January 21, 2014

Memorandum

To: Ed Mussler – Solid Waste Section/Permitting Branch Supervisor
Michael Scott – Solid Waste Section/Section Chief

From: Larry Frost – Solid Waste Section/Environmental Engineer

Subject: Duke Energy/Allen Steam Station/RAB Landfill/Permit No. 3612 – Ash Releases/Failures

Background:

The site of this landfill is on Duke/Allen property in Gaston County (south of Belmont). The landfill is sited on top of a retired coal ash basin (regulated by DWR and DEMLR – result of 2010 legislation), that was retired 20+ years prior to landfill permitting. To the north of the site is the Steam Station proper. To the south is the active ash basin (regulated by DWR and DEMLR). To the west is a closed ash fill area (regulated by DWR). And to the east is Lake Wyle/the Catawba River.

This was the first landfill permitted, by the Section, in accordance with NCGS 130A-295.4(b) as amended by Senate Bill 1492 (July 2007), allowing the construction of a coal combustion products (CCP) landfills over a formerly used coal ash storage site, in this case a retired ash basin.

In September 2008 the Section permitted the Allen Landfill for construction of Phase 1 (Cells 1 and 2). In December 2009 Cell 1 of Phase 1 was completed and permitted to operate (regulated by DWM and DEMLR). In December 2010 Cell 2 of Phase 1 was completed and permitted to operate. DIN 14135.

In 2010, due to a FGD (gypsum) release at the Duke Energy/Belews Creek Steam Station/FGD Landfill Permit No. 8505, the Section requested Duke investigate the use of chimney drains at all of its CCP landfills. Subsequently, all CCP landfills that could be retrofitted with chimney drains were retrofitted. All new CCP landfills are designed with chimney drains.

Allen Phase 1 Cell 1 was developed with side slope drained, not chimney drains,. Allen staff, in an effort to move water from the top of the landfill to leachate collection system (LCS), began creating a bottom ash corridor to the LCS with marginal success – bottom ash is gritty and is extremely pervious compared to fly ash.

In June 2011 the Allen Permit was modified for the installation of chimney drains in Cell 2. The Landfill has a constructed capacity of 2,082,500 cubic yards.

In September 2011 the Allen had an ash release to stormwater ditches and channels due to heavy rain. (Letter to Jason Watkins 9/30/2011)

On October 14, 2013 the Landfill had a release off liner once more due to heavy rains, described as a sink hole. DIN 19986.

On October 31, 2013 Allen moved forward with a planned effort to address the causes of the October 14 release. DIN 20061.

In the interim, December 16, 2013, Allen requested and received a variance to DEMLR compaction requirements at the Landfill. DIN 20298, DIN 20307, and DIN 20308.
Note; I see no evidence that this action was a mitigating factor in future releases, but is noteworthy.

On December 21-23, 2013 the Landfill experienced a release of coal ash due to heavy rainfall. DIN 20319.

On January 11, 2014 the Landfill experienced a release of coal ash due to heavy rainfall. DIN 20408.

Note; I have not included FOB actions, inspections and/or responses. They are available from Bill Wagner, Jason Watkins and CARA/Documentum.

Meeting:
On January 13, 2014 I requested a meeting with Duke Management, Duke's coal ash manager - Charah and Duke's engineering consultant - S&ME. We met on Thursday January 16, 2014 at 1:00 pm in the conference room of the Duke /Allen facility. All parties were represented. John Murray and I represented the Section.

Duke had Charah give a history of the 2013 issues at the Landfill, beginning with the issues in October 2013 through to January 16, 2014. The briefing was complete and was believed to represent the facts. Brief version;

- Duke/Charah in response to the release in October 2013 developed a plan to resolve the ash release issue at the Landfill.
- Duke/Charah was in the process of completing the project in mid-December when heavy rains caused the December release. Duke/Charah immediately responded to the December release, completed the cleanup, repaired damage to the stormwater structures and continued the final implementation of the original plan.
- Duke/Charah completed the final plan on Thursday January 9, 2014, with hydro seeding to the top of the Landfill. On Saturday January 11, 2014 the Landfill once more experienced heavy rains resulting in an ash release, caused by a pipe inlet (side slope drain) failure primarily due to buildup of hydro seeding material. The site was cleaned, revisions were made the outlet pipe design and repairs/revised designs are being implemented at the Landfill. Hydro seeding is the final step. Regular maintenance is also required.

- Duke/S&ME reported that due to a new operating regimen Allen is no longer a base load power plant, it is now a peak load plant, meaning the plant will be idle much of the year. The effect is that the Landfill will not be expanded in the next permit (5 year) cycle. The current Permit expires December 2014. DIN 14135.

The message I took to the meeting was;

1. The Permitting Branch has confident in the response Duke has implemented to each of the releases.
   Note: It appears aggressive, thorough and complete. Duke was appreciative and was complementary of Bill Wagner's response to each release.

2. The Permitting Branch is not confident in the design Duke has implemented in Cell 1, due to the history of releases. We requested "as built" drawings and an explanation as to why geosynthetic membranes were not explored.
   Note: Duke/Charah will provide the requested information and reiterated the releases were a result of bad weather during construction and not failure of the design. Duke/Charah insisted that the design is sound, that the design will now function properly and once vegetation is established will function even better. Duke/Charah insisted confidence in the design will be proven with time.

3. The Permitting Branch is concerned about the future of Cell 1 in the overall design of the Landfill. Duke/S&ME will be modifying the engineering plan for the Landfill.
   Note: Duke/S&ME is contemplating /developing a plan that will extend chimney drains over Cell 1 which may discharge to Cell 2 chimney drains and possible Cell 3 (not yet permitted). S&ME has written a "White Paper" on coal ash leachate design, based on the impervious nature of fly ash which may result in new design concepts. Experience has shown that the LCS's (leachate collections systems) in current use are based on MSW landfill designs. As we have seen, the standard MSW Landfill LCS currently in use is generally ineffective, without effective top of landfill drainage, after the application of as little as 6 feet of compacted fly ash. Message is, 6 feet of compacted fly ash is relatively impervious, permeability of 1 x 10^{-4} and new/better designs are warranted.

We toured the landfill, observed the work that has taken place and the designs being implemented. We exited the facility at 3:30 pm.

Should you have any questions please let me know.