DUKE ENERGY CORPORATION
526 South Church St.
Charlotte, NC 28202
Mailing Address:
PO Box 1006
Charlotte, NC 28201-1006

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36-12	**October 12, 2007**	**5640**

RECEIVED
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SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

APPROVED DOCUMENT
Division of Waste Management
Solid Waste Section
Date **September 2, 2008** By **LY Frost**

October 8, 2007

North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
401 Oberlin Road
Raleigh, N.C. 27605

Attention: Mr. Edward F. Mussler, III, P.E.

Subject: Duke Energy – Allen Steam Station
Retired Ash Basin CCP Landfill
Ash Structural Fill – Section .1700 Notification

Dear Mr. Mussler:

As requested, attached is information relative to the construction of an ash test fill for the purpose of corroborating settlement analyses for the proposed CCP landfill at Allen Steam Station. The information is submitted in accordance with the CCP structural fill notification requirements as outlined in 15A NCAC 13B .1703.

Duke Energy's understanding is that the test fill will be evaluated based upon the requirements of Sections .1703, .1704 and .1705 of DWM's "Requirements for Beneficial Use of Coal Combustion By-Products" and the September 24, 2007 letter from Jon Risgaard of NCDWQ to Larry Frost of NCDWM requiring that the fill also meet the permit conditions set forth in Permit No: WQ0000452.

The attached information addresses requirements in Section .1703, .1704 and pertinent items in .1705. The fill will also be operated to meet the requirements of the Water Quality permit due to the use of "wet" ash from the station's ash basin.

Upon approval, construction of the test fill is planned for early November 2007. If there are any questions or if additional information is needed, please contact me at 980-373-7892.

Sincerely,

Christopher D. Hallman

Christopher D. Hallman, P.E.
Waste and Remediation Management
Duke Energy Corporate EHS

Attachments

cc (w/att): Larry Frost – NCDENR, Asheville Office
Ted Manes

cc (wo/att): Bill McCabe

Allen Steam Station

Retired Ash Basin Landfill

Test Ash Fill Project Submittal

Duke Energy
October 8, 2007

Allen Steam Station Landfill - Ash Test Fill
Structural Fill Notification Requirements

15A NCAC 13B .1703(a)

1. "A description of the nature, purpose and location of the project, including the name of the United States Geological Survey seven and one-half minute map on which the project is located and a Department of Transportation map or an eight and one-half by 11 inch topographic map showing the project."

   The structural fill is being constructed for the purpose of providing data on the settlement that will occur as a result of the fill being located over an existing retired ash basin at the Allen Steam Station site. The settlement data will be used to corroborate landfill settlement analyses in preparation for a CCP landfill over the existing retired ash basin. The retired ash basin is located just south of the Allen Steam Station powerhouse area and adjacent to the Catawba River. The Allen site appears on the Belmont, N.C. seven and one-half minute USGS quadrangle map. Attached Figure 1 is a partial topo map from the Belmont quadrangle showing the location of the Allen Steam Station site.

2. "The estimated start and completion dates for the project."

   Estimated start – November 5, 2007
   Estimated completion – January 31, 2008

3. "An estimate of the volume of coal combustion by-products to be used for the project."

   Estimated volume = 74,000 cubic yards

4. "A Toxicity Characteristic Leaching Procedure (TCLP) analysis from a representative sample of each different coal combustion by-product source to be used in the project. The TCLP analysis shall be conducted and certified by the generator to be representative of each coal combustion by-product source used in the project. A TCLP analysis shall be conducted at least annually. A minimum analysis shall include: arsenic, barium, cadmium, lead, chromium, mercury, selenium and silver."

   Attachment I includes the most recent results of analyses conducted on wet ash that is excavated from the Allen ash basin and used in a beneficial fill as permitted under NCDWQ Permit No: WQ0000452. The analysis performed was from a representative sample of sluiced flyash and bottom ash from the basin that is used in the WQ fill. The same general CCP will be used to construct the landfill structural fill.

Future sampling and analysis of representative CCP to be used in the structural fill will be performed as required by this Section and Permit WQ0000452.

5. "A signed and dated statement by the owner(s) of the land on which the structural fill is to be placed, acknowledging and consenting to the use of coal combustion by-products as structural fill."

   Signed form attached – Attachment II.

6. "The notification shall include:"

   (A) Name of coal combustion by-products generator
   Duke Energy – Allen Steam Station

   (B) Physical location of the generating facility
   Station is located off of South Point Road in southeast Gaston County near the confluence of the South Fork and Catawba Rivers.

   (C) Address of generator
   253 Plant Allen Road
   Belmont, N.C. 28012

   (D) Name of contact for generator
   Mr. Don L. Scruggs

   (E) Telephone number of generator
   704-829-2423

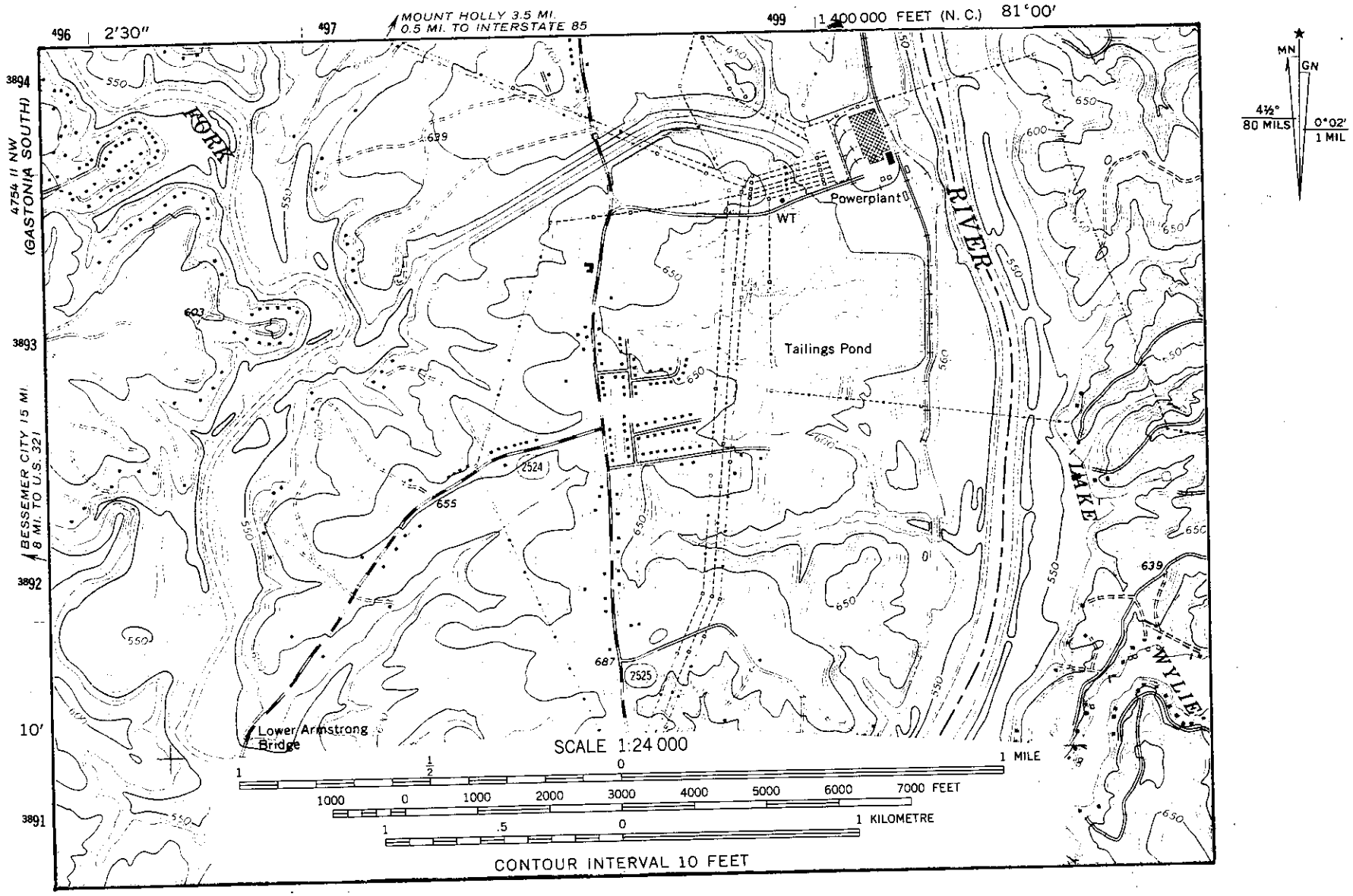

FIGURE 1 **USGS TOPOGRAPHIC MAP OF THE AREA AROUND ALLEN STEAM STATION**

Attachment I

CCP Laboratory Analytical Results

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-5038

Analytical Laboratory Use Only
Lab #: 06-DEC-0310
Sample Class: RCRA
Sample Originator: NC SC
Logged By: ZRC
Date & Time: 12-19-06 8:32
Project: PRISM
PO #: M12625
Job #:
Cooler Temp (C):
Preserv.: 1=HCl, 2=H_2SO_4, 3=HNO_3, 4=Ice, 5=None
SAMPLE PROGRAM: Ground Water, NPDES, Drinking Water, UST, RCRA Waste

Customer Must Complete

1) Project Name: ALLEN ASH
2) Phone No: 382-8768
3) Client: JESSICA BERNARCIK
4) Fax No:
5) Business Unit:
6) Process:
7) Resp. Center To:
8) Project ID:
9) Activity ID:
10) Mail Code:

Page ____ of ____
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Customer to complete all appropriate non-shaded areas.

Customer to complete appropriate columns to right

LAB USE ONLY
11) Lab ID: 2603410

12) Chem Desktop No.	13) Sample Description or ID	14) Collection Information: Date	Time	Signature	15) Comp.	16) Grab	17) Analysis Requested: TCLP	SPLP	TOTALS
169333	AL-2006-ASH REUSE	12/18/06	1300	D.L. Sawyer			✓	✓	✓

(See attached)

Send pdf and excel spreadsheet of vendor results to:
labcustomer@duke-energy.com

Customer to sign & date below

Relinquished By	Date/Time	Accepted By	Date/Time
D.L. Sawyer	12/18/06 1500	Cassie	12-18-06
Cassie	12-19-06 8:15	E.B. Carlson	12-19-06 8:15
[illegible]	12-19-06 16:30	[illegible]	12-19-06 16:30
[illegible]	12/19/06 1800	[illegible]	12-19-06 18:00
Relinquished By	Date/Time	Received for Laboratory By	Date/Time
		Seals Intact Opened By	Date/Time
		Seals Not Opened By	Date/Time

Customer, IMPORTANT: Please indicate desired turnaround.

22) Requested Turnaround
14 Days X ~~[illegible]~~ 1-2-07
*7 Days ____
*48 Hr ____
*Other ____
* Add. Cost Will Apply

G12b6526

SEE ATTACHED FOR SPLP, TCLP, AND METALS CONSTITUENTS

Case Narrative

PRISM LABORATORIES, INC.

Date:	01/11/07	**Client Project ID:**	06-DEC-0310
Company:	Duke Energy Corporation	**Prism COC Group No:**	G1206526
Contact:	Jay Perkins	**Collection Date(s):**	12/18/06
Address:	13339 Hagers Ferry Road	**Lab Submittal Date(s):**	12/19/06
	Huntersville, NC 28078	**Client Project Name Or No:**	Allen Ash

This data package contains the analytical results for the project identified above and includes a Case Narrative, Laboratory Report and Quality Control Data totaling 16 pages. A chain-of-custody is also attached for the samples submitted to Prism for this project.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative. Quality control statements and/or sample specific remarks are included in the sample comments section of the laboratory report for each sample affected.

Semi Volatile Analysis

N/A

Volatile Analysis

N/A

Metals Analysis

Analysis Note for Q20208 MS Mercury: Matrix interference is suspected. Post-digestion spike recovery (124%) is outside the acceptance limits (85-115%).

Analysis Note for Q20208 MSD Mercury: Matrix interference is suspected.

Analysis Note for Q20210 MS Antimony: Matrix interference is suspected. Post-digestion spike recovery (92%) is within the acceptance limits.

Analysis Note for Q20210 MS Arsenic: Matrix interference is suspected. Post-digestion spike recovery (89%) is within the acceptance limits.

Analysis Note for Q20210 MS Barium: Matrix interference is suspected. Post-digestion spike recovery (84%) is within the acceptance limits.

Analysis Note for Q20210 MS Calcium: Sample concentration too high for recovery evaluation.

Analysis Note for Q20210 MS Chromium: Matrix interference is suspected. Post-digestion spike recovery (82%) is within the acceptance limits.

Analysis Note for Q20210 MS Magnesium: Sample concentration too high for recovery evaluation.

Analysis Note for Q20210 MS Manganese: Sample concentration too high for recovery evaluation.

Analysis Note for Q20210 MS Nickel: Matrix interference is suspected. Post-digestion spike recovery (87%) is within the acceptance limits.

Analysis Note for Q20210 MS Potassium: Sample concentration too high for recovery evaluation.

Analysis Note for Q20210 MS Selenium: Matrix interference is suspected. Post-digestion spike recovery (84%) is within the acceptance limits.

Analysis Note for Q20210 MSD Antimony: Matrix interference is suspected.

Analysis Note for Q20210 MSD Arsenic: Matrix interference is suspected.

Analysis Note for Q20210 MSD Calcium: Sample concentration too high for recovery evaluation.

Analysis Note for Q20210 MSD Chromium: Matrix interference is suspected.

Analysis Note for Q20210 MSD Magnesium: Sample concentration too high for recovery evaluation.

Analysis Note for Q20210 MSD Manganese: Sample concentration too high for recovery evaluation. RPD recovery outside of the control limits.

Analysis Note for Q20210 MSD Potassium: Sample concentration too high for recovery evaluation.

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Case Narrative

PRISM LABORATORIES, INC.

Date:	01/11/07	**Client Project ID:**	06-DEC-0310
Company:	Duke Energy Corporation	**Prism COC Group No:**	G1206526
Contact:	Jay Perkins	**Collection Date(s):**	12/18/06
Address:	13339 Hagers Ferry Road	**Lab Submittal Date(s):**	12/19/06
	Huntersville, NC 28078	**Client Project Name Or No:**	Allen Ash

Analysis Note for Q20210 MSD Selenium: Matrix interference is suspected.

Analysis Note for Q20210 MSD Sodium: Matrix interference is suspected.

Wet Lab and Micro Analysis

Analysis Note for Q20157 Sulfate: MS/MSD unavailable for reporting. Analysis Note for Q20169 Phosphorus: MS outside the control limits. Matrix interference is suspected.

Please call if you have any questions relating to this analytical report.

Date Reviewed by:	Robbi A. Jones	**Project Manager:**	Angela D. Overcash
Signature:	Robbi A. Jones	**Signature:**	
Review Date:	01/11/07	**Approval Date:**	01/11/07

Data Qualifiers Key Reference:

B: Compound also detected in the method blank.
#: Result outside of the QC limits.
DO: Compound diluted out.
E: Estimated concentration, calibration range exceeded.
J: The analyte was positively identified but the value is estimated below the reporting limit.
H: Estimated concentration with a high bias.
L: Estimated concentration with a low bias.
M: A matrix effect is present.

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Full Service Analytical & Environmental Solutions

Laboratory Report

01/05/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310
Sample Matrix: Solid

Client Sample ID: 26039740/ 2006-Ash Reuse
Prism Sample ID: 169333
COC Group: G1206526
Time Collected: 12/18/06 13:00
Time Submitted: 12/19/06 18:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	84.7	%			1	SM2540 G	12/21/06 15:00	lthao	
Mercury by CVAA									
Mercury	0.098	mg/kg	0.024	0.0046	1	7471A	12/28/06 14:10	jhoppel	Q20208
Sample Preparation:			0.6 g / 50 mL			7471A	12/27/06 9:15	jhoppel	P17139
Metals by ICP									
Antimony	0.29 J	mg/kg	0.70	0.14	3	6010B	12/30/06 1:56	mcampbell	Q20210
Arsenic	31	mg/kg	1.8	0.25	3	6010B	12/30/06 1:56	mcampbell	Q20210
Barium	350	mg/kg	1.8	1.1	3	6010B	12/30/06 1:56	mcampbell	Q20210
Boron	BRL	mg/kg	88	4.9	3	6010B	12/30/06 1:56	mcampbell	Q20210
Cadmium	0.25 J	mg/kg	0.88	0.012	3	6010B	12/30/06 1:56	mcampbell	Q20210
Calcium	1800	mg/kg	18	2.1	3	6010B	12/30/06 1:56	mcampbell	Q20210
Chromium	18	mg/kg	0.88	0.053	3	6010B	12/30/06 1:56	mcampbell	Q20210
Copper	41	mg/kg	1.8	0.13	3	6010B	12/30/06 1:56	mcampbell	Q20210
Lead	11	mg/kg	0.88	0.074	3	6010B	12/30/06 1:56	mcampbell	Q20210
Magnesium	860	mg/kg	8.8	0.84	3	6010B	12/30/06 1:56	mcampbell	Q20210
Manganese	130	mg/kg	0.88	0.18	3	6010B	12/30/06 1:56	mcampbell	Q20210
Molybdenum	4.0	mg/kg	1.8	0.17	3	6010B	12/30/06 1:56	mcampbell	Q20210
Nickel	18	mg/kg	1.8	0.060	3	6010B	12/30/06 1:56	mcampbell	Q20210
Potassium	1600	mg/kg	8.8	7.0	3	6010B	12/30/06 1:56	mcampbell	Q20210
Selenium	7.6	mg/kg	1.8	0.56	3	6010B	12/30/06 1:56	mcampbell	Q20210
Silver	0.15 J	mg/kg	0.88	0.067	3	6010B	12/30/06 1:56	mcampbell	Q20210
Sodium	230	mg/kg	53	6.7	3	6010B	01/03/07 19:22	mcampbell	Q20210
Zinc	19	mg/kg	8.8	0.88	3	6010B	12/30/06 1:56	mcampbell	Q20210
Sample Preparation:			2 g / 50 mL			3050B	12/27/06 9:45	jhoppel	P17140
Sample Preparation:			2.02						
pH Value, Electrometric Method									
pH	4.38	pH units			1	9045C	12/21/06 15:32	hmiddl	Q20060

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Full Service Analytical & Environmental Solutions

Laboratory Report

01/05/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310
Sample Matrix: Solid

Client Sample ID: 26039740/ 2006-Ash Reuse
Prism Sample ID: 169333
COC Group: G1206526
Time Collected: 12/18/06 13:00
Time Submitted: 12/19/06 18:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Total Phosphorus by Automated Ascorbic Acid Reduction Method									
Total Phosphorus	310	mg/kg	15	2.9	5	SM4500-P F	12/28/06 12:30	celfaki	Q20169
Sample Preparation:			1.0083 g / 50 mL			SM4500-P B5	12/27/06 9:15	celfaki	P17145
SPLP Extraction for Metals									
SPLP Extraction	Complete				1	1312	12/22/06 16:20	jhoppel	
SPLP Leachable Mercury by CVAA									
Mercury	0.000083 J	mg/L	0.012	0.000052	1	7470A	01/02/07 16:11	jhoppel	Q20235
Sample Preparation:			20 mL / 30 mL			7470A	01/02/07 10:00	jhoppel	P17163
SPLP Leachable Metals by ICP									
Antimony	BRL	mg/L	0.0059	0.0035	1	6010B	01/02/07 16:20	mcampbell	Q20239
Arsenic	BRL	mg/L	0.30	0.0043	1	6010B	01/02/07 16:20	mcampbell	Q20239
Barium	0.14 J	mg/L	5.9	0.0018	1	6010B	01/02/07 16:20	mcampbell	Q20239
Boron	0.30 J	mg/L	0.59	0.19	1	6010B	01/02/07 16:20	mcampbell	Q20239
Cadmium	0.00024 J	mg/L	0.059	0.00024	1	6010B	01/02/07 16:20	mcampbell	Q20239
Calcium	31	mg/L	0.12	0.038	1	6010B	01/02/07 16:20	mcampbell	Q20239
Chromium	BRL	mg/L	0.30	0.0011	1	6010B	01/02/07 16:20	mcampbell	Q20239
Copper	0.018	mg/L	0.012	0.0020	1	6010B	01/02/07 16:20	mcampbell	Q20239
Iron	0.19	mg/L	0.059	0.0087	1	6010B	01/02/07 16:20	mcampbell	Q20239
Lead	BRL	mg/L	0.30	0.0013	1	6010B	01/02/07 16:20	mcampbell	Q20239
Magnesium	2.4	mg/L	0.059	0.0096	1	6010B	01/02/07 16:20	mcampbell	Q20239
Manganese	0.33	mg/L	0.0059	0.0015	1	6010B	01/02/07 16:20	mcampbell	Q20239
Nickel	0.027	mg/L	0.0059	0.0011	1	6010B	01/02/07 16:20	mcampbell	Q20239
Potassium	1.0	mg/L	0.59	0.019	1	6010B	01/02/07 16:20	mcampbell	Q20239
Selenium	0.015 J	mg/L	0.059	0.0066	1	6010B	01/02/07 16:20	mcampbell	Q20239
Silver	BRL	mg/L	0.30	0.00094	1	6010B	01/02/07 16:20	mcampbell	Q20239
Zinc	0.034 J	mg/L	0.035	0.0032	1	6010B	01/02/07 16:20	mcampbell	Q20239

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Laboratory Report

01/05/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310
Sample Matrix: Solid

Client Sample ID: 26039740/ 2006-Ash Reuse
Prism Sample ID: 169333
COC Group: G1206526
Time Collected: 12/18/06 13:00
Time Submitted: 12/19/06 18:00

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Sample Preparation:				50 mL /	50 mL	3010A	12/27/06 7:00	jhoppel	P17138
TCLP Extraction for Metals									
TCLP Extraction	**Complete**				1	1311	12/21/06 16:20	jhoppel	
TCLP Leachable Mercury by CVAA									
Mercury	**0.00009 J**	mg/L	0.010	0.000042	1	7470A	01/02/07 15:05	jhoppel	Q20233
Sample Preparation:				20 mL /	30 mL	7470A	01/02/07 10:00	jhoppel	P17162
TCLP Leachable Metals by ICP									
Arsenic	**BRL**	mg/L	0.050	0.0036	1	6010B	12/30/06 2:47	mcampbell	Q20212
Barium	**0.58 J**	mg/L	5.0	0.0015	1	6010B	12/30/06 2:47	mcampbell	Q20212
Cadmium	**BRL**	mg/L	0.025	0.0002	1	6010B	12/30/06 2:47	mcampbell	Q20212
Chromium	**0.0083 J**	mg/L	0.25	0.0009	1	6010B	12/30/06 2:47	mcampbell	Q20212
Lead	**0.010 J**	mg/L	0.050	0.0011	1	6010B	12/30/06 2:47	mcampbell	Q20212
Selenium	**0.021 J**	mg/L	0.050	0.0056	1	6010B	12/30/06 2:47	mcampbell	Q20212
Silver	**BRL**	mg/L	0.25	0.0008	1	6010B	12/30/06 2:47	mcampbell	Q20212
Sample Preparation:				50 mL /	50 mL	3010A	12/27/06 7:00	jhoppel	P17137

Sample Comment(s):

BRL = Below Reporting Limit
J = Estimated value between the Reporting Limit and the MDL
The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.
All results are reported on a dry-weight basis

Angela D. Overcash, V.P. Laboratory Services

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Full Service Analytical & Environmental Solutions

Laboratory Report

01/05/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310
Sample Matrix: Water

Client Sample ID: SPLP Extract of 169333
Prism Sample ID: 169333-1
COC Group: G1206526
Time Collected: 12/18/06 13:00
Time Submitted: 12/19/06 18:00
Ailquoted Sampl 169333

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Chloride by Ion Chromatography									
Chloride	2.5 J	mg/L	10	0.11	10	300.0	12/27/06 16:08	mlandreth	Q20156
Fluoride by Ion Chromatography									
Fluoride	0.71 J	mg/L	1.0	0.012	10	300.0	12/27/06 16:08	mlandreth	Q20154
Nitrate by Ion Chromatography									
Nitrate	0.66 J	mg/L	1.0	0.081	10	300.0	12/27/06 16:08	mlandreth	Q20155
Total Phosphorus by Automated Ascorbic Acid Reduction Method									
Total Phosphorus	0.029 J	mg/L	0.050	0.020	1	SM4500-P F	01/04/07 10:49	celfaki	Q20292
Sample Preparation:				50 mL /	50 mL	SM4500-P B5	01/02/07 12:15	celfaki	P17178
Sulfate by Ion Chromatography									
Sulfate	99	mg/L	10	0.52	10	300.0	12/27/06 16:08	mlandreth	Q20157

Sample Comment(s):

BRL = Below Reporting Limit
J = Estimated value between the Reporting Limit and the MDL
The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.
All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Full Service Analytical & Environmental Solutions

Level II QC Report

1/9/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310

COC Group Number: G1206526
Date/Time Submitted: 12/19/06 18:00

pH Value, Electrometric Method, method 9045C

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
pH	6.86	6.86	pH units	100	99.21 - 100.	Q20060

Duplicate

Sample ID:		Sample Result	Duplicate Result	Units	RPD %	RPD Range %	QC Batch ID
169333	pH	4.38	4.66	pH units	6	0 - 20	Q20060

Fluoride by Ion Chromatography, method 300.0

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Fluoride	0.020	0.1	<0.05	mg/L	Q20154

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Fluoride	4.864	5	mg/L	97	80 - 120	Q20154

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169334-	Fluoride	115.34	111.11	mg/L	99	80 - 120	Q20154

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169334	Fluoride	115.07	111.11	mg/L	98	80 - 120	0	0 - 20	Q20154

Nitrate by Ion Chromatography, method 300.0

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Nitrate	ND	0.1	<0.05	mg/L	Q20155

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Nitrate	4.624	5	mg/L	92	90 - 110	Q20155

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169334-	Nitrate	107.49	111.11	mg/L	96	80 - 120	Q20155

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169334	Nitrate	107.47	111.11	mg/L	96	80 - 120	0	0 - 20	Q20155

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Full Service Analytical & Environmental Solutions

Level II QC Report

1/9/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310

COC Group Number: G1206526
Date/Time Submitted: 12/19/06 18:00

Chloride by Ion Chromatography, method 300.0

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Chloride	ND	1	<0.5	mg/L	Q20156

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Chloride	4.512	5	mg/L	90	90 - 110	Q20156

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169334-	Chloride	201.08	111.11	mg/L	89	80 - 120	Q20156

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169334	Chloride	200.98	111.11	mg/L	89	80 - 120	0	0 - 20	Q20156

Sulfate by Ion Chromatography, method 300.0

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Sulfate	ND	1	<0.5	mg/L	Q20157

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Sulfate	4.842	5	mg/L	97	90 - 110	Q20157

Total Phosphorus by Automated Ascorbic Acid Reduction Method, method SM4500-P F

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Total Phosphorus	ND	0.5	<0.25	mg/kg	Q20169

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Total Phosphorus	101	100	mg/kg	101	80 - 120	Q20169

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169333	Total Phosphorus	384	100	mg/kg	124 #	80 - 120	Q20169

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169333	Total Phosphorus	343	100	mg/kg	83	80 - 120	11	0 - 20	Q20169

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COC Group Number: G1206526
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Mercury by CVAA, method 7471A

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Mercury	-0.00268	0.02	<0.01	mg/kg	Q20208

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Mercury	0.48290	0.404	mg/kg	120	80 - 120	Q20208

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169603	Mercury	0.53270	0.41	mg/kg	126 #	80 - 120	Q20208

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169603	Mercury	0.51985	0.398	mg/kg	127 #	80 - 120	2	0 - 20	Q20208

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Metals by ICP, method 6010B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Antimony	0.0423	0.2	<0.1	mg/kg	Q20210
Arsenic	0.024	0.5	<0.25	mg/kg	Q20210
Barium	0.0593	0.5	<0.25	mg/kg	Q20210
Boron	1.4507	25	<12.5	mg/kg	Q20210
Cadmium	0.0014	0.25	<0.125	mg/kg	Q20210
Calcium	1.8796	5	<2.5	mg/kg	Q20210
Chromium	0.0564	0.25	<0.125	mg/kg	Q20210
Copper	0.0136	0.5	<0.25	mg/kg	Q20210
Lead	0.0265	0.25	<0.125	mg/kg	Q20210
Magnesium	0.1041	2.5	<1.25	mg/kg	Q20210
Manganese	0.0381	0.25	<0.125	mg/kg	Q20210
Molybdenum	0.0317	0.5	<0.25	mg/kg	Q20210
Nickel	-0.0176	0.5	<0.25	mg/kg	Q20210
Potassium	0.545	2.5	<1.25	mg/kg	Q20210
Selenium	0.0646	0.5	<0.25	mg/kg	Q20210
Silver	0.0023	0.25	<0.125	mg/kg	Q20210
Sodium	0.898	15	<7.5	mg/kg	Q20210
Zinc	0.2157	2.5	<1.25	mg/kg	Q20210

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Antimony	24.0304	25	mg/kg	96	80 - 120	Q20210
Arsenic	23.477	25	mg/kg	94	80 - 120	Q20210
Barium	24.6561	25	mg/kg	99	80 - 120	Q20210
Cadmium	23.0214	25	mg/kg	92	80 - 120	Q20210
Calcium	101.891	100	mg/kg	102	80 - 120	Q20210
Chromium	24.6972	25	mg/kg	99	80 - 120	Q20210
Copper	26.2832	25	mg/kg	105	80 - 120	Q20210
Lead	23.2654	25	mg/kg	93	80 - 120	Q20210
Magnesium	93.6179	100	mg/kg	94	80 - 120	Q20210
Manganese	24.566	25	mg/kg	98	80 - 120	Q20210
Nickel	23.1784	25	mg/kg	93	80 - 120	Q20210
Potassium	101.518	100	mg/kg	102	80 - 120	Q20210
Selenium	20.6644	25	mg/kg	83	80 - 120	Q20210
Silver	24.2855	25	mg/kg	97	80 - 120	Q20210
Sodium	102	100	mg/kg	102	80 - 120	Q20210
Zinc	23.2495	25	mg/kg	93	80 - 120	Q20210

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169603	Antimony	3.5236	25	mg/kg	16 #	75 - 125	Q20210
	Arsenic	16.4131	25	mg/kg	69 #	75 - 125	Q20210

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Project ID: 06-DEC-0310

COC Group Number: G1206526
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Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %		Recovery Range %	QC Batch ID
	Barium	140.518	25	mg/kg	60	#	75 - 125	Q20210
	Cadmium	21.5747	25	mg/kg	85		75 - 125	Q20210
	Calcium	5761.65	100	mg/kg	395	#	75 - 125	Q20210
	Chromium	58.8142	25	mg/kg	68	#	75 - 125	Q20210
	Copper	66.299	25	mg/kg	120		75 - 125	Q20210
	Lead	25.534	25	mg/kg	85		75 - 125	Q20210
	Magnesium	20200	100	mg/kg	1000	#	75 - 125	Q20210
	Manganese	657	25	mg/kg	-2332	#	75 - 125	Q20210
	Nickel	85.4999	25	mg/kg	75	#	75 - 125	Q20210
	Potassium	484.546	100	mg/kg	3	#	75 - 125	Q20210
	Selenium	14.7579	25	mg/kg	70	#	75 - 125	Q20210
	Silver	24.7396	25	mg/kg	97		75 - 125	Q20210
	Sodium	355	100	mg/kg	124		75 - 125	Q20210
	Zinc	104.778	25	mg/kg	103		75 - 125	Q20210

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %		Recovery Range %	RPD %		RPD Range %	QC Batch ID
169603	Antimony	3.63	24.752	mg/kg	17	#	75 - 125	3		0 - 20	Q20210
	Arsenic	16.1589	24.752	mg/kg	69	#	75 - 125	2		0 - 20	Q20210
	Barium	150.743	24.752	mg/kg	102		75 - 125	7		0 - 20	Q20210
	Cadmium	21.5009	24.752	mg/kg	86		75 - 125	0		0 - 20	Q20210
	Calcium	6048.29	99.01	mg/kg	688	#	75 - 125	5		0 - 20	Q20210
	Chromium	56.8079	24.752	mg/kg	61	#	75 - 125	3		0 - 20	Q20210
	Copper	65.3837	24.752	mg/kg	117		75 - 125	1		0 - 20	Q20210
	Lead	25.7509	24.752	mg/kg	87		75 - 125	1		0 - 20	Q20210
	Magnesium	19600	100	mg/kg	400	#	75 - 125	3		0 - 20	Q20210
	Manganese	839	25	mg/kg	-1604	#	75 - 125	24	#	0 - 20	Q20210
	Nickel	85.9155	24.752	mg/kg	77		75 - 125	0		0 - 20	Q20210
	Potassium	547.181	99.01	mg/kg	67	#	75 - 125	12		0 - 20	Q20210
	Selenium	14.2561	24.752	mg/kg	68	#	75 - 125	3		0 - 20	Q20210
	Silver	24.543	24.752	mg/kg	97		75 - 125	1		0 - 20	Q20210
	Sodium	371	100	mg/kg	140	#	75 - 125	4		0 - 20	Q20210
	Zinc	100.659	24.752	mg/kg	87		75 - 125	4		0 - 20	Q20210

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Project Name: Allen Ash
Project ID: 06-DEC-0310

COC Group Number: G1206526
Date/Time Submitted: 12/19/06 18:00

TCLP Leachable Metals by ICP, method 6010B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Arsenic	-0.004	0.05	<0.025	mg/L	Q20212
Barium	0.0013	5	<2.5	mg/L	Q20212
Cadmium	-0.0017	0.025	<0.0125	mg/L	Q20212
Chromium	0.0041	0.25	<0.125	mg/L	Q20212
Lead	0.0083	0.05	<0.025	mg/L	Q20212
Selenium	0.0053	0.05	<0.025	mg/L	Q20212
Silver	0.0002	0.25	<0.125	mg/L	Q20212

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Arsenic	0.255	0.25	mg/L	102	80 - 120	Q20212
Barium	0.2452	0.25	mg/L	98	80 - 120	Q20212
Cadmium	0.2414	0.25	mg/L	97	80 - 120	Q20212
Chromium	0.2369	0.25	mg/L	95	80 - 120	Q20212
Lead	0.2459	0.25	mg/L	98	80 - 120	Q20212
Selenium	0.2552	0.25	mg/L	102	80 - 120	Q20212
Silver	0.256	0.25	mg/L	102	80 - 120	Q20212

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169333	Arsenic	0.2533	0.25	mg/L	102	75 - 125	Q20212
	Barium	0.8381	0.25	mg/L	101	75 - 125	Q20212
	Cadmium	0.2341	0.25	mg/L	94	75 - 125	Q20212
	Chromium	0.233	0.25	mg/L	90	75 - 125	Q20212
	Lead	0.2404	0.25	mg/L	92	75 - 125	Q20212
	Selenium	0.2615	0.25	mg/L	96	75 - 125	Q20212
	Silver	0.2515	0.25	mg/L	101	75 - 125	Q20212

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169333	Arsenic	0.2512	0.25	mg/L	101	75 - 125	1	0 - 20	Q20212
	Barium	0.8124	0.25	mg/L	91	75 - 125	3	0 - 20	Q20212
	Cadmium	0.232	0.25	mg/L	93	75 - 125	1	0 - 20	Q20212
	Chromium	0.2304	0.25	mg/L	89	75 - 125	1	0 - 20	Q20212
	Lead	0.2384	0.25	mg/L	91	75 - 125	1	0 - 20	Q20212
	Selenium	0.257	0.25	mg/L	94	75 - 125	2	0 - 20	Q20212
	Silver	0.2479	0.25	mg/L	99	75 - 125	1	0 - 20	Q20212

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TCLP Leachable Mercury by CVAA, method 7470A

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Mercury	0.00007	0.01	<0.005	mg/L	Q20233

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Mercury	0.00941	0.0094	mg/L	100	80 - 120	Q20233

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169334	Mercury	0.00908	0.0094	mg/L	90	80 - 120	Q20233

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169334	Mercury	0.00933	0.0094	mg/L	93	80 - 120	3	0 - 20	Q20233

SPLP Leachable Mercury by CVAA, method 7470A

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Mercury	0.00009	0.01	<0.005	mg/L	Q20235

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Mercury	0.00953	0.0094	mg/L	102	80 - 120	Q20235

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169334	Mercury	0.00880	0.0094	mg/L	92	80 - 120	Q20235

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169334	Mercury	0.00870	0.0094	mg/L	91	80 - 120	1	0 - 20	Q20235

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SPLP Leachable Metals by ICP, method 6010B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Antimony	0.002	0.005	<0.0025	mg/L	Q20239
Arsenic	0.0001	0.25	<0.125	mg/L	Q20239
Barium	0.0003	5	<2.5	mg/L	Q20239
Boron	0.0625	0.5	<0.25	mg/L	Q20239
Cadmium	ND	0.05	<0.025	mg/L	Q20239
Calcium	0.0238	0.1	<0.05	mg/L	Q20239
Chromium	ND	0.25	<0.125	mg/L	Q20239
Copper	0.0018	0.01	<0.005	mg/L	Q20239
Iron	0.016	0.05	<0.025	mg/L	Q20239
Lead	0.0008	0.25	<0.125	mg/L	Q20239
Magnesium	0.0057	0.05	<0.025	mg/L	Q20239
Manganese	0.0002	0.005	<0.0025	mg/L	Q20239
Nickel	-0.0008	0.005	<0.0025	mg/L	Q20239
Potassium	0.1569	0.5	<0.25	mg/L	Q20239
Selenium	0.0018	0.05	<0.025	mg/L	Q20239
Silver	0.0003	0.25	<0.125	mg/L	Q20239
Zinc	0.0054	0.03	<0.015	mg/L	Q20239

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Antimony	0.2598	0.25	mg/L	104	80 - 120	Q20239
Arsenic	0.2641	0.25	mg/L	106	80 - 120	Q20239
Barium	0.2598	0.25	mg/L	104	80 - 120	Q20239
Boron	1.0275	1	mg/L	103	80 - 120	Q20239
Cadmium	0.2529	0.25	mg/L	101	80 - 120	Q20239
Calcium	1.0499	1	mg/L	105	80 - 120	Q20239
Chromium	0.2605	0.25	mg/L	104	80 - 120	Q20239
Copper	0.264	0.25	mg/L	106	80 - 120	Q20239
Iron	1.0755	1	mg/L	108	80 - 120	Q20239
Lead	0.2611	0.25	mg/L	104	80 - 120	Q20239
Magnesium	1.0257	1	mg/L	103	80 - 120	Q20239
Manganese	0.2585	0.25	mg/L	103	80 - 120	Q20239
Nickel	0.2465	0.25	mg/L	99	80 - 120	Q20239
Potassium	1.2	1	mg/L	120	80 - 120	Q20239
Selenium	0.2517	0.25	mg/L	101	80 - 120	Q20239
Silver	0.2626	0.25	mg/L	105	80 - 120	Q20239
Zinc	0.2569	0.25	mg/L	103	80 - 120	Q20239

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169333	Antimony	0.2636	0.25	mg/L	105	75 - 125	Q20239
	Arsenic	0.2701	0.25	mg/L	107	75 - 125	Q20239

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Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
	Barium	0.3709	0.25	mg/L	101	75 - 125	Q20239
	Boron	1.2288	1	mg/L	97	75 - 125	Q20239
	Cadmium	0.2475	0.25	mg/L	99	75 - 125	Q20239
	Calcium	27.6159	1	mg/L	106	75 - 125	Q20239
	Chromium	0.2541	0.25	mg/L	101	75 - 125	Q20239
	Copper	0.2709	0.25	mg/L	102	75 - 125	Q20239
	Iron	1.2222	1	mg/L	106	75 - 125	Q20239
	Lead	0.254	0.25	mg/L	101	75 - 125	Q20239
	Magnesium	2.954	1	mg/L	96	75 - 125	Q20239
	Manganese	0.5297	0.25	mg/L	98	75 - 125	Q20239
	Nickel	0.268	0.25	mg/L	98	75 - 125	Q20239
	Potassium	1.8584	1	mg/L	98	75 - 125	Q20239
	Selenium	0.2563	0.25	mg/L	97	75 - 125	Q20239
	Silver	0.2539	0.25	mg/L	102	75 - 125	Q20239
	Zinc	0.2768	0.25	mg/L	99	75 - 125	Q20239

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169333	Antimony	0.2643	0.25	mg/L	105	75 - 125	0	0 - 20	Q20239
	Arsenic	0.2644	0.25	mg/L	105	75 - 125	2	0 - 20	Q20239
	Barium	0.3668	0.25	mg/L	99	75 - 125	1	0 - 20	Q20239
	Boron	1.2328	1	mg/L	98	75 - 125	0	0 - 20	Q20239
	Cadmium	0.2437	0.25	mg/L	97	75 - 125	2	0 - 20	Q20239
	Calcium	27.5147	1	mg/L	96	75 - 125	0	0 - 20	Q20239
	Chromium	0.2489	0.25	mg/L	99	75 - 125	2	0 - 20	Q20239
	Copper	0.2652	0.25	mg/L	100	75 - 125	2	0 - 20	Q20239
	Iron	1.2024	1	mg/L	104	75 - 125	2	0 - 20	Q20239
	Lead	0.2488	0.25	mg/L	99	75 - 125	2	0 - 20	Q20239
	Magnesium	2.9365	1	mg/L	94	75 - 125	1	0 - 20	Q20239
	Manganese	0.5237	0.25	mg/L	96	75 - 125	1	0 - 20	Q20239
	Nickel	0.2628	0.25	mg/L	96	75 - 125	2	0 - 20	Q20239
	Potassium	1.845	1	mg/L	97	75 - 125	1	0 - 20	Q20239
	Selenium	0.2534	0.25	mg/L	96	75 - 125	1	0 - 20	Q20239
	Silver	0.248	0.25	mg/L	99	75 - 125	2	0 - 20	Q20239
	Zinc	0.2718	0.25	mg/L	97	75 - 125	2	0 - 20	Q20239

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Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Level II QC Report

1/9/07

Duke Energy Corporation
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project Name: Allen Ash
Project ID: 06-DEC-0310

COC Group Number: G1206526
Date/Time Submitted: 12/19/06 18:00

Total Phosphorus by Automated Ascorbic Acid Reduction Method, method SM4500-P F

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Total Phosphorus	ND	0.05	<0.025	mg/L	Q20292

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Total Phosphorus	2.012	2	mg/L	101	90 - 110	Q20292

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
169264	Total Phosphorus	2.648	2	mg/L	109	80 - 120	Q20292

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
169264	Total Phosphorus	2.569	2	mg/L	105	80 - 120	3	0 - 20	Q20292

#-See Case Narrative

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Attachment II

In accordance with 15A NCAC 13B .1703(a)(5), I hereby acknowledge and consent to the use of coal combustion by-products at the Duke Energy Allen Steam Station in Belmont, North Carolina for the purpose of structural fill. The structural fill is to be used for the beneficial purpose of supporting the engineering design of a CCP industrial landfill at the Allen site.

Signature

Allen Steam Station Manager
Title

10/04/07
Date

15A NCAC 13B .1703(b)

"In addition to the notification requirements under Paragraph (a) of this rule, at least 30 days before using coal combustion by-products as a structural fill in projects with a volume of more than 10,000 cubic yards, the person proposing the use shall submit a written notice to the Division containing construction plans for the structural fill facility, including a stability analysis when necessary, which shall be prepared, signed and sealed by a registered professional engineer in accordance with sound engineering practices."

See attached Construction Plans, drawings 1 thru 5, as prepared by S&ME, Inc.

See attached Slope Stability Evaluation from S&ME, Inc., dated October 3, 2007.

15A NCAC 13B .1704

"Coal combustion by-products used as a structural fill shall not be placed:"

(1) "Within 50 horizontal feet of a jurisdictional wetland unless after consideration of the chemical and physical impact on the wetland, the U.S. Corps of Engineers issues a permit or waiver for the fill;"
As shown on Drawing 2 – Structural Fill Siting Demonstration, wetland areas are identified and are located more than 50 feet from the structural fill. In addition, the USACE has determined that a permit is not required by them and an application for Isolated Wetlands Permit has been submitted to the NCDWQ.

(2) "Within 50 horizontal feet of the top of the bank of a perennial stream or other surface water body;"
As shown on Drawing 2 – Structural Fill Siting Demonstration, the fill is greater than 50 feet from the Catawba River, the only adjacent surface water body. In addition, the fill is not located within any areas restricted by Catawba River watershed or buffer requirements.

(3) "Within two feet of the seasonal high ground-water table;"
As shown on Drawing 2 – Structural Fill Siting Demonstration, the base of the fill (El. 622) is located in excess of 2 feet above the seasonal high water contours shown on the drawing.

(4) "Within 100 horizontal feet of any source of drinking water, such as a well, spring or other groundwater source of drinking water;"
All groundwater drinking water sources are well beyond 100 feet of the structural fill.

(5) "Within an area subject to a one-hundred year flood, unless it can be demonstrated to the Division that the facility will be protected from inundation, and washout, and the flow of water is not restricted and the storage volume of the flood plain will not be significantly reduced;"
As shown on Drawing 2 – Structural Fill Siting Demonstration and the Site Suitability Report submitted by S&ME on August 31, 2007, the fill is not located within the 100 year flood plain.

(6) "Within 25 feet of any property boundary; and"
As shown on Drawing 2 – Structural Fill Siting Demonstration, the fill is located significantly beyond 25 feet of the station's property boundary.

(7) "Within 25 feet of a bedrock outcrop."
As discussed in the Site Suitability Report submitted by S&ME on August 31, 2007, the fill is not located within 25 feet of any bedrock outcrops.

15A NCAC 13B .1705

The following addresses applicable portions of Section .1705 as well as requirements to operate this fill in accordance with Permit No. WQ0000452.

The proposed structural fill will be designed, constructed, operated and maintained in accordance with applicable portions of Section .1700, Permit No: WQ0000452 and the approved Erosion Control Plan (pending) to minimize the harmful release of coal combustion by-products to the environment. In addition, the fill will be constructed and maintained in accordance with erosion control plan provisions, the WQ permit and normal station ash handling practices to minimize dusting and hazards to public health and safety. The fill will be constructed in one foot maximum lifts and compacted as required to meet the needs for monitoring settlement of the test fill.

The fill is being constructed in excess of the minimum buffer requirements from surface and groundwaters and per a proposed erosion control plan in order to not impact adjacent surface and groundwaters.

Due to the intended use of the fill for settlement monitoring and capping by the proposed future landfill, formal closure of the fill will not occur. As discussed on Drawing 5 – Erosion and Sediment Control Details, seeding will occur to minimize dusting and erosion concerns.

As shown on Drawing 4, the test fill will be constructed using 3:1 horizontal to vertical slopes.

As stated, the fill will be constructed, operated and maintained in full compliance with requirements of the NCDWQ Permit No: WQ0000452.

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FROST	10/12/07	RCO 32/5

S&ME

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OCT 10 2007

SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

October 3, 2007

Duke Energy
526 South Church Street
P.O Box 1006
Mail Code: EC-11J
Charlotte, NC 28202

Attention: Mr. Ted Manes

Reference: **Proposed Test Fill – Slope Stability Evaluation**
Retired Ash Basin Ash Landfill - Allen Steam Station,
Gaston County, North Carolina
S&ME Project No. 1356-06-825

Dear Mr. Manes:

S&ME, Inc. (S&ME) is pleased to submit the letter summarizing the slope stability evaluation of the proposed test fill supporting design of the proposed ash landfill at Duke Energy's Allen Steam Station. S&ME conducted these analyses based on your request during our teleconference on Monday, September 24, 2007. A brief background and summary of the slope stability evaluation are presented in this letter.

BACKGROUND

Duke Energy is in the process of permitting a new ash landfill on top of a retired ash basin (RAB) at the Allen Steam Station. S&ME conducted settlement and slope stability analyses to evaluate the feasibility of the proposed landfill development over the RAB. We are proposing to design, construct, and monitor a full-scale test fill on the RAB to improve our understanding of settlement characteristics of the R.A.B. material. We requested North Carolina Department of Natural Resources (NCDENR) authorization for the test fill in our September 14, 2007 letter. NCDENR authorized us to proceed with the test fill in their September 24, 2007 email under solid waste section .1700 rules. Specifically, solid waste rules section .1703(b) requires written notice of the test fill containing construction plans and slope stability analyses.

SLOPE STABILITY EVALUATION

S&ME evaluated the slope stability of the proposed test fill using estimated material strength parameters from our August 31, 2007 "Site Suitability Study" report and published strength data for fly ash material. Slope stability was evaluated using the Spencer's method implemented in Geostudio's SLOPE/W computer program. This computer program evaluates slope stability of user defined cross sections by randomly searching for critical (lowest factor of safety) potential failure surfaces. The test fill location is illustrated in Figure 1, proposed test fill location plan. The cross section is illustrated in Figure 2, test fill slope stability analysis section. Details of the slope stability evaluation are summarized in the attached Slope Stability Calculation sheets. Results of the slope stability evaluation indicate a factor of safety of 1.91, which is greater than the established design criteria of 1.5 for static conditions.

CLOSING

S&ME appreciates this opportunity to be of service to Duke Energy. Please feel free to contact us if you have any questions or need additional information.

S&ME, Inc.

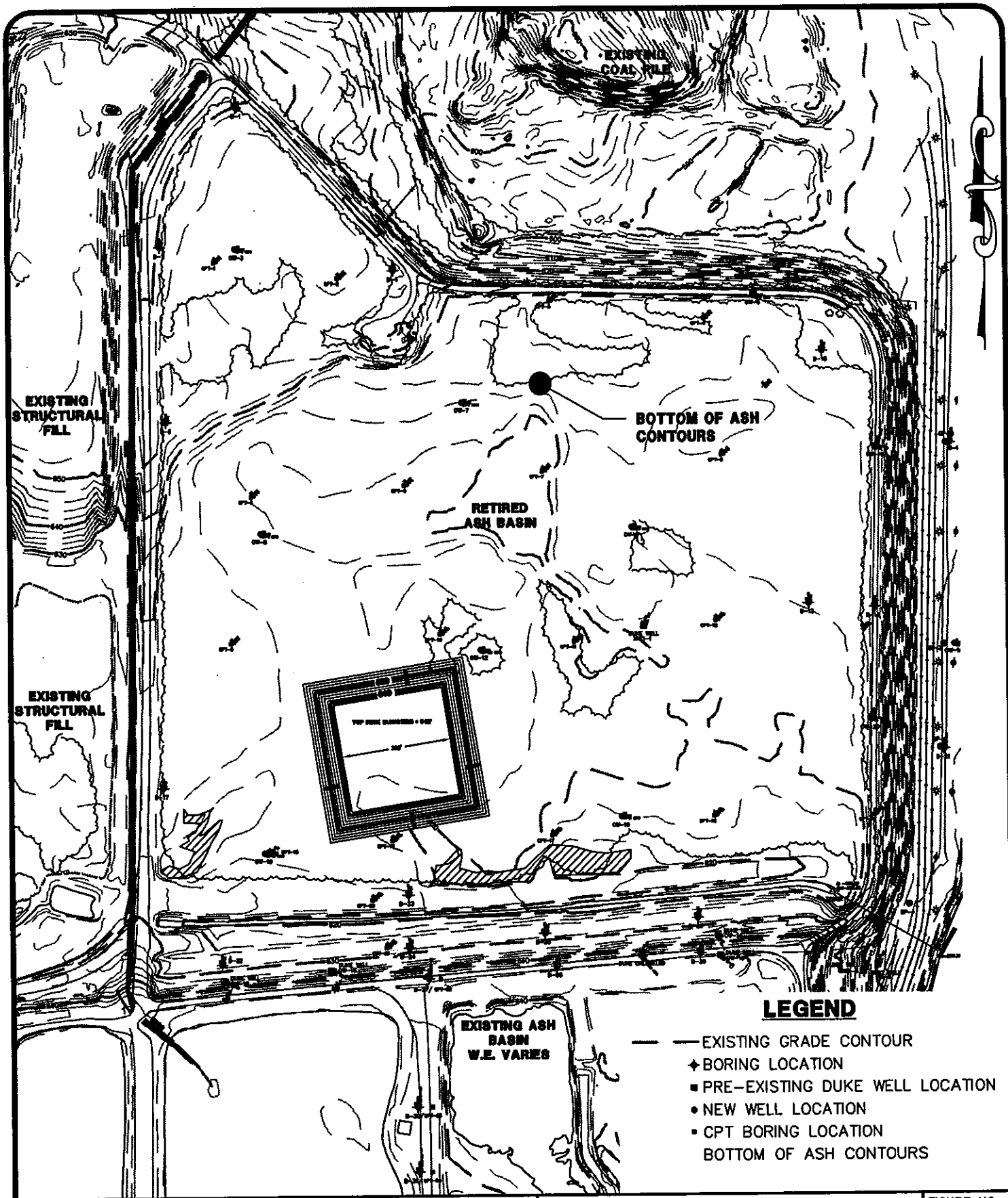
NORTH CAROLINA PROFESSIONAL SEAL 032153 ENGINEER KENNETH R. DALY 10-3-07

Zach D. Scarboro, E.I.
Staff Professional

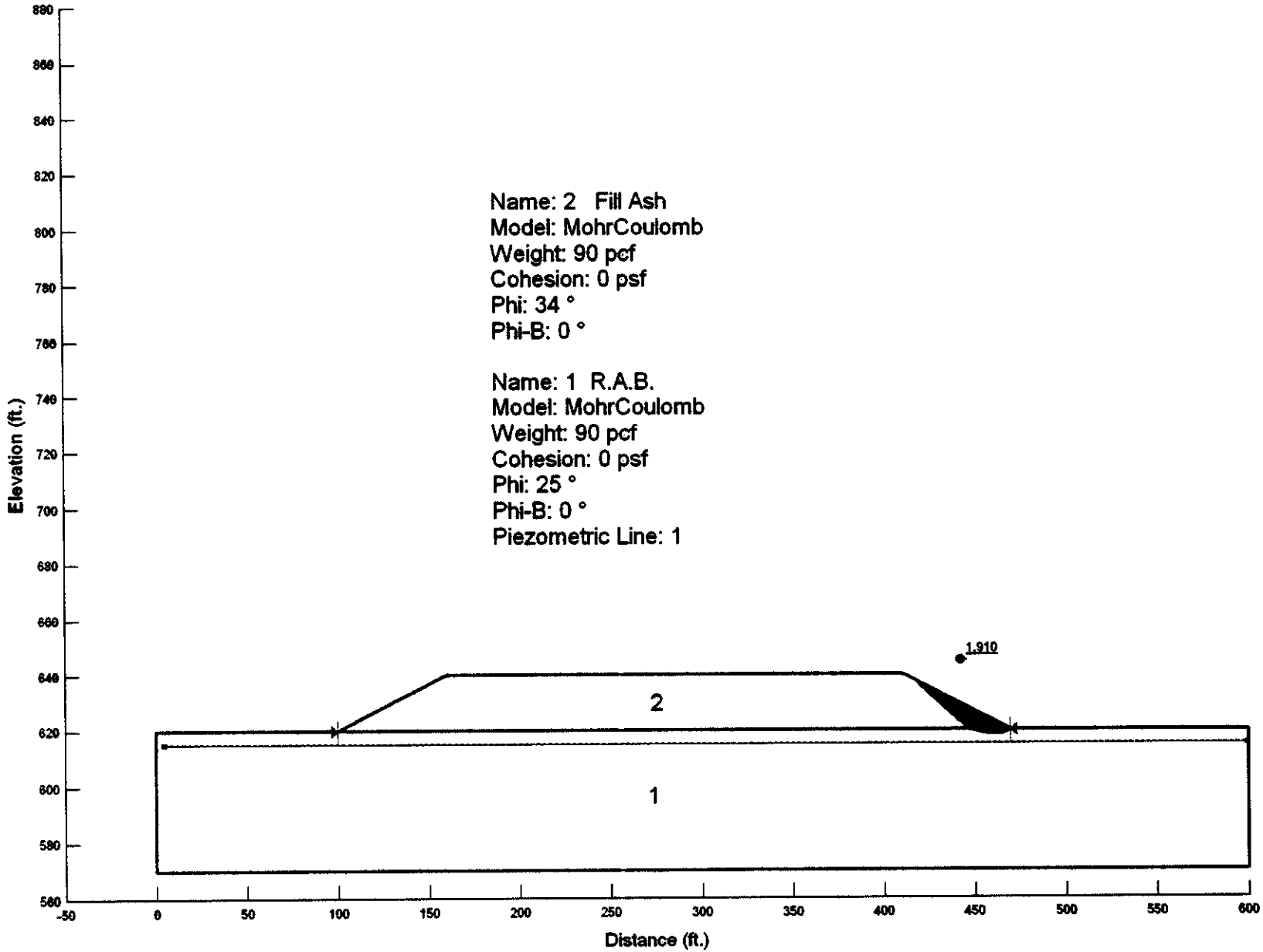
Kenneth R. Daly, P.E.
Senior Project Engineer

Senior Reviewed by: Jason Reeves, P.E.
Senior Engineer

Attachments: Figure 1, Proposed Test Fill Location Plan
Figure 2, Test Fill Slope Stability Analysis Section
Test Fill Slope Stability Calculation



SCALE: 1" = 300'	S&ME WWW.SMEINC.COM	**PROPOSED TEST FILL LOCATION PLAN** PLANT ALLEN STEAM STATION BELMONT, NORTH CAROLINA	FIGURE NO. 1
DATE: 9-07-07			
DRAWN BY: ELH			
PROJECT NO: 1356-06-825			



SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Test Fill Slope Stability Analysis Section**	FIGURE NO.
DRAWN BY: ZDS		**Allen Steam Station**	2
CHECKED BY: JSR		253 Plant Allen Rd.	
DATE: 10/3/2007		BELMONT, NORTH CAROLINA	
		JOB NO.: 1356-06-825	

OBJECTIVE

Evaluate the global slope stability of the proposed test fill located on the retired ash basin at Allen Steam Station.

METHOD

Evaluate the stability of the test fill under the static condition. Perform analyses using Geostudio's SLOPE/W computer software. A pseudo-static analysis was not performed considering that the proposed test fill will be in place for approximately one year.

CALCULATIONS

Design Criteria

The minimum factor of safety for static or long-term conditions was adapted from USACE (2003) documents as 1.5.

Cross Section

Subsurface data including stratigraphy and location of the water table were obtained from soil test boring logs, monitoring well logs, and estimated long term seasonal high water levels prepared for the site suitability study developed by S&ME (2007). The cross section location is shown in Figure 1. The cross section is illustrated in Figure 2. The proposed test fill will be placed on top of the retired ash basin (RAB). The retired ash basin is underlain with saprolite and buttressed by a dike. The water table was assumed to start approximately 5 feet below the surface of the RAB.

Material Properties

The generalized cross-section consists of 2 types of materials: ash fill: and RAB ash. For each material the unit weight, effective stress cohesion, and effective stress friction angle were estimated.

Unit Weight

Results of laboratory testing indicate the following RAB ash unit weights and moisture contents (S&ME, 2007).

RAB Ash UNIT WEIGHT LABORATORY TEST RESULTS			
Sample	γ_d (pcf)	ω_{moist} (%)	γ_{moist} (pcf)
B-6 (20-22')	61.8	49.9	92.6
OW-12 (15-17')	60.5	41.6	85.7
B-13 (20-22')	77.2	20.7	93.2
OW-18 (8.5-10.5')	72.5	37.6	99.8
OW-19 (40-42')	91.8	30.7	120.0
B-32 (31.2')	77	40.1	107.9
Average	**73.5**	**36.8**	**99.9**

Based on these test results a moist unit weight of 90 pcf was selected for use in the stability analyses.

Based on S&ME testing of ash fill properties during work performed at the Belews Creek Steam Station (S&ME, 2001) we recommend an ash fill unit weight of 90 pcf.

Shear Strength

S&ME performed consolidated undrained (CU) triaxial shear strength testing on four samples during the Site Suitability Study (2007). Results of CU triaxial testing are summarized in the following table.

RAB ASH SHEAR STRENGTHS		
Boring No.	Effective Strength	
	c' (psf)	φ' (degrees)
B-6	140	33
B-13	190	25.2
OW-12	90	29.5
OW-18	140	29.3

Based on results of laboratory testing, we selected an effective stress friction angle of 25 degrees and cohesion of 0 psf to characterize RAB ash strength.

Based on values reported in literature (Oweis et. al., 1998) we recommend an ash fill effective stress friction angle of 34 degrees and cohesion of 0 psf.

ANALYSES

Slope stability analyses were performed on the test fill using SLOPE/W for the static condition. S&ME evaluated slope stability of the proposed test fill using the Spencer's method as implemented in the Geostudio's SLOPE/W computer program. This computer program evaluates slope stability of user defined cross sections by randomly searching for critical (lowest factor of safety) potential failure surfaces. Results of analyses are attached. Results indicate a factor of safety of 1.91.

CONCLUSIONS

Results of analyses indicate that the proposed test fill slope stability factor of safety is 1.91, which exceeds the design criteria factor of safety of 1.5 required for the conditions analyzed.

REFERENCES

1. GEO-Slope International, "SLOPE/W, Geostudio 2007 Version 7.01," Calgary, Alberta, Canada.
2. Oweis, Issa, and Khera, Raj, "Geotechnology of Waste Management," 2nd Ed., PWS Publishing Com. 1998.
3. S&ME, Inc., "Fly and Bottom Ash Testing Results – Landfill Duke Energy – Belews Creek Station," Stokes County, North Carolina, April 27, 2001.
4. S&ME, Inc., "Site Suitability Study Retired Ash Basin (RAB) – Landfill Duke Energy – Allen Steam Station," Belmont, North Carolina, August 31, 2007.
5. USACE, "Engineering and Design – Slope Stability," EM 1110-2-1902, October 31, 2003.

Test Fill Slope

Report generated using GeoStudio 2007, version 7.01. Copyright © 1991-2007 GEO-SLOPE International Ltd.

File Information

Title: Test Fill Allen Steam Station
Comments: Test Fill Layer w/ Underlying Strata of R.A.B.
Created By: ZDS
Revision Number: 33
Date: 10/2/2007
Time: 11:01:55 AM
File Name: Test Fill_UnderlyingLayer_Spencer.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Task 6 Liner System Design\Test Fill\Slope Stability\

Test Fill Slope

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Auto-Search
PhreaticCorrection: Yes
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: Fill Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 2: R.A.B.

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf

Phi: 25 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	R.A.B.	1,2,3,4
Region 2	Fill Ash	5,6,7,8

Points

	X	Y
Point 1	0	570
Point 2	0	620
Point 3	600	620
Point 4	600	570
Point 5	100	620
Point 6	160	640
Point 7	410	640
Point 8	470	620

Tension Crack

Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Slip Surface Limits

Left Coordinate: (100, 620)
Right Coordinate: (470, 620)

Piezometric Lines

Piezometric Line 1

Coordinates
Coordinate: (5, 615.12884)
Coordinate: (600, 615.12884)
Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
Material: R.A.B.

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.910	(457.834, 658.574)	27.57431	(417.714, 637.428)	(470, 620)
2	795	1.972	(457.834, 658.574)	40.447	(424.957, 635.014)	(470, 620)

Slices of Slip Surface: Optimized

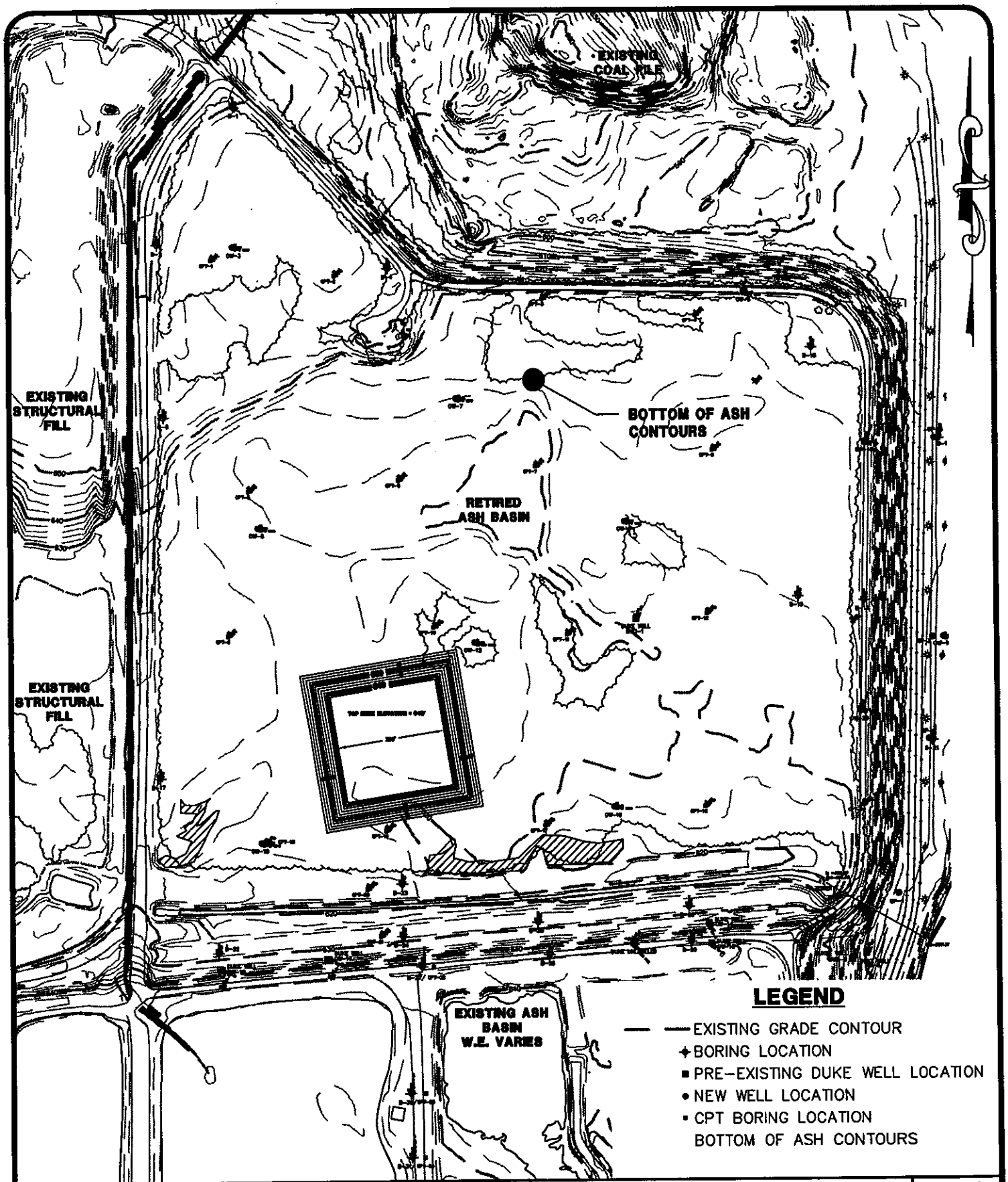
	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	418.3834	636.95785	0	16.427577	11.08054	0
2	419.7212	636.0166	0	49.28273	33.241621	0
3	421.3374	634.9454	0	87.576885	59.071355	0
4	423.232	633.7442	0	126.69361	85.455918	0
5	424.87735	632.72345	0	161.75011	109.10183	0
6	426.2734	631.8832	0	187.91882	126.75284	0
7	427.69565	631.01385	0	213.48733	143.99902	0
8	429.14415	630.11535	0	242.22296	163.38145	0
9	430.64485	629.2051	0	274.27859	185.00324	0

10	432.1977	628.2831	0	302.6234	204.12206	0
11	433.88775	627.2789	0	333.38179	224.86885	0
12	435.715	626.19245	0	366.82298	247.42523	0
13	437.54765	625.128	0	404.31426	272.71341	0
14	439.3857	624.08555	0	434.8573	293.31495	0
15	441.0441	623.1446	0	462.32281	311.84067	0
16	442.52285	622.3052	0	486.94066	328.44562	0
17	444.084	621.41415	0	511.68	345.13252	0
18	445.7276	620.4714	0	539.64106	363.99249	0
19	446.55515	619.9967	-303.75759	566.55013	264.18666	0
20	447.60435	619.7935	-291.07283	669.98333	312.41836	0
21	449.69125	619.39365	-266.12494	644.14595	300.37019	0
22	451.53475	619.08565	-246.90257	636.73439	296.91412	0
23	453.13485	618.8695	-233.41354	608.13987	283.58028	0
24	454.73495	618.6533	-219.9245	579.57632	270.26087	0
25	456.3506	618.49265	-209.90384	567.76817	264.75464	0
26	457.9818	618.3876	-203.34549	526.65002	245.58094	0
27	459.61295	618.28255	-196.79326	485.53187	226.40723	0
28	461.16865	618.25595	-195.12992	466.11895	217.35483	0
29	462.64895	618.3078	-198.36386	411.90494	192.07443	0
30	464.1292	618.3596	-201.59779	357.69093	166.79402	0
31	465.78205	618.57905	-215.29365	315.17811	146.96997	0
32	467.6075	618.96615	-239.44619	204.1793	95.210369	0
33	469.2601	619.57985	-277.74611	98.102013	45.74572	0

Slices of Slip Surface: 795

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	425.6965	634.04525	0	38.789284	26.163702	0
2	427.17585	632.21575	0	113.57938	76.610261	0
3	428.6552	630.5843	0	184.19111	124.23847	0
4	430.13455	629.11765	0	250.33999	168.85646	0
5	431.6139	627.79205	0	311.90281	210.3811	0
6	433.0933	626.5898	0	368.82292	248.7742	0
7	434.57265	625.4974	0	421.09523	284.03232	0
8	436.052	624.5043	0	468.71681	316.15348	0
9	437.53135	623.602	0	511.67554	345.12951	0
10	439.0107	622.7836	0	549.97475	370.96266	0
11	440.4901	622.0434	0	583.59009	393.63649	0
12	441.96945	621.3767	0	612.48522	413.1265	0
13	443.4488	620.7797	0	636.57693	429.37656	0
14	444.9282	620.2491	0	655.88955	442.40309	0
15	446.42825	619.77645	-289.50665	669.5626	312.22217	0
16	447.949	619.36125	-263.61343	676.08881	315.26539	0

17	449.46975	619.00885	-241.63297	677.08183	315.72844	0
18	450.9905	618.71755	-223.46474	672.34482	313.51954	0
19	452.5113	618.486	-209.02791	661.77942	308.59281	0
20	454.03205	618.3132	-198.25676	645.13637	300.83203	0
21	455.5528	618.19845	-191.09497	622.17303	290.12405	0
22	457.07355	618.1412	-187.52667	592.60399	276.33578	0
23	458.5943	618.1412	-187.52667	556.06505	259.29739	0
24	460.11505	618.19845	-191.09497	512.14686	238.818	0
25	461.6358	618.3132	-198.25676	460.34505	214.66242	0
26	463.1566	618.486	-209.02791	400.04641	186.5447	0
27	464.67735	618.71755	-223.46474	330.53443	154.13074	0
28	466.1981	619.00885	-241.63297	250.92234	117.00701	0
29	467.71885	619.36125	-263.61343	160.14073	74.674847	0
30	469.2396	619.77645	-289.50665	56.84406	26.506821	0

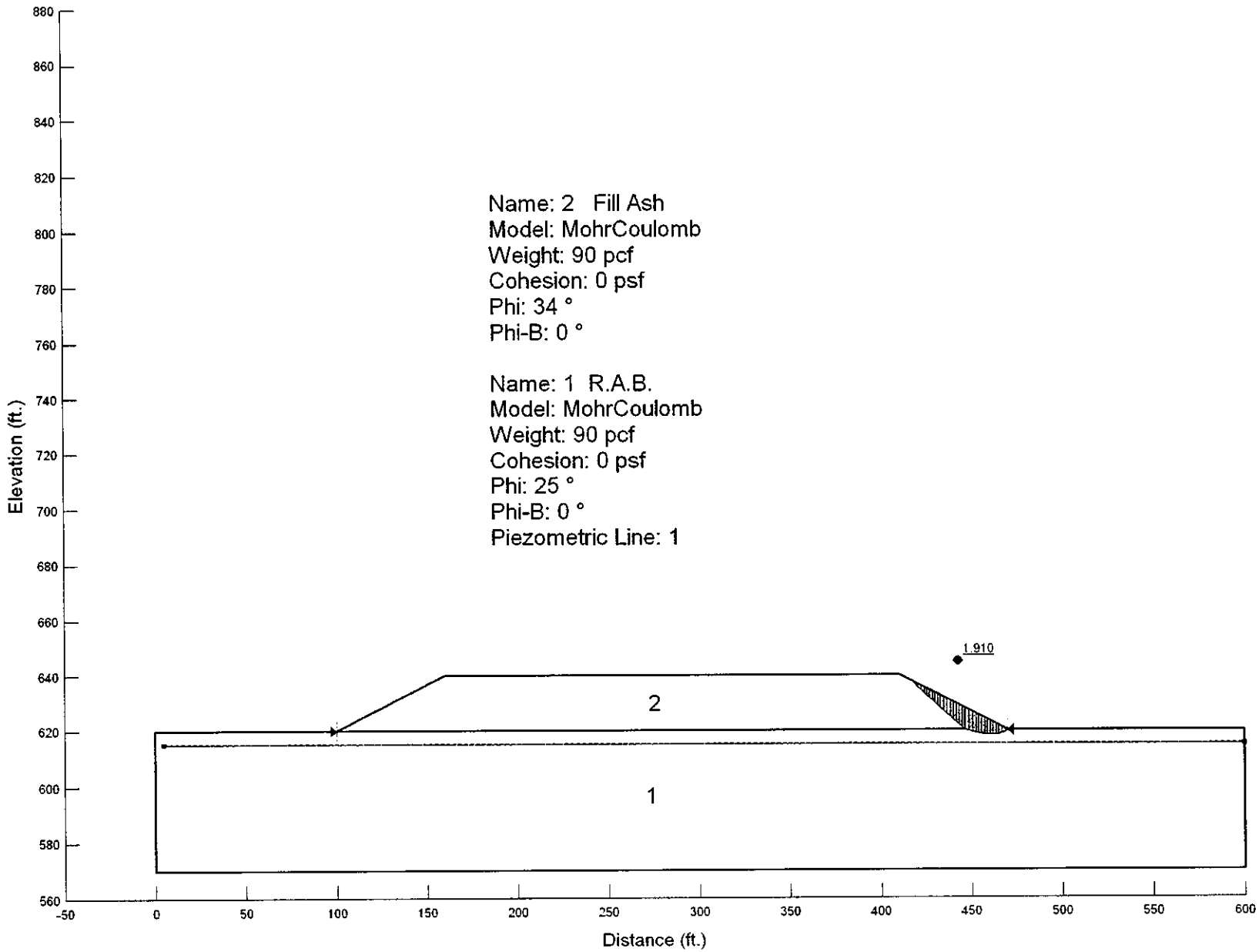


SCALE:	1" = 300'
DATE:	9-07-07
DRAWN BY:	ELH
PROJECT NO:	1356-06-825

S&ME
WWW.SMEINC.COM

PROPOSED TEST FILL LOCATION PLAN
PLANT ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

FIGURE NO.
1



SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Test Fill Slope Stability Analysis Section**	FIGURE NO.
DRAWN BY: ZDS		**Allen Steam Station**	2
CHECKED BY: JSR		253 Plant Allen Rd.	
DATE: 10/3/2007		BELMONT, NORTH CAROLINA	
		JOB NO.: 1356-06-825	