottom of the boring through PVC tremie pipe; grout clean-out residue to be disposed of dry.		
Emergency Grouting Mix	Not Applicable		
Bollards	Not Applicable		
Other Considerations	Type I flashing light barricades to be used at road-edge borings if left open or unfinished overnight.		

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Drill borehole; Collect split-spoons and bulk samples	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
2	Abandon Borehole; Demobilize	24						
		35						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
18								
24								

Drilling Setup	
Standard	Verify boring ID/utility clearance/Trenching and Excavation Permit
	Drill rig and grout equipment on spill containment
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, geologist working surface (i.e. table, tailgate, side of rig)

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
35	Drummed Soil Transfer to Roll-Off Container

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID	Scope of Work
OW-401S OW-411S	<p>• Auger drill through soil/ash to equipment refusal depths or approximately 10-feet into groundwater table, whichever is encountered first; collect undisturbed sample, install Type II well, and develop well as described below.</p> <p style="text-align: center;"><i>Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan</i></p>
OW-403S OW-412S	
OW-404S OW-413S	
OW-405S OW-414S	
OW-406S OW-415S	
OW-407S OW-416S	
OW-408S OW-417S	
OW-409S OW-418S	
OW-410S OW-419S	

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Termination Criteria	Drill to equipment refusal depth or ~10-ft into water table, whichever is encountered first		
Drill Methods	Hollow-Stem Auger		
Water Hauling	Portable tanks or water truck filled from hydrant at Massood Logistics adjacent to Hopkins property		
Sampling	Collect 1 undisturbed sample of residual material from each location from within anticipated saturated screened interval with piston sampler & 2-ft Shelby tube. Preserve Shelby tubes with wax and sealed plastic caps.		
IDW Handling	If cuttings are ash and can't be put back down the borehole or suspicious soil, they will be containerized as directed by Site Safety & Environmental personnel. If cuttings are soil and do not appear to have suspicious characteristics, they can be spread on ground at boring location.		
Surface Casing Installations	4"x 4" Steel Stick-Up		
Well Casing Installations	Type II-2" PVC		
Well Installation Depth	Varies		
Well Screen Interval	10-ft screens at varying depths		
Well Development	Yes: submersible pump or Waterra		
Boring Grout Mix (for well)	2.5 lbs bentonite; 94 lbs portland cement; 10 gallons water; Grout mix will be pumped to bottom of the boring through PVC tremie pipe; grout clean-out residue to be disposed of dry.		
Emergency Grouting Mix	Not Applicable		
Bollards	None		
Other Considerations	Type I flashing light barricades to be used at road-edge borings if left open or unfinished overnight.		

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Drill borehole; Collect undisturbed sample	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
2	Install Well; Demobilize	24						
		35						
		5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
16								
18								
24								

Drilling Setup	
Standard	Verify boring ID/utility clearance/Trenching and Excavation Permit
	Drill rig and grout equipment on spill containment
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, geologist working surface (i.e. table, tailgate, side of rig)

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
35	Drummed Soil Transfer to Roll-Off Container

DRILLING WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID	Scope of Work
OW-401D OW-411D OW-403D OW-414D OW-404D OW-415D OW-405D OW-416D OW-406D OW-417D OW-407D OW-418D OW-408D OW-409D OW-410D	<p>•SPT auger drill through soil/ash to equipment refusal depths; collect split-spoon samples and bulk samples as described below; install 6" PVC Outer Casing to top of bedrock; NQ rock core; install Type III well, and develop well as described below.</p> <p style="text-align: center;"><i>Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan</i></p>

Boring Specifications			
Work Item	Anticipated	Actual	Comment
Drilling Setup	Standard (see below)		
Termination Criteria	Drill approx. 10' into bedrock; looking for water-bearing fractures		
Drill Methods	Hollow-Stem Auger/NQ Core		
Water Hauling	Portable tanks or water truck filled from hydrant at Massood Logistics adjacent to Hopkins property		
Sampling	<ul style="list-style-type: none"> •Collect split-spoon samples using 1.5-ft sampler; samples collected every 5 ft starting at 3.5 ft bgs and continue until refusal depth •Collect bulk sample from composite drill cuttings from residual soils (depth intervals will vary among borings) in 5-gallon plastic buckets with lids 		
	<p>If cuttings are ash and can't be put back down the borehole or suspicious soil, they will be containerized as directed by Site Safety & Environmental personnel. If cuttings are soil and do not appear to have suspicious characteristics, they can be spread on ground at boring location.</p>		
Surface Casing Installations	6"x 6" Steel Stick-Up		
Well Casing Installations	Type III - 6" PVC Outer Casing; 2" PVC Well Casing		
Well Installation Depth	Varies		
Well Screen Intervals	5-ft screens at varying depths		
Well Development	Yes: submersible pump or Waterra		
Boring Grout Mix (for outer casing & well)	2.5 lbs bentonite; 94 lbs portland cement; 10 gallons water; Grout mix will be pumped to bottom of the boring through PVC tremie pipe; grout clean-out residue to be disposed of dry.		
Emergency Grouting Mix	Not Applicable		
Bollards	None		
Other Considerations	Type I flashing light barricades to be used at road-edge borings if left open or unfinished overnight.		

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Standard Setup; Water hauling; Drill borehole; Collect split-spoons and bulk samples	5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
		16						
		18						
2	Install wells; Demobilize	24						
		35						
		5						
		6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
16								
18								
24								

Drilling Setup	
Standard	Verify boring ID/utility clearance/Trenching and Excavation Permit
	Drill rig and grout equipment on spill containment
	Emergency spill kit available
	Pumps with leak-free hoses
	Shovels, wrenches, geologist working surface (i.e. table, tailgate, side of rig)

AHA No.	AHA Description
5	Drilling Operations and Well Installation
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel
31	Groundwater Sampling
35	Drummed Soil Transfer to Roll-Off Container

Slug Test Setup	
Standard	Verify well ID
	Unlock well and remove expandable cap. If cap appeared to be under pressure (positive or negative) when removed, allow water level to stabilize before recording static water level. (Can check with water level indicator probe to see if water level is rising or falling prior to slug testing equipment being placed in well).
	Pump decontaminated with Liquinox/Dionized Water Solution OR new bailer
	Clean tubing
	Data logger turned on

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Setup & Slug Test	6						
		7						
		9						
		12						
		13						
		16						
		18						
24								
2	End Test & Remove testing equipment	6						
		7						
		9						
		12						
		13						
		16						
		18						
24								

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

SURVEY WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID					Scope of Work	
<i>Borings:</i>	B-451	B-457	B-464		<ul style="list-style-type: none"> • Establish vertical and horizontal control from established benchmark/datum • Clear vegetation to establish line of sight for survey level/GPS as needed (most locations are in open areas or will have paths cleared to by time of survey) • Collect horizontal and vertical points for boring and well locations; Record vertical points for both ground surface and top of PVC casing at well locations 	
	B-452	B-458				
	B-453	B-459				
	B-454	B-460				
	B-455	B-462				
	B-456	B-463				
<i>Wells:</i>	OW-401S	OW-406S	OW-410S	OW-415S		OW-419S
	OW-401D	OW-406D	OW-410D	OW-415D		
	OW-403S	OW-407S	OW-411S	OW-416S		
	OW-403D	OW-407D	OW-411D	OW-416D		
	OW-404S	OW-408S	OW-412S	OW-417S		
	OW-404D	OW-408D	OW-413S	OW-417D		
	OW-405S	OW-409S	OW-414S	OW-418S		
	OW-405D	OW-409D	OW-414D	OW-418D		
					Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan	

Surveying Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify boring/well locations; Site clear for survey as needed		
Survey Method	Survey Level or GPS		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
1	Standard Setup & Survey	3	Crew Chief				
		6					
		7					
		9					
		13	Technician (s)				
		16					
		18					
		20					
24							

AHA No.	AHA Description
3	Clearing Brush and Trees
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
16	Mobilization/Demobilization
18	PPE Use
20	Surveying
24	Vehicle Travel

WATER LEVEL COLLECTION WORK PACKAGE

Duke Energy - Dan River Steam Station: On-Site Landfill Development

Location ID						Scope of Work
Current Project Wells:	OW-401S	OW-406S	OW-410S	OW-415S	OW-419S	● Measure and record depth to groundwater surface with respect to top of PVC casing of wells.
	OW-401D	OW-406D	OW-410D	OW-415D		
	OW-403S	OW-407S	OW-411S	OW-416S		
	OW-403D	OW-407D	OW-411D	OW-416D		
	OW-404S	OW-408S	OW-412S	OW-417S		
	OW-404D	OW-408D	OW-413S	OW-417D		
	OW-405S	OW-409S	OW-414S	OW-418S		
Wells Installed By Others	GWA-1S	GWA-3S	MW-301BR	AS-4D		Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan
	GWA-1D	GWA-3D	MW-303BR	AS-6D		
	GWA-2S	GWA-11S	MW-306-BR	AS-10D		
	GWA-2D	GWA-11D	AS-2D	AS-12D		
Dan River Steam Station Site	MW-12	MW-20D				
	MW-12D	MW-23D				
Historic Wells:	MW-20S					

Water Level Collection Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard: Verify well location; unlock surface casing; remove well cap; decontaminate water level meter with alconox or liquinox solution and a deionized water rinse		
Water Level Collection Method	Electric Water Level Indicator Probe with 0.01-ft incremented tape		

Assignments							
No.	Activity	AHA No.	Personnel Assigned	Date Assigned	Date Started	Date Completed	SSO Accepted
			Field Technicians				
1	Setup and Collect Water Levels	6					
		7					
		9					
		13					
		16					
		18					
		24					

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
13	Insect Stings and Bites and Poisonous Plants
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel

WELL ABANDONMENT WORK PACKAGE						
Duke Energy - Dan River Steam Station: On-Site Landfill Development						
Location ID					Scope of Work	
Wells:	OW-401S	OW-406S	OW-410S	OW-415S	OW-419S	●Abandon wells by in-place tremie method; placing grout inside well PVC from bottom of well to ground surface. Refer to Figure 1 - Potential On-Site Landfill Boring Location Plan (or As-Built drawing if it is available at time of abandonment)
	OW-401D	OW-406D	OW-410D	OW-415D		
	OW-403S	OW-407S	OW-411S	OW-416S		
	OW-403D	OW-407D	OW-411D	OW-416D		
	OW-404S	OW-408S	OW-412S	OW-417S		
	OW-404D	OW-408D	OW-413S	OW-417D		
	OW-405S	OW-409S	OW-414S	OW-418S		
	OW-405D	OW-409D	OW-414D	OW-418D		

Well Abandonment Specifications			
Work Item	Anticipated	Actual	Comment
Setup	Standard Setup (see below)		
Remove Well Pad & Surface Casing	Chain pull with support truck or skid-steer		
Abandonment Method	In-Place Tremie Grout; grout clean-out residue to be disposed of dry		

Well Abandonment Setup	
Standard	Verify well ID/Trenching and Excavation Permit
	Daily inspection of equipment performed and acceptable
	Grout equipment on spill containment
	Emergency spill kit available
	Pumps with leak-free hoses

Assignments								
No.	Activity	AHA No.	Personnel Assigned		Date Assigned	Date Started	Date Completed	SSO Accepted
			Geo/Eng	Driller				
1	Setup & Remove Well Pad and Surface Casing	6						
		7						
		9						
		12						
		13						
		15						
		16						
		18						
2	Abandon Well	6						
		7						
		9						
		11						
		12						
		13						
		14						
		15						
16								
18								
24								

AHA No.	AHA Description
6	Emergency Preparedness and Shower/Eyewash Use
7	Ergonomics
9	Field General
11	Haz Com
12	Housekeeping
13	Insect Stings and Bites and Poisonous Plants
14	Machine Guarding and Portable Hand Tools
15	Means of Egress, Fire Prevention and Protection
16	Mobilization/Demobilization
18	PPE Use
24	Vehicle Travel