Permit No.	Scan Date	DIN
3612	**May 25, 2011**	**14014**

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May 23, 2011
Solid Waste Section
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May 23, 2011

North Carolina Department of Environment and Natural Resources
Division of Waste Management - Solid Waste Section
2090 U.S. Highway 70
Swannanoa, North Carolina 28778

Attention: Mr. Larry Frost
Larry.Frost@ncdenr.gov

Reference: **Operations Plan Permit Modification**
Retired Ash Basin (RAB) Ash Landfill
Duke Energy - Allen Steam Station, Belmont, North Carolina
S&ME Project No. 1356-10-009A, Task 05
S&ME Engineering License No. F-0176

Dear Mr. Frost:

On behalf of Duke Energy (Duke), S&ME Inc., (S&ME) is submitting this letter requesting that the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Waste Management consider a permit modification to the existing Operations Plan at Duke's Allen Steam Station, Retired Ash Basin (RAB) Ash Landfill (Permit No. 36-12). We prepared this letter based on correspondence between Mr. Larry Frost of NCDENR and various Duke and S&ME personnel. This permit modification addresses various operational subjects consisting of filling guidance, dust control, and contact water management. Filling guidance and dust control were addressed in previous correspondence with NCDENR.

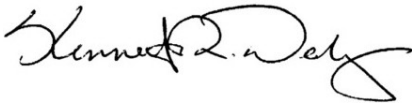
As previously stated in S&ME's "Cell 2 Access Request Letter" dated April 26, 2011, the Operations Plan text and figures were intended to provide general filling guidance. The revised Operations Plan is attached, and it provides more general language regarding filling guidance. In addition, the landfill sequencing figures have been removed.

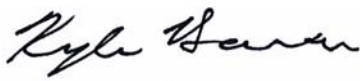
Dust control was also addressed in previous correspondence with NCDENR. S&ME prepared and submitted a "Dust Control Plan" on May 13, 2011, which outlined various dust control methods and outlines a monitoring and corrective action response program. This Plan was approved by NCDENR in a letter dated May 17, 2011, which explained that the Plan would eliminate the need for the application of weekly operational soil cover and the need to provide demonstrations for alternative cover materials. The approved "Dust Control Plan" is provided as Appendix III in the attached Operations Plan.

As stated in NCDENR's letter dated May 17, 2011, this permit modification also includes the addition of chimney drains in landfill operations. The addition of chimney drains will help the landfill operator manage contact water within the landfill by providing a more direct drainage path from the active face to the leachate collection system (LCS). The attached Operations Plan provides language regarding the addition of chimney drains in landfill operations.

Please contact us at your convenience if you have any questions or need additional information.

Sincerely,
S&ME, Inc.





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Attachments: Operations Plan, May 23, 2011, Retired Ash Basin (RAB) Ash Landfill, Allen Steam Station, Permit No. 36-12

OPERATIONS PLAN
RETIRED ASH BASIN (RAB) - ASH LANDFILL
ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

S&ME Project No. 1356-06-825

Prepared for:
526 South Church Street
Charlotte, North Carolina 28202

Prepared by:
S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

March 11, 2008
Revised May 23, 2011

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II	Operations Quality Assurance Plan
III	Dust Control Plan

1. GENERAL FACILITY OPERATIONS

1.1 Overview

This Operations Plan was prepared for the Retired Ash Basin (RAB) ash landfill at Duke Energy's Plant Allen Steam Station and presents the landfill's operational requirements for: (1) general facility operation; (2) waste handling and landfill sequencing; and (3) leachate and storm water management. This Operations Plan was prepared consistent with requirements of Rules .0505 of 15A NCAC 13B of the North Carolina Solid Waste Management Rules.

The RAB ash landfill is owned by Duke Energy. The operations of the facility will either be overseen by a Duke Energy Operations Manager or subcontracted to an outside company.

1.2 Contact Information

Correspondence and questions concerning the operation of the RAB ash landfill should be directed to the appropriate entity as follows:

- ***OWNER***
  Duke Energy – Allen Steam Station
  253 Plant Allen Road, Belmont, NC 28012
  (704) 829-2423
  Facility Contact: Don Scruggs

- ***STATE REGULATORY AGENCY***
  North Carolina Department of Environment and Natural Resources
  Division of Waste Management, Solid Waste Section
  Asheville Regional Office
  2090 US Highway 70, Swannanoa, NC 28778
  (828) 296-4500
  Regional Engineer: Larry Frost

1.3 Safety

Landfill operations at the RAB ash landfill are conducted considering the health and safety of the facility's operating staff. Duke Energy will provide each of the operating staff with site specific safety training prior to landfill operations and designate safety protocol on-site in accordance to Duke Energy's Safe Work Practices. An Emergency Action Plan (EAP) is included in Appendix I to provide guidance in the event of a slope failure.

1.4 Access and Security Requirements

Access roads to the landfill will be of all weather construction and maintained in good condition. To prevent unauthorized entry, access to the Duke Energy property is controlled by means of perimeter fencing and controlled access entrances.

1.5 Signs

Signs providing the permit number, stating that no hazardous or un-permitted waste can be received without written permission from the State Division of Waste Management, Solid Waste Section (Division) and other pertinent information will be posted at the site entrance. Traffic signs and markers will be provided as necessary to promote an orderly traffic pattern to and from the active disposal area and maintain efficient operating conditions. The entrance sign will state:

"Industrial Solid Waste Landfill Facility
Permit No. 36-12
No Hazardous or Un-Permitted Waste Allowed
Contact Plant Environmental Health and Safety"

1.6 Dust Control

Dust control is a critical component of operations at the RAB ash landfill. Areas in need of dust control consist of both the active face and inactive areas within the landfill. Dust control will be implemented through various methods. Dust control performance will be monitored during operations. Dust control methods and monitoring procedures are described in further detail in the Dust Control Plan in Appendix III.

1.7 Fire Control

No open burning shall be permitted at the RAB ash landfill. Ash is a non combustible material and the threat of fire is minimal. However, if a fire occurs at the landfill the local fire department shall be notified and equipment and stockpiled soil shall be provided to control accidental fires. Any fire that occurs at the landfill shall be reported to the Division within 24 hours and a written notification will be submitted within 15 days by the Operations Manager.

1.8 Training

Due to the diversity and nature of job tasks required at the landfill, personnel should be adequately trained to handle facility operations and maintenance. The Operations Manager should have a general understanding of all the tasks required for site operations. Individuals performing the various tasks should have adequate training for the specific tasks they are assigned. Noteworthy operations and maintenance tasks to be addressed in training include:

- maintaining accurate records of waste loading (quantitative and qualitative);
- operating requirements for storm water segregation from exposed waste areas; and
- operating and maintaining leachate collection system and leak detection system.

The facility operator will complete approved operator training courses in accordance with permit requirements.

1.9 Record Keeping

An operating record will be maintained on-site and will include the following:

- Leak Detection System (LDS) monitoring information;
  - documentation of an approved response action plan from the Division;
  - records of the amount of liquids removed at each sump;
  - notice of exceedence of action leakage rate for sumps (if any);
  - preliminary assessment report for exceedence of action leakage rate (if any);
  - reports documenting remedial actions (if any);
- closure and post-closure LDS monitoring plan and results;
- closure cost estimate and financial assurance documentation; and
- Operations Plan.

The above records will be kept in the operating record for the active life of the landfill and the post-closure care period. Information contained in the operating record must be furnished upon request to the Division or made available for inspection by the Division. Additional records kept on-site will include:

- Facility Permits;
  - solid waste facility permits;
  - National Pollutant Discharge Elimination System (NPDES) storm water discharge permit;
  - Erosion and Sediment Control Plan;
- regulatory agency inspection reports;
- Site Suitability Study;
- employee training program and records;
- internal vehicle maintenance records; and
- site drawings and specifications.

1.10 Erosion and Sedimentation Control

1.10.1 Erosion Control Device Monitoring

Erosion and sedimentation control features include temporary and permanent sediment basins, rain gutters, road ditches, outlet protection aprons, downchute piping, and direct runoff to perimeter ditches. Prior to landfill closure, sediment basins shall be checked weekly. During post closure, sediment basins shall be checked quarterly and within 24-hours of a 1-inch (or greater) rainfall event. Sediment shall be removed from each structure to its original dimensions when sediment accumulates to one half of the design depth. The sediment basins, embankments, spillways and outlets shall also be checked for erosion damage. Necessary repairs shall be made as soon as practical. Any trash or debris within the riser structures or outfalls shall be removed.

Prior to closure, channels shall be monitored after each runoff event. Post closure, channels shall be checked after each 1-inch (or greater) rainfall event. Riprap-lined channel sections

and outlet protection aprons shall be checked for washouts. Riprap shall be added to these areas as needed to maintain the integrity of the structure.

1.10.2 Surface Erosion Monitoring

Vegetative ground cover sufficient to control erosion must be established within 15 working days or 90 calendar days upon completion of any phase of landfill development as per the North Carolina Erosion and Sedimentation Control Guidelines. Seedbed preparation, seeding, soil amendments, and mulching for the establishment of vegetative ground cover shall be applied in accordance with the approved Erosion and Sediment Control Plan, if applicable.

Slopes shall be periodically checked for erosion and vegetative quality, and fertilized and mowed at least once a year. A slope or portion thereof shall be identified as needing maintenance and if it meets any one of the following conditions:

- Exposed waste on exterior slopes;
- Bare spots larger than 25 square feet;
- Bare spots make up more than 2% of total seeded area;
- Rills exceeding 4 inches in depth;
- Areas of cracking, sliding, or sloughing; or
- Areas of seepage.

Slopes identified as needing maintenance shall be repaired immediately as appropriate to correct deficiencies. Repair activities may include re-dressing the slope, filling in low areas, and/or seeding. In the event that cracking, sliding, sloughing, or seepage is identified on slopes, a slope failure identification criteria is met , and the Notification Sequence provided in the Emergency Action Plan (EAP) included in Appendix I should be followed accordingly.

1.10.3 Stormwater Discharge

The landfill operation shall not cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirement of the Clean Water Act, including, but not limited to, NPDES requirements, pursuant to Section 402. In addition, under the requirements of Section 404 of the Clean Water Act, the discharge of dredged or fill material into waters of the state that would be in violation of the requirements shall not be allowed by landfill operations.

Operations at the landfill shall not cause the discharge of a non-point source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or statewide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act, as amended.

2. WASTE HANDLING AND LANDFILL SEQUENCING

2.1 Landfill Capacity

The RAB ash landfill is comprised of two Phases (Phase 1 and Phase 2). The landfill phases are divided into cells and the cells are further divided into subcells. Landfill sequencing is further described in Section 2.4 of this Operations Plan. The landfill is estimated to have a storage life of approximately 12 years, based on a projected 500,000 tons per year disposal rate. The disposal rate assumes no beneficial ash reuse.

The landfill capacity was estimated using the proposed grading and closure plans in conjunction with the anticipated annual disposal rates. The gross volume of the landfill, which consists of the airspace between the protective cover soil and the proposed final cover surface, was estimated to be on the order of 2,082,500 cubic yards for Phase 1 and 3,958,200 cubic yards for Phase 2 for a total volume of 6,040,700 cubic yards. The approximate final cover soil volume considering a 3-foot thick cover (2-ft final cover and 1-ft interim cover) over an approximate 50-acre footprint is approximately 242,200 cubic yards. Deducting the approximate final cover soil volume, the airspace available for waste placement (including operational soils) is 5,789,500 cubic yards. Using an assumed in-place waste density of 75 lb/ft^3 (1.01 $tons/yd^3$), the available dry tonnage of waste to be placed in the landfill was estimated to be on the order of 5,856,500 tons.

2.2 Waste Acceptance, Disposal and Screening Requirements

The landfill will only accept combustion products residuals including fly ash, bottom ash, boiler slag, mill rejects, flue gas desulfurization (FGD) residue, and sand blast material generated at the Allen Steam Station. The landfill owner or operator shall notify the Division within 24 hours of attempted disposal of any wastes the landfill is not permitted to receive. Hazardous, liquid, or infectious wastes shall not be disposed of in the landfill.

The proposed landfill will be receiving a relatively consistent and homogeneous waste stream of combustion products residuals generated solely from the Allen Steam Station. Waste will be hauled and disposed of by dedicated and consistent operators from the waste source to the landfill. As hauling and disposal operations are wholly contained within the site, random inspections are not proposed. Rather loads will be monitored continuously through operations. Based on the consistent and homogeneous waste stream it is anticipated that municipal solid waste, hazardous, liquid, or non-permitted wastes will be readily distinguished from the ordinary waste stream.

2.3 Operating Concepts

The primary objective of the RAB ash landfill is to operate safely and efficiently while minimizing leachate generation and controlling storm water. The landfill development will be sequenced in Phases. Landfilling operations will generally proceed from the west towards the east by the use of cells. Each cell is divided into smaller subcells. In general, waste placement will be performed in 10-foot thick operational lifts with operations usually being focused within a particular cell area. Operational areas will be covered with

intermediate or final cover as appropriate. Soil diversion berms will be used to collect and divert the non-contact storm water runoff to areas where the runoff will be directed to a sediment basin. When the desired waste elevations are obtained within the cell, waste placement will move to the next cell where the process will be repeated.

2.4 Landfill Sequencing

The general steps for the operation of the landfill are summarized below. The operating concepts shall be followed throughout operations until final closure grades are met.

Waste placement shall begin in Cell 1, Subcell 1A and should generally progress sequentially. The first 10-foot operational lift shall be placed in Subcell 1A; after the first 10-foot operational lift is placed in Subcell 1A, the raincover shall be removed from Subcell 1B and the first 10-foot operational lift shall be placed in Subcell 1B. After the first 10-foot operational lift of waste is placed across Cell 1, waste placement shall then continue across Cell 1 in 10-foot lifts

When operations dictate, the operator may begin waste placement in Cell 2 following the same general format as Cell 1, where a 10-foot operational lift is placed in Subcell 2A, then the rain cover is removed from Subcell 2B, then a 10-foot operational lift is placed into Subcell 2B. Waste placement in Cell 2 shall continue in 10-foot operational lifts. Waste placement in Cells 3 and 4 shall follow the same general format as Cells 1 and 2 until final closure grades are met.

In the event that the projected 500,000 tons per year disposal rate is exceeded such that it may influence the loading rate from waste placement during operations, the landfill owner or operator shall notify the Division and evaluate the influence on landfill stability. In the event that these steps for landfill operations are changed such that it may affect the expected loading rate from waste placement during operations, the landfill owner or operator shall notify the Division and evaluate the influence on landfill stability.

2.5 Waste and Cover Material Placement

Waste and cover material shall be placed to the lines and grades shown on the grading plans with slopes no steeper than 3 (horizontal) to 1 (vertical). Prior to waste placement, stakes indicating the limits of waste placement, as shown on the Engineering Plan Drawings, shall be located. The waste shall be compacted as densely as practical using compactors and dozers in approximate 1-foot lifts to achieve a vertical operational lift thickness of 10 feet. Quality assurance monitoring and testing for waste placement is included in the Operations Quality Assurance Plan in Appendix II. Initially, the waste shall be placed from up-gradient to down-gradient. As higher waste elevations are achieved, the waste may be placed from down-gradient to up-gradient on the active face slope, as long as landfill surfaces are graded to allow proper drainage and segregation. The landfill surface shall be graded to promote positive drainage.

Chimney drains may be used to provide contact water infiltration to the LCS. Chimney drain locations may be decided in the field. However, chimney drains shall be located and constructed over existing LCS laterals or center corridors to provide a more direct drainage

path to the LCS. Chimney drains shall consist of perforated HDPE pipe surrounded by a drainage aggregate media. Chimney drains shall be extended to the active face during waste placement. During operations, chimney drains may be modified with pipe fittings to allow the chimney drain pipe to drain contact water from the active face. Chimney drain pipes shall not be directly connected to LCS lateral or header pipes.

Flue gas desulfurization (FGD) residue will be spread in 6-inch lifts in the center of the operational area. No FGD residue shall be placed within 25 feet of the exterior slopes. Prior to placement of the next fill lift, material should be adequately blended with the other waste. The waste stream was assumed for design to be comprised predominantly of ash. Should the waste stream change at some time during operations, the design slope stability analyses must be reviewed for the changed conditions.

Should the quantity of combustion products residuals other than fly ash (listed in Section 2.2) exceed 25,000 tons per year and is placed in an area larger than one-acre and is placed in a thickness exceeding 12-inches, the waste fill compaction shall be monitored and tested according to the requirements above.

Operational soil cover should be applied as needed for dust control and stormwater management. Operational soil cover should be applied at a thickness suited to its purpose. For example, operational soil cover may be applied thinner to provide dust control and it may be applied thicker to tolerate erosion when its purpose is stormwater management. Operational covers to provide dust control shall be as described in the facility Dust Control Plan in Appendix III. A 12-inch thick interim cover layer shall be placed on areas where final grades have been reached or where waste placement will be inactive for 12 months or more.

2.6 Final Cover

The final cover system for a completed phase will be finished within 180 days following the beginning of closure activities unless otherwise approved by the Division.

The proposed final cover will consist of a compacted interim soil cover, 40-mil LLDPE geomembrane liner, geocomposite drainage layer, an 18-inch thick earthen barrier layer, and a 6-inch earthen vegetative layer. A proposed alternative is to use a 50-mil structured geomembrane with an integral drainage layer overlain with a geotextile. The geomembrane will provide a barrier layer to reduce leachate generation. The vegetative layer will consist of on-site soil suitable for maintaining a grass cover and controlling erosion. Surface water that percolates through the vegetative layer and 18-inch thick earthen barrier layer will drain through the geocomposite drainage layer. The geocomposite will day-light periodically across the cover system and at the toe of the landfill final cover slope to provide drainage.

3. ENVIRONMENTAL MANAGEMENT

3.1 Storm Water Collection and Conveyance

Storm water runoff from the landfill will be directed via a system of rain gutters, road ditches, downchute piping, and direct runoff to perimeter ditches surrounding the landfill limits. The perimeter ditches and southern downchute pipes discharge directly to a sediment basin on the south side of the landfill. Final and interim erosion and sediment control plans are contained within the Permit to Construct Application.

During initial operations of each cell within the non-active subcell, a geomembrane raincover will be used to reduce leachate generation. The collected water can then be pumped into the sediment basin.

The storm water collection and conveyance system shall be checked regularly and maintained such that necessary repairs will be made as early as practical.

3.2 Leachate Collection System (LCS)

The leachate collection system (LCS) consists of a geocomposite drainage layer with a series of lateral collection pipes. The lateral pipes are connected to a header pipe that provides gravity drainage of the leachate to sumps. From the sumps, the leachate is pumped to the active ash basin by forcemain then discharged under the plant's existing NPDES permit.

The general operation required to begin waste placement includes the activation of the LCS. This task is accomplished by removing the sacrificial geomembrane cover to expose the LCS corridor. The opened LCS corridor flows directly into the sumps such that rain water entering the cell will now enter the LCS. The Operations Manager shall monitor and document the removal of the sacrificial geomembrane cover and LCS activation within each cell and file the documentation in the facility operation records.

Clean-out pipes have been provided at the ends of the LCS leachate lateral and header pipes. If clogging is suspected, the LCS pipes can be cleaned out by the use of a clean-out snake or high pressure water flushing or monitored with camera equipment.

3.2.1 Maintenance, Record Keeping and Sampling

The maintenance of the leachate management system's physical facilities (consisting of HDPE piping, sumps, and pumps) and records will be performed by or under the direct supervision of Duke Energy.

Leachate will be pumped to the active ash basin on-site then discharged under the plant's existing NPDES permit. Water leaving the active ash basin will be sampled in accordance with the requirements of the plant's NPDES discharge permit.

Periodic equipment maintenance shall be performed as recommended by the equipment manufacturer. Equipment maintenance will consist of checking equipment for corrosion,

leakage, wear, scale build-up, improper functioning, and other improper operations. Appropriate corrective measures shall be taken when equipment is not operating properly.

The LCS sump shall be equipped with a dedicated pump system. The LCS pump system contains one low-flow pump (25 gallons per minute) and one high-flow pump (230 gallons per minute). The pump system shall operate automatically based on level switches with a low level cutoff and high level run-start activations. Additionally, a visual and audible high level alarm shall be in place which will also have a high level activation. See the table below for LCS specific sump operations levels. The LCS system control panels will be equipped with visual and audible alarms programmed to identify sump liquid levels. LCS alarms will be checked and tested for proper function weekly.

Pump	**Low level cutoff**	**High level run-start**	**High level alarm activation**
Low-flow (25 gpm)	0.5 feet (6 inches)	1.5 feet (18 inches)	2.5 feet (30 inches)
High-flow (230 gpm)		2.0 feet (24 inches)	

Records shall be maintained documenting the amounts of leachate generated and disposed of at the active ash basin.

Leachate from the LCS system shall be sampled semiannually from dedicated sample ports located on the LCS system. The following constituents will be analyzed for semiannually:

Temperature	Arsenic	Barium
Boron	Cadmium	Chloride
Chromium	Copper	Fluoride
Iron	Lead	Manganese
Mercury	Nickel	Nitrate
pH	Selenium	Silver
Sulfate	Zinc	Total Dissolved Solids

3.2.2 Contingency Plan

In the unlikely event that leachate can not be pumped to the active ash basin (i.e. a power outage), leachate flow will be temporarily stored within the landfill until such time that pumping operations to the active ash basin can be restored. Please note that the design provides for redundant electrical supply from the power plant, such that the system will switch to the backup power supply line in the event that primary power is lost. In such an event, the Division shall be notified in writing, within 30 days, about the events and corrective actions taken.

3.3 Leak Detection System (LDS)

A leak detection system (LDS) has been incorporated into the design of the RAB ash landfill. The LDS consists of a secondary 60 mil HDPE liner system overlain by a secondary geocomposite drainage layer connected to LDS sumps. To aid in determining the location of a possible leak source and to reduce the likelihood of premature closure of an entire landfill cell as a consequence of excessive leakage, the LDS of each landfill cell is subdivided into two subcells, each with a dedicated LDS sump. Flow collected in the sumps will be transferred to the active ash basin via the leachate force main.

Each LDS sump shall be equipped with a dedicated pump system. Each LDS pump system contains one low-flow pump (25 gallons per minute). The LDS pump system shall operate automatically based on level switches with a low level cutoff and a high level run-start activation. Additionally, a visual and audible high level alarm shall be in place which will also have a high level activation. See the table below for LDS specific sump operations levels. The LDS system control panels will be equipped with visual and audible alarms programmed to identify sump liquid levels. LDS alarms will be checked and tested for proper function weekly.

Pump	**Low level cutoff**	**High level run-start**	**High level alarm activation**
Low-flow (25 gpm)	0.5 feet (6 inches)	1.5 feet (18 inches)	2.0 feet (24 inches)

The LDS has been designed with an Initial Response Leakage Rate (IRLR) of 300 gallons per acre per day and an action leakage rate (ALR) of 500 gallons per acre per day. Should fluid collected in the LDS exceed the IRLR or ALR based on routine flow meter readings, the owner or operator shall take steps as indicated in the facility's Response Action Plan presented in Section 3.3.3.

The management of the leak detection system's physical facilities (consisting of piping and flow meters) and records of monitoring will be performed by or under the direct supervision of Duke Energy.

3.3.1 LDS Maintenance

Periodic equipment maintenance shall be performed as recommended by the manufacturer. Equipment maintenance will consist of checking equipment for corrosion, wear, scale build-up, improper functioning, and other improper operations. Appropriate corrective measures shall be taken when equipment is not operating properly. The LDS system control panels will be equipped with visual alarms programmed to identify sump liquid levels. LDS sump controls will be checked and tested for proper function weekly.

3.3.2 Record Keeping and Monitoring

Flow will be measured at the discharge of each LDS sump by a totalizing flow meter. The facility shall maintain records of monthly flow rate data from each LDS sump from the activation of the cell drainage system and until the waste height reaches

approximately 40 feet. From that point, flow rate data shall be collected on a quarterly basis until landfill closure.
During the post-closure care period, semi-annual monitoring is required. If the liquid levels in the sumps stay below the pump high level run-start (no pump flow) for more than 1 year, then flow rates can be recorded annually. However, if at any time during post-closure care the pump high level run-start level is exceeded on the semi-annual or annual schedules, the facility must return to monthly monitoring, until such time as the liquid level remains below the pump high-level run start activation level for two consecutive months.

The purpose of LDS monitoring is to monitor if the leakage rates have been exceeded. Specific leakage rates are identified in Section 3.3. To determine if exceedances of the leakage rates have occurred, the facility must convert monitored data to an average daily flow rate for each sump (in gallons per acre per day, gpad). For example, the average daily flow rate in gpad is equal to the total monthly flow rate divided by the number of days in the month, divided by the area of the cell in acres. For calculation purposes, subcell areas are summarized for Cells 1 and 2 in the table below.

Subcell	Areas
Cell 1A	4.9 acres
Cell 1B	5.9 acres
Cell 2A	7.6 acres
Cell 2B	6.2 acres

If a leakage rate is exceeded, then the Division must be notified as set forth in the Response Action Plan presented in Section 3.3.3.

3.3.3 Response Action Plan

The purpose of the response action plan is to describe the necessary course of action in the event the Initial Response Leakage Rate (IRLR) and/or the Action Leakage Rate (ALR) are exceeded. If the IRLR is exceeded, steps 1 through 4 will be followed. Should the ALR also be exceeded steps 1 through 6 will be followed. The IRLR and ALR are referenced collectively as "leakage rates" in the following response action plan steps.

The IRLR is 300 gallons per acre per day.

The ALR is 500 gallons per acre per day.

The response action steps include:

Step 1 (IRLR and ALR):
Review physical equipment (pump and flow meter) function and data to confirm flow readings. Review operations to evaluate where operating equipment may have contacted the landfill liner or how landfill operations may have influenced

the exceedance.

If the exceedance is confirmed, the cell LDS flow shall be recorded daily. Should the daily monitored LDS flow exceed the IRLR or ALR after the initial exceedance, operational responses may include: the reduction of active face area; grading to provide improved drainage; and/or, the addition of interim soil cover.

Step 2 (IRLR and ALR):
Within 14 days of identifying that a leakage rate has been exceeded, the facility shall contact the Division in writing. Daily LDS flow recording shall continue. Should none of the daily measured LDS flow rates exceed the leakage rate within 14 days of initial identification of the exceedance, monthly LDS flow averaging shall resume.

Step 3 (IRLR and ALR):
Within 30 days of identifying that a leakage rate has been exceeded, the facility shall submit to the Division a written preliminary assessment which shall include at a minimum:

- the amount of the liquid exceedance including initial measurement and daily measurements, if necessary, to date;
- likely sources of the liquids;
- the possible leak location;
- the possible leak size;
- the probable cause of the leak; and
- an outline of the short-term actions being taken and planned.

Step 4 (IRLR and ALR):
To the extent practicable, evaluate the location, size and cause of the leak; and assess the potential for leakage escaping into the environment and its mobility. Leachate quality shall be sampled, including a chemical analysis of LDS fluids, to evaluate potential hazards (pH and RCRA metals).

Step 5 (ALR Only):
When the ALR is exceeded, establish whether or not the unit should be closed or receipt of waste should be curtailed; and conclude whether waste should be removed from the unit for inspection, engineered controls, or repair of the subcell liner and drainage system. Evaluate and prepare to implement what other short-term or long-term measures shall be taken to mitigate or stop any leaks according to the stage (early operations, middle operations, or closed) of landfill development, as detailed in Section 3.3.2, the discussion on LDS flow measurement.

Step 6 (ALR Only):
Within 60 days of identifying that the ALR has been exceeded, submit to the Division the results of the evaluation performed in Step 4, any actions taken according to Step 5, and any further measures planned. For as long as there is an

exceedance of the action leakage rate, the owner or operator shall submit monthly reports to the Division summarizing the results of the remedial actions taken and further actions planned.

3.4 Landfill Gas Management

Waste will consist of combustion products residuals including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization (FGD) residue generated at the Allen Steam Station. The majority of the waste stream (approximately 95% or more) will consist of fly ash. A small portion of the remaining waste stream will consist of FGD residue. Based on the nature of the waste it is not anticipated that methane or hydrogen sulfide gas will be generated or that odor will be an issue. However, Duke Energy proposes to monitor for the presence of these gases throughout active landfill operations as summarized in the following sections.

3.4.1 Monitoring Program

Duke Energy will monitor for the presence of methane and hydrogen sulfide gas on an annual basis during landfill operations. Monitoring will be conducted by sampling/measuring within 12 to 24 inches of the landfill surface with a handheld gas meter. Monitoring shall be conducted continuously while traversing the landfill cell and active face on an approximate 100-foot wide grid pattern.

3.4.2 Record Keeping

Results of the gas monitoring program will be maintained in the operating record.

3.4.3 Contingency Plan

In the event that methane or hydrogen sulfide gases are detected, appropriate actions will be taken. In the event that gases are regularly detected during active landfill operations, the final closure and post-closure plan will be developed to address gas. It is anticipated that a minimum response will be to provide a passive gas venting system with the final closure. In the event that odor becomes a concern during operations, landfill operating procedures will be evaluated. Corrective measures may include reducing the active face area and placing additional or more frequent operational soil cover.

APPENDIX I

Emergency Action Plan (EAP)

EMERGENCY ACTION PLAN (EAP)
RETIRED ASH BASIN (RAB) - ASH LANDFILL
ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

S&ME Project No. 1356-06-825

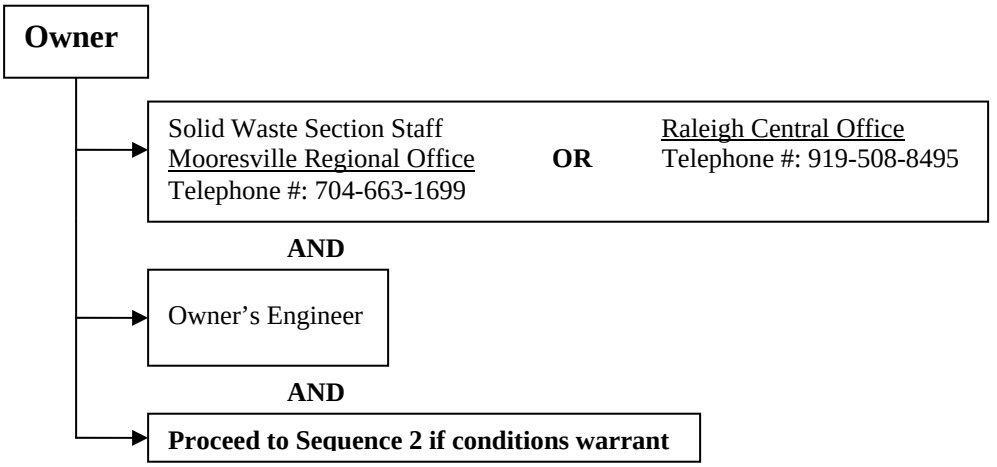
Prepared for:
526 South Church Street
Charlotte, North Carolina 28202

Prepared by:
S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

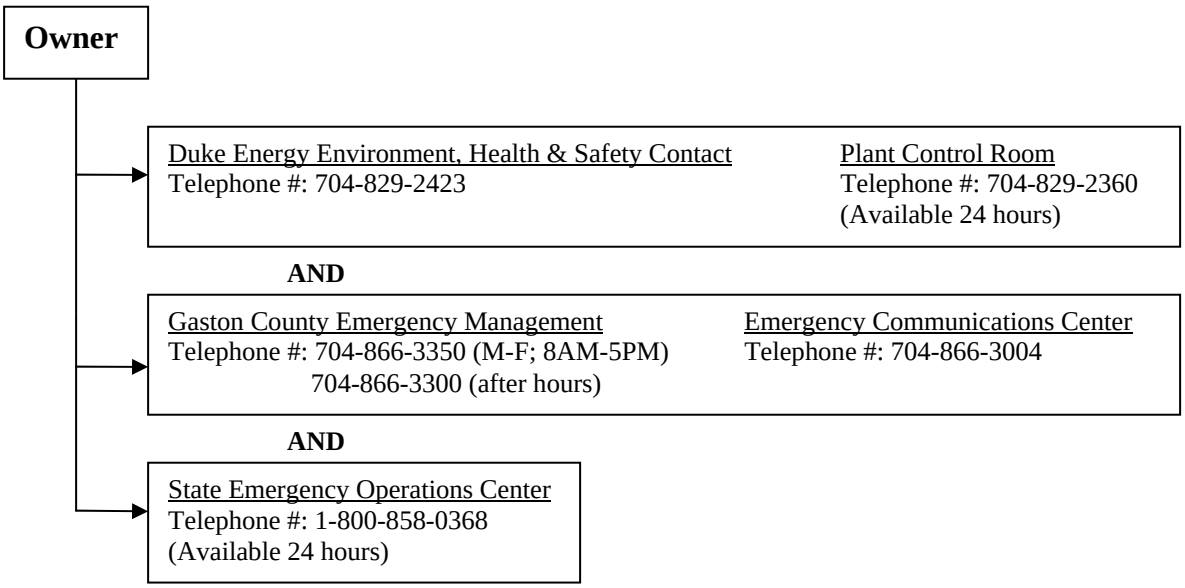
November 20, 2009

Emergency Action Plan (EAP)
Notification Sequence

Sequence 1: If one of the **Alert Conditions** listed in Section 3 of this plan has been observed, but slope failure does not appear imminent then the following notification sequence is followed by the **Owner**:



Sequence 2: If one of the **Emergency Conditions** is occurring or slope failure appears to be otherwise imminent, the following notification sequence is followed by the Owner:



In the event of an **Emergency Condition**, if directed by the station, assemble at the designated Assembly Area.

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3 SLOPE FAILURE INDENTIFICATION CRITERIA.....1

4 NOTIFICATION SEQUENCE.....3

1. STATEMENT OF PURPOSE

The purpose of this Emergency Action Plan (EAP) is to safeguard the lives and reduce damage to Duke Energy's Allen Steam Station property or surrounding properties, in the event of slope failure of the retired ash basin (RAB) ash landfill.

This EAP establishes slope instability identification criteria, identifies emergency response entities, identifies impacted areas, establishes procedures for notification and provides contact information for emergency notifications. This EAP provides a framework for consistent and appropriate response to slope failure events, should they occur. Implementation and familiarity with the elements of the EAP will reduce the risk associated with landfill operations and help to mitigate impacts resulting from slope failure events.

2. PROJECT DESCRIPTION & IMPACTS

The ash landfill is located on the eastern portion of the Duke Energy – Allen Steam Station property approximately 0.25 miles south of the Allen Steam Station in the footprint of a retired ash basin (RAB). Ash waste fill heights are expected to be on the order of 200 feet with slopes constructed at 3 (horizontal) to 1 (vertical) slopes.

The RAB is bound to the north, east, south, and west by earthen dikes. Adjacent to the RAB to the north is the Station's coal pile and the Catawba River is located to the east. Adjacent to the RAB to the south is an existing active ash basin, and to the west is a structural fill area. Impacted areas are located on Duke Energy's Allen Steam Station property. The critical slope, in regards to the health and safety of the general public, is the eastern slope of the landfill, which is upstream of the Catawba River.

3. SLOPE FAILURE IDENTIFICATION CRITERIA

3.1 Alert Status

The following conditions indicate a potential emergency situation. If one or more of these conditions are observed, the owner should initiate Notification Sequence 1 immediately:

i. cracking on landfill slope faces;

ii. bulging on landfill slope faces;

iii. wet spots, seepage, or flow emerging from or near the landfill slope faces; and

iv. shallow sloughing up to about three feet deep.

While under Alert Status, the owner shall continuously monitor slope conditions of the landfill. The owner shall communicate regularly with North Carolina Department of Environment and Natural Resources (NCDENR) personnel and the Engineer. The owner

shall determine if conditions warrant a transition to Emergency Status, and notify the emergency management authorities.

3.2 Emergency Status

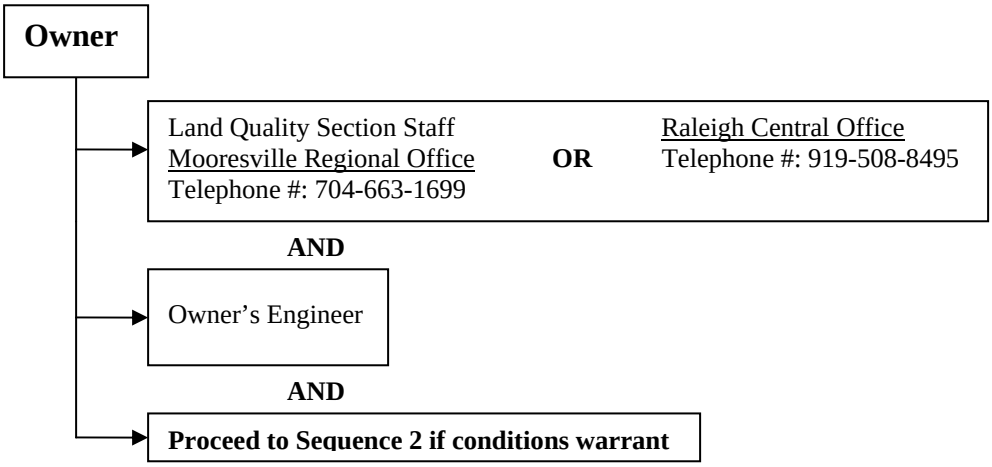
The following conditions indicate slope failure is possible. If one or more of these conditions is observed, the owner should initiate Notification Sequence 2 immediately:

i. slope faces in the process of cracking, sliding, or sloughing.

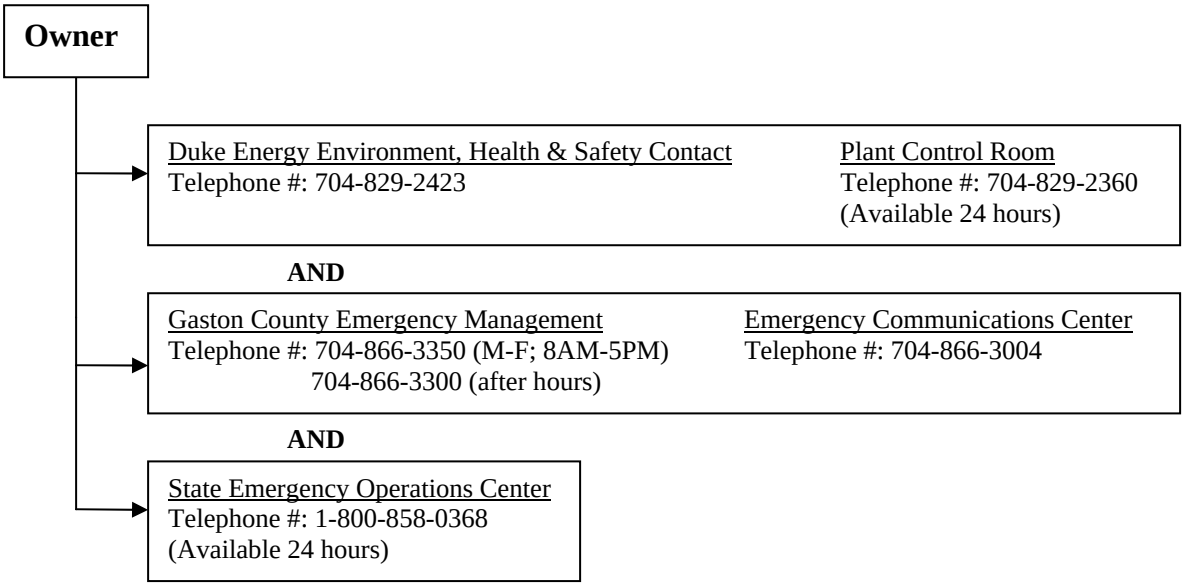
ii. turbid seepage (that is, muddy seepage) and or boils emerging from the landfill slope faces.

4. NOTIFICATION SEQUENCE

Sequence 1: If one of the Alert Conditions listed in Section 3 of this plan has been observed, but slope failure does not appear imminent then the following notification sequence is followed by the Owner:



Sequence 2: If one of the **Emergency Conditions** is occurring or slope failure appears to be otherwise imminent, the following notification sequence is followed by the Owner:



In the event of an **Emergency Condition**, if directed by the station, assemble at the designated Assembly Area.

APPENDIX II

Operations Quality Assurance Plan
(Revised November 11, 2010)

OPERATIONS QUALITY ASSURANCE PLAN
RETIRED ASH BASIN (RAB) - ASH LANDFILL
ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

S&ME Project No. 1356-06-825

Prepared for:
526 South Church Street
Charlotte, North Carolina 28202

Prepared by:
S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

November 11, 2010

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1. PROJECT DESCRIPTION

Quality assurance (QA) monitoring and testing of waste placement during operations of the RAB Ash Landfill shall be performed as presented herein. QA monitoring and testing will be provided by an engineering and testing firm independent of the operator specializing in the observation and testing of soils.

2. QA MONITORING AND TESTING

2.1 Waste Placement

Waste shall be placed and compacted in loose lifts to achieve a 12-inch compacted lift thickness. These incremental lifts shall be placed to achieve a vertical operational lift thickness of 10 feet. The waste filling sequence shall be consistent with the Operations Plan. In general the waste filling sequence shall progress in 10-ft thick operational lifts, with each lift completed across a whole cell before beginning the next lift.

2.2 QA Field Monitoring

QA field monitoring shall be performed to verify that operations are being performed in accordance with the general steps outlined in Section 2 of the Operations Plan. The engineering technician responsible for field monitoring shall document the waste type, location of waste placement, and general placement and compaction methods during waste placement. Documentation shall include information, such as the operator's equipment types and number of passes to achieve the minimum compaction requirements. Waste placement monitoring documentation shall be maintained with the on-site operation records.

2.3 QA Field Testing

QA field testing shall be performed to monitor the compaction and moisture conditioning during waste placement. Waste shall be compacted to a minimum 95 percent of its Standard Proctor (ASTM D 698) maximum dry density. Compacted moisture content shall be within 5 percent of optimum moisture content.

In-place density and moisture content testing shall be performed at the following frequencies:

Cells 1 and 3: One test per 8,000 cubic yards (or one test per 216,000 square feet per 12-inch thick lift).

Cells 2 and 4: One test per 2,000 cubic yards (or one test per 54,000 square feet per 12-inch thick lift).

In-place density testing shall be performed using the Sand-Cone Method (ASTM D 1556), Nuclear Methods (ASTM D 6938), or the Drive-Cylinder Method (ASTM D 2937). Moisture content testing shall be performed using the Direct Heating Method (ASTM D 4959) or Nuclear Methods (ASTM D 6938). Density testing shall generally be performed and test locations documented on a one-acre grid, and including areas within 25 feet of

exterior slopes. Waste placement testing records shall be maintained with the on-site operations records.

In the event that an in-place density and moisture content test fails, the area of waste placement shall be reworked, reconditioned, and retested until the minimum compaction requirement is met.

2.4 Laboratory Testing

Laboratory testing shall be performed at the following frequencies:

Cells 1 and 3: One Standard Proctor moisture-density relationship (ASTM D 698) developed per 50,000 cubic yards of material placed.

Cells 2 and 4: One Standard Proctor moisture-density relationship (ASTM D 698) developed per 20,000 cubic yards of material placed.

Laboratory testing records shall be maintained with the on-site operations records.

APPENDIX III

Dust Control Plan

DUST CONTROL PLAN
RETIRED ASH BASIN (RAB) - ASH LANDFILL
PERMIT NO. 36-12
ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

S&ME Project No. 1356-10-009A
S&ME Engineering License No. F-0176

Prepared for:
526 South Church Street
Charlotte, North Carolina 28202

Prepared by:
S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 28273

May 13, 2011

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3. MONITORING AND CORRECTIVE ACTION RESPONSE 2

3.1 MONITORING 2
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FIGURE **TITLE**

1 Cells 1 and 2 Operations Grid

1. INTRODUCTION AND SITE DESCRIPTION

This Dust Control Plan is for the Retired Ash Basin (RAB) ash landfill at Duke Energy's Plant Allen. This Plan provides dust control methods for managing dust emissions at the RAB ash landfill. This Plan provides a monitoring program and corrective action response to contain CCP's to prevent dust nuisances to employees and the public. The monitoring program will aid Duke Energy and the landfill operator in evaluating the dust control methods, or combination of dust control methods, that prove effective with site specific conditions.

The RAB ash landfill has an approximate 47-acre footprint, and is used for coal combustion product (CCP) management. CCP's primarily consist of moisture conditioned fly ash from the plant's dry ash handling system as well as ash basin ash, bottom ash, boiler slag, mill rejects, flue gas desulfurization (FGD) residue, and sand blast material.

This Plan will be added as an appendix to the approved Operations Plan for the RAB ash landfill.

2. DUST CONTROL METHODS

The primary potential source of dust emissions in the landfill is the top deck area and active area of waste placement. These areas are at a higher risk for producing dust due to vehicular and equipment traffic and earthworks-like construction. Exterior landfill slopes are less of a dust control concern as they have intermediate or operational soil covers which are vegetated as required in the Operations Plan. Operational soil cover is currently defined as 6 inches of soil material applied weekly to the active area of waste placement.

Dust emissions from the landfill can be controlled through a variety of dust control methods. Possible dust control methods are identified herein. Dust control methods may be characterized as products and/or applications, structural wind breaks and/or covers, and operational methods.

Dust control methods for the landfill area include:

- Watering;
- Establishing vegetative cover;
- Mulching;
- Structural controls consisting of:
  - Wind breaks (i.e. fencing and/or berms); and
  - Temporary coverings (i.e. tarps);
- Spray applied dust suppressants consisting of, and not limited to:
  - Anionic asphalt emulsion;
  - Latex emulsion;
  - Resin in water;
  - Polymer based emulsion; and

  - Mineral mortar coatings (i.e. posi-shell);
- Calcium chloride;
- Soil stabilizers (i.e. soil cements);
- Operational soil cover;
- Modifying the active working area; and
- Modifying operations during dry and windy conditions.

The operator may use, and is not limited to, combinations of these dust control methods or any method that is technically sound to control dust for the specific site conditions. If the operator intends to use a dust control method not presented above, the proposed dust control method will be evaluated on a case by case basis to assess the effectiveness with specific site conditions. For the purposes of this Plan, operational soil cover will be defined as soil material applied at a suitable thickness to provide dust control. The effectiveness of the dust control methods implemented should be evaluated through a dust monitoring program outlined in Section 3.

Operational equipment generally consists of dump trucks, vibratory smooth drum roller, bulldozer, water truck, spray trailer, track hoe, and service truck. Operational equipment will be used to construct, install, apply, and/or repair dust control methods. The operator will make provisions to alleviate any on-site issues that arise when primary equipment is being maintained or is inoperable. In the event that Plant Allen contains multiple landfill facilities in the future, the landfill operator will make provisions to have the necessary equipment to control multiple fugitive CCP dusting emission events.

3. MONITORING AND CORRECTIVE ACTION RESPONSE

This section describes a dust monitoring program and suggests corrective action responses should fugitive emissions be observed.

3.1 Monitoring

During landfill operations, a dust monitoring program will be implemented to evaluate the dust control measure performance and observe the areas for dust emissions. The dust monitoring program consists of performing visual observations of dust prone areas, dust control measures, and monitoring existing and forecasted weather conditions.

Dust emissions can occur under many conditions. For the purposes of this Plan, dust emissions are characterized as fugitive emissions, where CCP dust is located outside the limit of landfill waste. This is most likely to occur during windy, dry, and hot weather conditions. Therefore, the operator will monitor both existing and forecasted weather conditions and use dust control measures suited to the weather conditions. The dust control measures shall be implemented prior to the forecasted weather conditions.

Equipment operators shall continuously observe the active face and other areas within the landfill limit for dust emissions. In addition, preventative dust control measures should be observed and documented at least twice daily (morning and afternoon) when the landfill is in operation to evaluate the dust control measure performance. Additional

observations may be necessary as site and weather conditions dictate. Observations will be documented on the attached "*Monitoring Worksheet*," or online database/worksheet, etc. Due to the continual maintenance necessary on moisture conditioned and spray-applied areas, the operator shall pay particular attention to these areas. Structural controls shall be observed to monitor that they are achieving their intended purpose. Observations in the landfill area may be made with reference to the Cells 1 and 2 grid system shown in the attached Figure 1.

Monitoring will be conducted during times when the landfill is in operations. The operator shall continue to provide necessary dust control measures during periods when operations are inactive (i.e. outages, weekends, holidays). Operators are to establish appropriate measures so that dust emissions are not reasonably likely to occur during inactive operations periods when monitoring is not being conducted.

3.2 Corrective Action

If fugitive dust emissions are observed and observations indicate dust control measures are not achieving their intended purpose, then appropriate corrective actions will be taken. Dust control measures should be reapplied, repaired, or added, as necessary, to control dust emissions. The operator will construct, install, apply, and/or repair dust control measures prior to the end of the work day to control dust emissions during non-operating hours. The operator will implement dust control measures as preventative controls rather than in response to fugitive dust emissions.

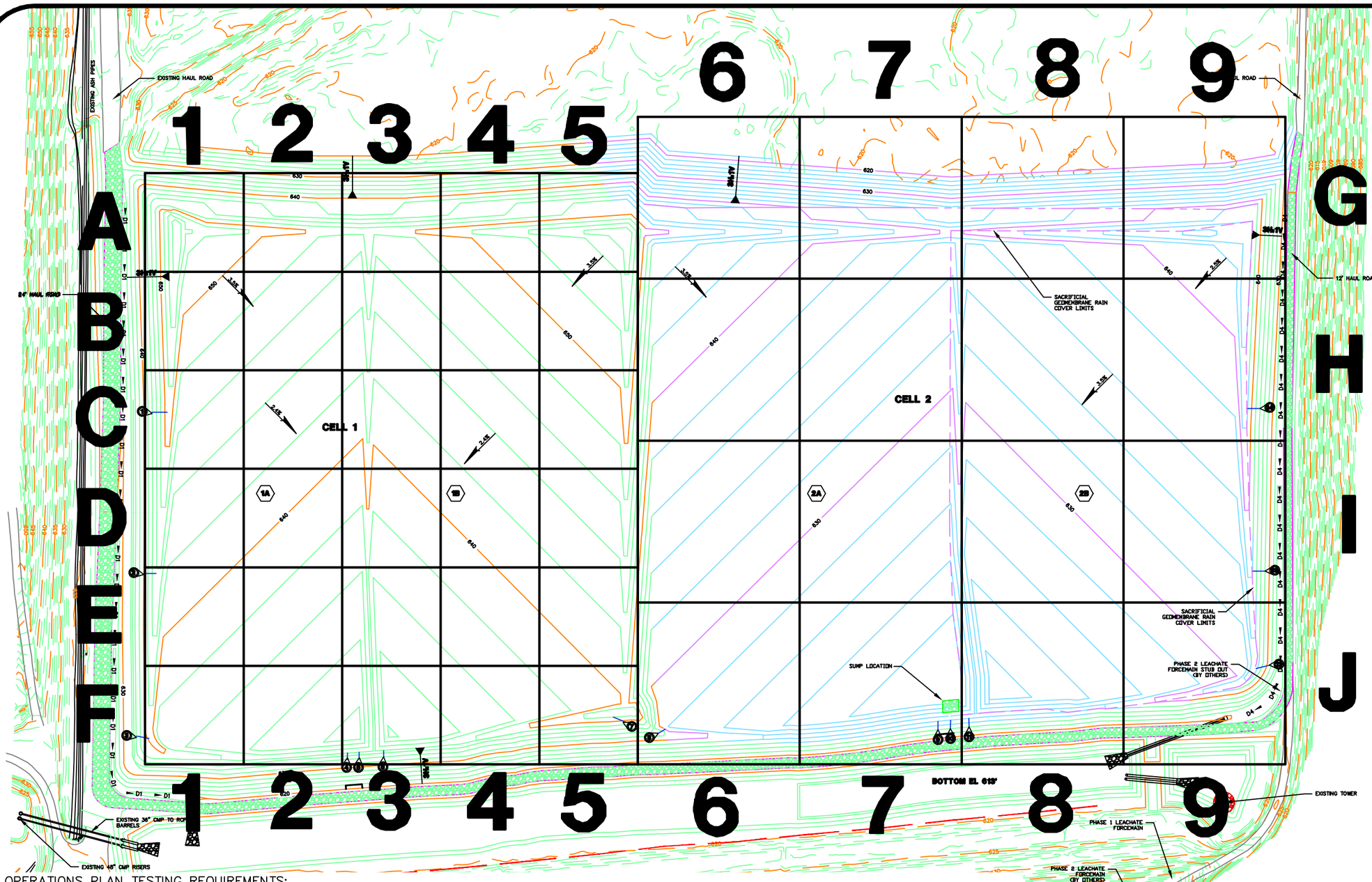
RAB Ash Landfill
Permit No. 36-12

Dust Control Plan -
Monitoring Worksheet

Allen Steam Station
Belmont, North Carolina

Week:

Date/Time	Dust Control Method in Use	Effective Yes/No	Observation Location	Preventative or Corrective Action Taken Yes/No	Observations/comments including: weather conditions, wind speeds, precipitation, forecast, preventative or corrective actions taken (if needed), additional operational notes	Name of Observer



OPERATIONS PLAN TESTING REQUIREMENTS:

CELL 1: FIELD DENSITY TESTING – ONE TEST PER 216,000 SQ. FT. PER 12–INCH THICK LIFT (APPROX. 11 (140' X 140') GRIDS)
LABORATORY TESTING – ONE STANDARD PROCTOR TEST PER 1,350,000 SQ. FT. PER 12–INCH THICK LIFT (APPROX. 69 (140' X 140') GRIDS)

CELL 2: FIELD DENSITY TESTING – ONE TEST PER 54,000 SQ. FT. PER 12–INCH THICK LIFT (APPROX. 1 (230' X 230') GRID)
LABORATORY TESTING – ONE STANDARD PROCTOR TEST PER 540,000 SQ. FT. PER 12–INCH THICK LIFT (APPROX. 10 (230' X 230') GRIDS)

GRAPHIC SCALE

150 0 75 150 300

(IN FEET)

SCALE: 1" = 500'
DATE: 05/13/11
PROJECT NO. 1356–10–009
DRAWN BY: KB
ENGINEERING LICENSE NO: F–0176
CHECKED BY:

S&ME
9751 SOUTHERN PINE BLVD.
CHARLOTTE, N.C. 28273
(704)523–4726
WWW.SMEINC.COM

CELLS 1 AND 2 OPERATIONS GRID DUST CONTROL PLAN

ALLEN STEAM STATION RAB ASH LANDFILL
BELMONT, NORTH CAROLINA

FIGURE NO. 1