STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
& ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES
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SITE INVESTIGATION &
RESTORATION SECTION

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July 7, 2011

Mr. David Bacher
NRG
P.O. Box 408
Power Plant Rd.
Millsboro, DE 19966

RE: Burton Island Ash Disposal Area, (DE-1399)
DRAFT Comments on Remedial Investigation Report for Operable Unit 2 (OU2)

Dear Mr. Bacher:

The DNREC Site Investigation and Restoration Section (DNREC SIRS) has reviewed the subject report. We have the following comments.

GENERAL

1. USEPA (1997) is repeatedly cited in the report; however there are three 1997 USEPA references in the References section - USEPA 1997a, USEPA 1997b, and USEPA 1997c. Please correct.

2. Page 1-9 contains an assertion that the Army Corps of Engineers used the eastern end of Burton Island for dredge spoil disposal. However, no documentation is provided for this assertion. Please cite references or delete the statement. Also the assertion seems to conflict with the soil boring observations in section 3.3.1; please clarify.

3. On page 2-16, it is reported that the pond SE had a salinity of 3.55%, yet the salinity of ocean water is typically about 3.4%. Please clarify whether 3.55% is correct, or whether it should be 3.55‰.

4. On page 7-3, the URL for Gano (1996) is outdated. This document is now located at *http://www.dnrec.delaware.gov/fw/Hunting/Documents/Wildlife%20Management%20Plans/Assawoman%20WMP%201996%20-%20Web%20Site%20Version%202003.pdf*.

RADIOACTIVE ELEMENTS

5. No chemical data for uranium (U) or thorium (Th) were provided. U is **chemically toxic** (to kidneys) *(http://www.atsdr.cdc.gov/ToxProfiles/tp150.pdf)* as well as an alpha emitter. The report only provides specific activity (SA) data, not chemical analytical data.

Please present risk assessment references based on SA data that would allow correlation of SA levels to chemical data. Further, please estimate the risk posed by these elements at the Site, and demonstrate whether the SA levels measured indicate that the levels of U and Th present do not pose an unacceptable radiological or toxic risk to human or ecological receptors.

GROUNDWATER/MASS LOADING (see spreadsheet, attachment B)

6. The mass loading calculations in section 3.3.3 *et seq.* shall also be performed with assumed increases in sea level of 0.5 m, 1.0 m, and 1.5 m (estimated potential sea level rise by 2100, as per DNREC sea level rise planning policy).

AIR DISPERSION

7. In Table 4-2, the 24-hour "realistic" PM-10 estimate is calculated to be almost 50% of the NAAQS standard. Therefore, if the bare area of the site slightly more than doubled, *e.g.,* due to a fire or weather event or to remedial construction, the modeled emissions would exceed the standard. Although this doesn't indicate an immediate problem, it raises issues of (1) needing to govern any remedial construction activities so that this is prevented or mitigated, with a sufficient safety margin, and (2) needing to address vegetative cover issues in the O&M Plan.

HUMAN HEALTH RISK

8. According to RAGS (Section 8), total risk should be presented to one significant digit.

9. On page 5-23, it is stated that *"There are no fish consumption advisories related to metals in the Delaware Inland Bays."* This statement is **incorrect**: there is an advisory for Delaware Atlantic Coastal Waters including Delaware Inland Bays recommending consumption of no more than one 8-ounce meal per year (**no** consumption for women of childbearing age or for children) of bluefish greater than 14 inches for PCBs and mercury (DNREC, March 30, 2006. *DNREC News* Vol. 36, No. 84.). As bluefish is a popular game fish in the Inland Bays region, this is worthy of note. Please correct the referenced statement to indicate the existence of this fish consumption advisory.

10. In an attempt to refute the calculated human health risk for trespassing anglers, NRG/IRPLLC security precautions are cited. However, with the exception of the fence separating the ash dump from the plant (not relevant to trespassing anglers), these measures have not been described. Therefore their efficacy in reducing risk has not and currently can not be determined. (This must also be addressed in the forthcoming O&M Plan.)

11. Similarly, in ruling out risk to hypothetical future construction workers, NRG/IRPLLC occupational safety procedures were cited. However, these have not actually been submitted, so their efficacy in reducing risk has not and currently can not be determined. (This must also be addressed in the forthcoming O&M Plan.)

12. (Page 5-31) DNREC's unacceptable cancer risk level of 1×10^{-5} is not "suggested guidance;" it is in Section 9 of the *Delaware Regulations Governing Hazardous Substance Cleanup* and therefore mandatory. Please correct.

ECOLOGICAL ISSUES AND ECOLOGICAL RISK

13. Please provide a map combining the information in Figure 2.4-1 (Vegetative and Habitat Communities) and Figure 3.1-1 (Soil Sample Locations [including sampling unit boundaries]). Alternatively, please provide a transparent overlay to the same scale as Figure 2.4-1 showing the sampling unit boundaries.

14. USFWS and NMFS wildlife and habitat information for the shoreline stabilization project may be dated, as no dates or copies of correspondence from these agencies appear in the report or appendices. Species status and presence may have changed since the shoreline project's permitting stage. Please provide copies of these documents as appendices, unless already included in the FE report, and note the dates for them in the text and references.

15. Page 5-81 and the conclusion on page 5-94 suggest adopting a much higher HQ threshold than 1.0: *"In order to account for the difference between adverse impacts to individuals and adverse impacts at the population level, the* de minimus [sic] *HQ of 1 could be raised to some higher level based on professional judgment and experience; for instance 5 or 10."* DNREC SIRS does not concur with this approach. USEPA ecological risk assessment guidance at the scientific/management decision point following the screening-level ecological assessment is clear: either (1) the site risks are negligible and no remediation is warranted; or (2) there is insufficient information and the assessment process should continue to Step 3 (Baseline Risk Assessment Problem Formulation); or(3) the information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted.

16. Based on existing habitat types at OU2 mapped for the report, Canada Goose would not be expected to occur within OU2, as the site is dominated by forested habitat and upland *Phragmites*. Being waterfowl, Canada Goose is really more of an aquatic receptor, and typical diet items presented in USEPA's *Wildlife Exposure Factors Handbook* (USEPA 1993) are not likely to be available in OU2. Also, the shoreline remediation revetment, which the report notes as having made access to OU2 by people more difficult, would also make it more difficult for geese to access OU2. Page 5-58 states: *"Measurement receptors will not be considered if their preferred habitat is not potentially impacted by ash material or if their preferred habitat does not occur within OU2."* As such, Northern Bobwhite (also included in the *WEFH*) would be a more appropriate receptor for this guild in OU2.

17. Page 5-81: Table 5.2-13 shows the Invertivorous Bird LOAEL EHQ for methylmercury (MeHg) as 1.85E+01, but this value is not shaded as an exceedance of an EHQ of 1.0.

18. In regard to use of a NOAEL, Page 5-85 of the report states: *"A less sensitive endpoint that is still protective of the ecological populations or communities of interest may be the LOAEL or some other endpoint."* By definition (page 5-75), a LOAEL is *"The lowest concentration or dose at which an adverse effect is observed...."* It is noted that the use of LOAELs (Table

5.2-13) results in only two EHQs exceeding 1.0, whereas the use of NOAELs (Table 5.2-12) per USEPA guidance results in **13** exceedances, including an EHQ of 18 for barium for Omnivorous Small Mammal and an EHQ of 22 for barium for Invertivorous Small Mammal.

In Tables N-11 through N-18, it is clear that whether a COPEC is a Constituent of Ecological Concern is based on the LOAELs, not the NOAELs. From USEPA 1997c: *"A NOAEL is more appropriate than a LOAEL to use as an screening ecotoxicity value to ensure that risk is not underestimated."* The guidance also states that NOAELs are preferred to LOAELs and gives a conversion to a NOAEL if only a LOAEL exists. Use of LOAELs is not a conservative approach and should not be undertaken if NOAELs exist. Therefore DNREC SIRS does not concur with this approach.

19. The assessment conclusion suggests the assessment framework is overly conservative and that communities and populations are not at risk and that no further action is warranted (page 6-8): *"The conservative assessment techniques used in the SLERA indicated that several metals in surface soil at OU2 may have the potential to affect the site ecosystem. However, if food web models were utilized to assess ecological communities and populations instead of individuals, then all of the calculated hazards would be less than the* de minimus [sic] *hazard levels and no food web impacts to terrestrial populations would be expected. Therefore, no further action would be warranted for the protection of terrestrial food web-based ecological communities and/or populations."* The screening-level risk assessment indicates a potential for adverse ecological effects at the site, based on 13 of 56 calculated NOAEL-based EHQs exceeding 1.0. Therefore DNREC does not agree with the No Further Action conclusion and will require development of either a Feasibility Study or a risk management plan to be developed.

20. (Page 5-41) Please note in the text that the Delmarva Fox Squirrel is federally listed as an endangered species. (*http://www.fws.gov/chesapeakebay/dfox.htm*, accessed May 11, 2011.)

21. Was any attempt made to search for or identify amphibian or reptile species that might use the ponds? (Where were the green treefrogs observed?) On page 5-47, Gano (1996) is cited as identifying 12 species of amphibians present at Assawoman Wildlife Area that "may also be present at the Ash Site." Previous correspondence from DNREC to Shaw noted scientific work suggesting that certain amphibians may be especially sensitive to coal ash constituents.

It is noted on page5-57 that *"Reptiles and amphibians are not directly assessed in the food web models 'because of the paucity of toxicological information on these receptors (USEPA, 1999).'"*

Please consult the 13 references identified in Attachment A to this letter. If these references provide sufficient data to allow modeling of ecological risk to these receptors, please do so as part of the revisions to the ecological risk assessment, citing the sources used.

If these references do not provide sufficient data to allow modeling of ecological risk to these receptors, please identify the remaining data gaps.

22. It is stated on page 5-61 that *"Current scientific consensus is that there is considerable uncertainty in the derivation of species-specific TRVs and that generic TRVs applicable to*

mammalian and avian receptors in general are more appropriate for use in risk assessments." Please provide specific references supporting this assertion.

23. On page 5-62 and 5-63, please correct the keys for the UCL equations to identify all the variables.

24. On pages 5-65 and 5-67, assumptions for Hg speciation are derived from EPA (1999) guidance for soil. Please verify that these assumptions are valid for coal ash.

25. On page 5-85, it is stated that the lack of consideration for bioavailability *"has the potential to greatly overestimate exposure to certain COPECs."* Actually it has the potential to overestimate **toxicity**, not exposure. Please correct or clarify this statement.

If you have any questions regarding the above, please do not hesitate to contact me.

Sincerely,

Gregory M. DeCowsky, CHMM
Environmental Scientist/Project Manager

Enclosure: Attachment A: References
Attachment B: CD

GMD:vdh; GMD11003.doc; DE 1399 II B 4

pc: Timothy T. Ratsep, Program Manager, DNREC SIRS
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Richard Greene, PhD., Environmental Engineer, DNREC Division of Watershed Stewardship

Attachment A
References on the effects of coal combustion wastes on amphibians and reptiles

Cherry, D.S., R.J. Currie, and D.J. Soucek. 2000. Review of the Global Adverse Environmental Impacts to Ground Water and Aquatic Ecosystems from Coal Combustion Wastes at *http://citizenscoalcouncil.org/A_REVIEW_OF_THE_ADVERSE_ENVIRONMENTAL_IMPACTS_OF_COAL_COMBUS.htm*

Hopkins, W.A., J. Congdon, and J.K. Ray. 2000. Incidence and impact of axial malformations in larval bullfrogs (*Rana catesbeiana*) developing in sites polluted by a coal-burning power plant. Environmental Toxicology and Chemistry 19:862–868.

Hopkins, W. A., M. T. Mendonça and J. D. Congdon. 1997. Increased Circulating Levels of Testosterone and Corticosterone in Southern Toads, *Bufo terrestris*, Exposed to Coal Combustion Wastes. General and Comparative Endocrinology 108:237-246.

Hopkins, W. A., M. T. Mendonça, C. L. Rowe and J. D. Congdon. 1998. Elevated Trace Element Concentrations in Southern Toads, *Bufo terrestris*, Exposed to Coal Combustion Wastes. Archives of Environmental Contamination and Toxicology 35:525-129.

Hopkins, W. A., C. L. Rowe, and J. D. Congdon. 1999a. Increased Maintenance Costs and Trace Element Concentrations in Banded Water Snakes, *Nerodia fasciata*, Exposed to Coal Combustion Wastes. Environmental Toxicology and Chemistry 18(6):1258-1263.

Hopkins, W. A., M. T. Mendonça and J. D. Congdon. 1999b. Responsiveness of the Hypothalamo-Pituitary-Interreal Axis in an Amphibian *(Bufo terrestris)* Exposed to Coal Combustion Wastes. Comparative Biochemistry and Physiology 122(2):191-196.

Peterson, J. V.A. Peterson, M.T. Mendonça. 2008. Growth and developmental effects of coal combustion residues on Southern Leopard Frog (*Rana sphenocephala*) tadpoles exposed throughout metamorphosis. *Copeia* 2008:499-503.

Peterson, J.D., V.A. Peterson, M.T. Mendonça. 2009. Exposure to coal combustion residues during metamorphosis elevates corticosterone content and adversely affects oral morphology, growth, and development in *Rana sphenocephala. Comp. Biochem. Physiol.* 149:36-40.

Raimondo, S. M., C. L. Rowe and J. D. Congdon. 1998. Exposure to Coal Ash Impacts Swimming Performance and Predator Avoidance in Larval Bullfrogs *(Rana catesbeiana)*. J. of Herpetology 32:289-292.

Rowe, C. L., O. M. Kinney and J. D. Congdon. 1998a. Oral Deformation in Tadpoles of Bullfrogs (*Rana catesbeiana*) Caused by Conditions in a Polluted Habitat. Copeia 1998:244-246.

Rowe, C. L., O. M. Kinney, R. D. Nugle and J. D. Congdon. 1998b. Elevated Maintenance Costs in an Anuran *(Rana catesbeiana)* Exposed to a Mixture of Trace Elements during the Embryonic and Early Larval Periods. Physiological Zoology 71(1):47-55.

Rowe, C. L., O. M. Kinney, A. P. Mori and J. D. Congdon. 1996. Oral Deformities in Tadpoles *(Rana catesbeiana)* Associated with Coal Ash Deposition Effects on Grazing Ability and Growth. Freshwater Biology 36:723-730.

Ward, C.K., S. Hassan, M.T. Mendonça. 2009. Accumulation and depuration of trace metals in southern toads, *Bufo terrestris*, exposed to coal combustion waste. *Archives Toxicol. Contam.* 56:268-275.

Attachment B
Mass loading calculations