STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

OFFICE OF THE
SECRETARY

PHONE: (302) 739-9000
FAX: (302) 739-6242

Secretary's Order No. 2013-WH-0044

Re: Approval of Final Plan of Remedial Action for Burton Island Ash Disposal Area (Operable Unit 2) near Millsboro, Sussex County

Date of Issuance: October 9, 2013
Effective Date: October 9, 2013

This Order of the Secretary of the Department of Natural Resources and Environmental Control (Department) considers the record of decision on the January 8, 2013 Proposed Plan of Remedial Action (Plan or PPRA) for the Burton Island Ash Disposal Area Operable Unit 2 (Site). The Site is 93.6 acres located approximately five miles east of Millsboro, Sussex County on Burton Island, which is between the Indian River to its north and Island Creek to its south in the Indian River Bay.

Background

In 2005, the Department's Division of Waste and Hazardous Substances, Site Investigation and Restoration Section (SIRS) began an investigation under the *Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91* (HSCA) and the Department's HSCA Regulations. The investigation was begun because of concerns with possible hazardous substances in the coal ash that may pose an undue risk to the environment and public health. SIRS and the Site's owner, NRG Energy's Indian River Power LLC executed a HSCA Voluntary Cleanup Agreement, and a Department approved

environmental consultant, Shaw Engineering, prepared extensive scientific studies on the Site for SIRS.

The Site's investigation was part of a larger area investigated in two other Operable Units. Operable Unit 1 was an investigation of the Burton Island shoreline, which was determined to be the greatest risk of exposure because erosion threatened to have coal ash enter the water. Operable Unit 3 was an investigation of the offshore area to determine if any contamination was present from the coal ash. SIRS' most immediate concern was the environmental remediation to stop the erosion of Burton Island's shoreline (Operable Unit 1) and possible contamination of offshore areas (Operable Unit 3). Consequently, SIRS prepared a Plan of Remedial Action for Operable Units 1 and 3, and this Plan was approved by Secretary's Order No. 2008-A-0032 issued July 30, 2008. Studies continued on Operable Unit 2 until 2012. Operable Unit 2 was where the coal ash was located and its area was much larger than the other two areas.

The Department held a February 7, 2013 public hearing on the Plan, and the public comment period for written comments was extended to April 1, 2013 to allow time for the Center for the Inland Bays to submit a study. The study was submitted in the middle of July. The Department's presiding hearing officer prepared the attached Report, which recommends approval of the Plan. The Report is hereby adopted. .

Findings and Reasons

This Order approves the environmental remediation of the Site and its estimated 2 million cubic yards of coal ash. The coal ash had been placed on the Site from 1957 through 1979 by Delmarva Power & Light Company (DP&L) as part of its operation of the coal fired Indian River Generating Station (IRGS) located on the western end of

Burton Island. In 2001, Delmarva Power & Light sold Burton Island and the Indian River Generating Station to NRG Energy's Indian River Power, LLC.

The Plan is based upon extensive studies by experts with the environmental consulting firm of Shaw Engineering. SIRS' experts reviewed the studies and independently determined that the targeted soil alternative was the most appropriate environmental remedy under HSCA given the risks involved. SIRS's Plan selected from among four alternatives the alternative that would provide for the acceptable level of risk to the environment and public health. The remedy required to be considered was to do nothing and this remedy was rejected because the Site has exposed coal ash that could be air borne or washed into the water. The other two alternatives were complete soil cover on the entire Site, a targeted soil cover of the exposed coal ash and total removal of the coal ash. The Plan adopted the targeted soil alternative, which was supported by the studies as the most appropriate remedy for the environmental remediation of the Site consistent with HSCA and the risks associated with the remediation alternatives considered. The Report is hereby adopted and the Department approves the proposed Plan as a final Plan, which will allow the remedial measures to be implemented under HSCA's procedures.

The Plan's implementation as a result of this Order will provide for the environmental remediation in a manner that will not undue risk of adverse impacts to human health or the environment. The Site's estimated 2 million cubic yards of coal ash would require approximately 200,000 truckloads to remove and take several years. The removal would result in a large hole until more soil would be trucked in. The removal would result in the total destruction of the existing wildlife and habitat on the Site that

has grown back since coal ash was last deposited there in 1979. The removal remedy also would delay the completion as it would take a long time and would expose more people to risk from the coal ash's contaminants of concern arsenic, aluminum, barium, cobalt, copper, mercury and selenium because of the intensive handling of the coal ash in its removal and transportation to a final disposal site. The remedy of placing soil cover over the entire Site was considered and rejected because such placement also would destroy the existing wildlife and its habitat and was not necessary in light of the existing cover on the coal ash. The remedy that was selected was a targeted soil cover of approximately 12" thick for those approximately 2.5 acres identified as needing addition soil cover because the coal ash was exposed. The remedy would grade and plant native vegetation and would impose controls on the land to reduce the risk of any human exposure. In addition, marked barrier would be placed on top of the coal ash before the soil cover was added

Some of the public comments opposed the Plan and wanted the coal ash to be removed. As noted above this alternative was considered but was not selected because of the undue risk of exposure of contaminant to the environment and an adverse impact to human health. The HSCA remediation allows for the selection of a remedy that follows the standards and policies. It was determined that removal would add substantial risks to the environment and human health from exposure from that remediation whereas the selected remedy had reduced the risks compared to the other three methods considered. The mandatory alternative to consider under HSCA was to do nothing, and this alternative was rejected.

The Department retains the authority to seek natural resources damages and the approval of this Plan does not prevent such action to be taken. The approval of this Plan will result in action taken to reduce the risk of exposure from contaminants in coal ash and achieve a remediation consistent with HSCA.

Conclusions

In sum, as more fully described in the reasons and findings above and in the Report, the record of decision supports that the Department adopts the following findings and conclusions:

1. The Department has jurisdiction under its statutory authority to make a determination in this proceeding;

2. The Department provided adequate public notice of the proceeding and the public hearing in a manner required by the law and regulations;

3. The Department held a public hearing in a manner required by the law and regulations;

4. The Department considered all timely and relevant public comments in making its determination;

5. The Department shall issue the Final Plan of Remedial Action based upon the Proposed Plan of Remedial Action in order to allow the implementation of environmental remediation of OU2 area consistent with the Plan; and

6. The Department shall provide notice of this action in a manner consistent with the law and regulations and shall publish the Order on its web page.

Collin P. O'Mara
Secretary

HEARING OFFICER'S REPORT

TO: The Honorable Collin P. O'Mara
Secretary, Department of Natural Resources and Environmental Control

FROM: Robert P. Haynes, Esquire
Senior Hearing Officer, Office of the Secretary
Department of Natural Resources and Environmental Control

RE: Proposed Plan of Remedial Action for Burton Island Ash Disposal Area
Operable Unit 2, Near Millsboro, Sussex County (SIRS Project DE-1399)

DATE: August 22, 2013

I. BACKGROUND AND PROCEDURAL HISTORY

This Report reviews a record a record of decision and recommends to the Secretary of the Department of Natural Resources and Environmental Control (Department) that a Proposed Plan for Remedial Action (Plan) prepared under the *Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91* (HSCA) and the Department's HSCA regulations, *Delaware Regulations Governing Hazardous Substance Cleanup. 7 DE Admin.1375* be approved as a final plan to allow for the environmental remediation of the Burton Island Ash Disposal Area Operating Unit 2 (Site).

The Site is 93.6 acres on the eastern half of Burton Island, which is a 244 acre island approximately five miles east of Millsboro, Sussex County in the Indian River Bay. The island is formed by the Indian River to the north and Island Creek to the south, which are tidal waters and part of the Indian River Bay. The coal fired Indian River Generating Station (IRGS) is located at the west side where IRGS' cooling water intake connects Island Creek and Indian River. From 1957 to 1979, Delmarva Power and Light, the former owner and operator of IRGS and all of Burton Island, deposited an estimated 200 million cubic yards of coal ash on the Site on the west side of Burton Island. In 2001, Delmarva Power & Light sold IRGS and Burton Island to NRG Energy's subsidiary, Indian River Power, LLC (IRP).

The Department's HSCA process began in 2005 when a Department field inspection noticed shoreline erosion along Burton Island. This erosion threatened to cause the coal ash to enter the water and cause possible water pollution from hazardous substances. The Department's Division of Waste and Hazardous Substances (DWHS), Site Investigation and Restoration Section (SIRS) and IRP entered into a HSCA Voluntary Cleanup Agreement.

SIRS' investigation first focused on the shoreline and possible water contamination. Consequently, SIRS divided the Burton Island investigation into three Operable Units (OU). Operable Unit 1 was the area along the Burton Island shoreline adjacent to where the coal ash was deposited. Operable Unit 2 was the area where the coal ash was stored. OU3 was the offshore area.

IRP retained a Department approved environmental consulting firm, Shaw Environmental (Shaw), to prepare a Facility Evaluation (FE), which was submitted in 2007. SIRS proposed a 2007 proposed plan of remedial action for the shoreline (OU1) and subaqueous and offshore areas (OU3). OU2 was not included because scientific investigation was still ongoing. This plan was the subject of a public hearing and was approved in Secretary's Order No. 2008-A-0032 issued July 30, 2008 and SIRS issued the final Plan on August 5, 2008.

The Site's scientific study was set forth in Shaw's 2008 Facility Evaluation, a 2011 Remedial Investigation, and a 2012 Feasibility Study. Together, these documents represent several thousand pages of data and expert analysis. SIRS reviewed the scientific studies and data and submitted the Plan for Division Director approval. Marjorie Crofts, Director of DWHS, who on January 8, 2013.signed approval of the Plan, which commenced the public comment process under HSCA and public notice was published of the Plan and a public hearing on it.

The Department held a public hearing on the Plan on February 7, 2013 in the Millsboro Fire Hall. Several members of the public attended and the Center for the Island Bays (CIB) requested that the record be kept open for forty five days in order that the CIB may submit

comments based upon a study that was underway. The request was granted and the public comment period was extended to April 1, 2013. On July 15, 2013, CIB submitted a study. SIRS prepared a response to the timely submitted public comments.

II. RECORD OF DECISION

This Report is based upon the record of decision, which includes the public hearing transcript, the written documents submitted as exhibits at the hearing, the written public comments timely received during the public comment period, and the post-hearing record investigation developed for this Report, including SIRS' the technical response document attached hereto.

At the hearing SIRS' representatives Timothy Ratsep, Administrator, Paul Will, Program Manager, and Greg DeCowsky, Project Manager were present. Mr. Ratsep provided introductory remarks and Mr. DeCowsky went through a slide presentation. The presentation described the history of the Site, the Department's investigation of the Site, and the proposed remedial action. SIRS submitted into the hearing record the following relevant documents from its files: Remedial Investigation Report dated February 2011 (DNREC Ex. 1); November 26, 2012 Feasibility Study for OU2 (DNREC Ex. 2); Plan dated January 8, 2013 (DNREC Ex. 3); legal notices of the Plan and public hearing published January 13 and 30, 2013 (DNREC Ex. 3); an email public comment from John Austin dated January 30, 2013 (DNREC) Ex. 4); an email public comment from Bart Wilson dated January 31, 2013 (DNREC Ex. 6); an e-mail from Rick Green of the Department of Watershed Stewardship (DNREC Ex. 7); the SIRS' slide presentation (DNREC Ex. 8); the February 7, 2013 letter from the Sierra Club (DNREC EX. 9); and the February 7, 2013 letter from Steve and Sallie Callanen (DNREC Ex. 10).

SIRS' Plan proposes the following remedial action: 1) Grading of bare areas or other targeted areas of OU2 (about 2.5 acres), including the pond banks, in order to stabilize the slopes and to cover the coal ash with marker fabric on which will be placed at least 12″ of clean soil

(including a topsoil layer of at least 3″); 2) Revegetating the covered areas with appropriate native vegetation, including grass seed mix(es) as well as shrubs and trees; 3) Implementation of daily (initially) perimeter patrols to inspect for signs of trespassing; 4) Implementation of a site-wide (all OUs) DNREC-approved Long-Term Stewardship (LTS) plan to ensure the continued integrity of the remedy; 5) The recording of a Department approved Environmental Covenant, consistent with Delaware's Uniform Environmental Covenants Act (Title 7, Del. Code Chapter 79, Subtitle II) (UECA).

Mr. DeCowsky reviewed the risk assessment analysis for the four alternatives that were considered, which included:1) the mandatory alternative of doing nothing, 2) the targeted soil cover of exposed ash and land use controls at an estimated present value total cost of $2.1 million over 3; full soil cover and land use controls at an estimated present value total cost of 16.4 million, 3) the removal and proper disposal of approximately 2 million cubic yards (220,000 dump trucks) of coal ash waste at an estimated present value total cost of $289.6 million. He explained the reasons for selecting the targeted cover in that it would have the lesser environmental impact that the total disturbance of the entire Site. Moreover, it would reduce the risk of contaminants moving through erosion, He also noted the shoreline erosion control remediation already achieved the greatest risk reduction. Thus, under the target soil alternative, only the exposed areas estimated at 2.5 acres will have soil cover as the remaining area is covered and has vegetation on it. The Site will be subject to land use controls and the security of patrols and the fencing around the Indian River Generating Station, including the Site. In response to changes that may be needed in the future, Mr. DeCowsky noted, for example, that if sea level change should require changes to the Plan, then the Plan could be changed.

Chuck Schonder spoke and presented comments from the Delaware Chapter of the Sierra Club that sought a decision to reject the PPRA. He cited the sea level rise study and the need to protect the Inland Bays as waters of exceptional recreational and ecological significance and

currently is classified as impaired value due to excessive pollutant levels. He was critical of Delaware's assessment of bioaccumulation of hazardous and carcinogenic toxic chemicals into the aquatic food chain.

Chris Bason spoke as the Executive Director of the Center for the Inland Bays (CIB). He indicated that the CIB was conducting a study and wanted more time to comment and requested that the public comment period be kept open for forty-five days. SIRS did not oppose this request and it was granted and the public comment period was kept open until April 1, 2013.

Henry Genino spoke and his comments were questions on who would be paying for the clean-up and he was told that IRP and Delmarva Power and Light would be responsible. He also asked questions on the calculation on how many people would come into contact with the Site and was provide answers.

Bill Zak spoke about his concern with the inadequate testing of the hazardous substances and the adverse impact on the environment from having the coal ash pile remain in place and leaching hazardous substances into the water.

Following the hearing the Department received public comments during the extended public comment period from Gregg Rosner, who requested the removal of the coal ash from the Site, Chuch Schonder also provided written comments that questioned why a concrete bulkhead was not built around the 12,079 foot shoreline and the SIRS response provided an answer. In addition, SIRS supplemented the record with an analysis prepared by Dr. Richard Green of the Department's Division of Watershed Stewardship and photographs taken by Mr. DeCowsky and other information provided to me.

III. DISCUSSION AND REASONS

I find that the Department's PPRA is a reasonable and sound method of environmental remediation of the Site. Consequently, I recommend approval of the Plan in final in order that its remedial actions may be implemented. The Site contains elevated levels of arsenic, barium,

mercury, nickel, selenium and thallium in the soil and arsenic and barium in the pond sediment. The remedial measures considered the pathways to exposure via groundwater and pond surface water and determined based upon analysis that human contact with the contaminants would be limited to trespassers on Burton Island at an estimated 16 events annually. The research used the remedial action objectives to evaluate the risks of harmful exposure to humans and the environment. .

The consultant's experts determined in the 2012 Feasibility Study that the alternative remedial action that best satisfied the remedial action objectives was a targeted soil cover over the exposed coal ash followed by land use controls and limited human access. SIRS staff reviewed the Feasibility Study and agreed with its conclusion and selected the targeted soil cover alternative for the Plan's remedial action. The remedial measure of targeted soil cover to the exposed coal ash and revegatation would provide results consistent with the HSCA requirements. The Department's experts considered the public comments, and provided a response to them defending the alternative selected for the Plan. The selection of the Plan does not end the possible remedies available to the Department because, as Mr. DeCowsky noted, the Department may still seek recovery for environmental natural resource damages.

I agree with SIRS' that its PPRA with its recommended alternative, which is 12" of new soil cover on the approximately 2.5 acres of exposed coal ash and grading and revegatation. This remediation followed by land use controls and monitoring should protect the public health and the environment consistent with HSCA, and the Plan can be modified as needed to account for any changes that may arise such an elevated sea level in the future.

IV. CONCLUSION

Attached is a draft Order should the Secretary accept this Report.

Robert P. Haynes, Esquire
Senior Hearing Officer

MEMORANDUM`

TO: Robert Haynes, Hearing Officer, DNREC OTS
THROUGH: Timothy Ratsep, Administrator, DNREC SIRS
Paul Will, Program Manager, DNREC SIRS
FROM: Gregory DeCowsky, Environmental Scientist/Program Manager, DNREC SIRS
SUBJECT: Response to public comments received following public hearing on Burton Island Historical Ash Disposal Area, Operable Unit 2 (OU2) Proposed Plan of Remedial Action (PPRA)
DATE:

DNREC SIRS received four public comments on this matter following the public hearing on 3/7/2013 two from Steve Callanen (received on the same day and addressed together), one from Gregg Rosner, and one from Chuck Schonder. These comments have all been provided to you previously.

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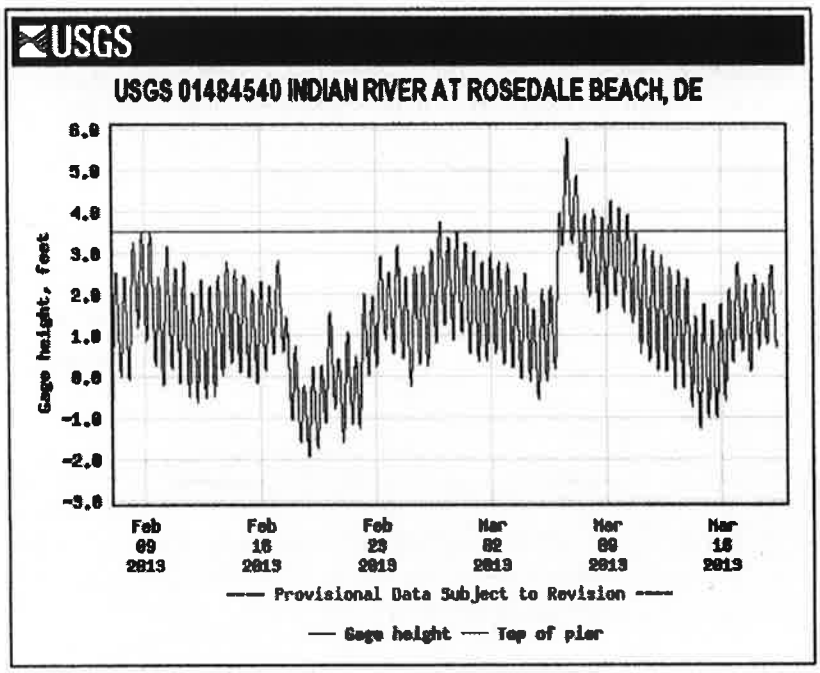
Comment 1. Steve Callanen, Received 3/19/2013

The attached USGS Tide Graph, for 2-7-13 to 3-19-13, is a factual reminder of the recent extremely high tides experienced and measured directly across Indian River from Burton Island. Note the number of times the water level exceeded the top of the pier (red line) at the U.S. Geological Survey's water height monitoring site (USGS 01484540) located at Rosedale Beach.
Steve Callanen
302-539-0635



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Comment 2. Steve Callanen, Received 3/19/2013

I had intended to include in my previous e-mail for your convenient inspection the following USGS web site:

http://waterdata.usgs.gov/de/nwis/uv?cb_00065=on&format=gif_default&period=21&site_no=01484540

Steve Callanen
302-539-0635

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DNREC SIRS response:

DNREC SIRS assumes that these submittals are intended to raise the issue of possible flooding impacts on the ash in the disposal area. However, there is no information given to indicate that floodwaters entering OU2 would have any different effect from precipitation.

This issue was addressed in great detail in the OU2 Remedial Investigation (RI) Report (*https://onlinedocs.dnrec.delaware.gov/docfinity/servlet/repository?j_username=DNRECAPI&j_password=API@dnrec2012&id=2c9ff3053c426633013c959a971e17c6&clearRedaction=false&annotate=true&thumb=false&pdf=true*) (especially Sections 3.3 and 3.4 and Appendices I and J) and in additional comments published on the DNREC web site. In particular, see Dr. Richard Greene's (DNREC Watershed Assessment) "An Assessment of Arsenic Concentrations in Upper Indian River Due to Mass Loading from the Burton Island Historical Ash Disposal Area, Millsboro, DE" (this is an Excel spreadsheet and does not lend itself to reproduction here; it will be emailed as a separate attachment) and Attachment C in NRG's response to DNREC SIRS comments on the OU2 RI, dated 7/22/2011 (http://www.dnrec.delaware.gov/whs/awm/Info/Documents/NRG-IRGS%20RIR%20responses%20to%20comments_July2011_final.pdf).

A full understanding of the topic requires reading the bulk of this material. A summary of this discussion is that modeling (based on groundwater studies conducted as part of the OU2 RI) shows that although some runoff and leaching of contaminants including into groundwater and surface water is expected, the magnitude of the arsenic loading will not be sufficient to cause a significant impairment of surface water or groundwater quality.

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Comment 3. Gregg Rosner, Received 3/19/2013

Dear Mr. Decowsky *[sic]*-

The recent proposal by the state regulatory agency, DNREC, for remediation of the coal ash dump located in proximity to Burton Island, does not adhere to the laws and inherent legal values of TITLE 7 RESOURCES & ENVIRONMENTAL CONTROL DELAWARE ADMINISTRATIVE CODE, including but not limited to the following statues *[sic]*;

5.11.1.1.2 Habitat Value
5.11.1.1.2.1 Habitat for resident species of wildlife including furbearers, invertebrates, finfish.
5.11.1.1.2.2 Habitat for migratory wildlife species including waterfowl, wading birds, shorebirds, passerines, finfish, shrimp.
5.11.1.1.2.3 Rearing area, nesting area, breeding grounds for various species.
5.11.1.1.2.4 Habitat for rare or endangered plants.
5.11.1.1.2.5 Presence of plants or animals known to be rare generally, or unique to the particular location.
5.11.1.1.2.6 Presence of plants or animals near the limits of their territorial range.
5.11.1.1.2.7 Presence of unique geologic or wetland features [7 DE Admin. Code 7502 §12.2]
5.11.3.2 Rare and endangered species are in need of active, protective management to preserve and enhance such species. The diversity and abundance of the native flora and fauna of Delaware, particularly those deemed rare or endangered, shall be preserved and enhanced through the protection of the habitat, natural areas, and areas of unusual scientific significance or having unusual importance to their survival. [7 Del.C. §201(1)(2)]

The taxpayers and residents of Delaware must not be financially liable for the the *[sic]* present and future remediation of this environmental malfeasance. Indian River power plant current owners, NRG of Princeton, NJ, should be required by the provisions of the Clean Water Act of 1972, and under the auspices and regulation of DNREC, to completely remove the coal ash dump, restore habitat values and prevent further and future denigration of the coastal environment.

Gregg Rosner

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DNREC SIRS response:

This excerpt is not part of the Hazardous Substance Cleanup Act (HSCA) or regulations promulgated thereunder. A review of the State web site ultimately showed the excerpt to be part of a document identified as:

5104 Delaware Coastal Management Program Federal Consistency Policies and Procedures
Delaware Department of Natural Resources and Environmental Control
Office of the Secretary
Delaware Coastal Programs
Authority: National Oceanic and Atmospheric Administration – Federal Coastal Zone Management Act (15 CFR part 923, subpart H)

The applicability of this policy (NOT a statute) is not clear to DNREC SIRS; nor is what the commenter alleges it requires DNREC SIRS to do or refrain from doing.

Further, inasmuch as the Burton Island disposal area was created by Delmarva Power (not NRG or IRPLLC) prior to the enactment of the Clean Water Act, the applicability of this Act to NRG in this matter is unclear.

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Comment 4. Chuck Schonder on behalf of the Delaware Chapter of the Sierra Club, Received 3/27/2013

Mr. Decowsky *[sic]*,

Please include this email, including the letter to the editor that appeared in the Cape Gazette, Coastal Point and Sussex Post in the public record of the public comments on the Burton Island Coal Ash Dump. The letter asks a number of questions that are unanswered in NRG/DNREC proposed plan to remedy the Indian River Coal Ash Dump.

One final question on this proposed remedy: Why was the building of a concrete wall or bulk heading around the 12,079 linear foot perimeter of Burton Island not included as an option in the feasibility study?

A rough estimate of the cost of bulk heading would be in the neighborhood of $25,000,000 at retail rate of $200 per linear foot. If this were done in conjunction with covering the bare areas of the dump with fabric as well as 12 inches of soil, at a cost of $2,000,000 it would seem cost effective. The other option on the table is trucking out the spoils over twenty three years at the cost estimate of approximately $300,000,000.

The USGS site at Rosedale beach, which measures water height and is directly across the river from Burton Island, could be used as a guide for the wall height.

We are obligated to do this the right way; this fragile ecosystem's health transcends expediency.

Chuck Schonder

----------Original Message----------

From: jdf0000@aol.com
Date: Mar 24, 2013 10:34:03 PM
Subject: Fwd: A remedy in search of answers - Chuck Schonder Delaware Chapter of the Sierra Club - Ocean View

To: cschonder@verizon.net
John D. Flaherty
-----Original Message-----
From: Glenn Rolfe <GRolfe@newszap.com>
To: jdf0000 <jdf0000@aol.com>
Sent: Sun, Mar 24, 2013 10:31 pm
Subject: RE: A remedy in search of answers - Chuck Schonder Delaware Chapter of the Sierra Club - Ocean View

Chuck

Glenn Rolfe here at the Sussex county Post.
Got your letter, or guest commentary …
Just need a follow-up confirmation from you, stating you are who you are and you wish to have your submission considered for publication.

From: jdf0000@aol.com [mailto:jdf0000@aol.com]
Sent: Sunday, March 24, 2013 10:24 PM
To: undisclosed-recipients:
Subject: A remedy in search of answers - Chuck Schonder Delaware Chapter of the Sierra Club - Ocean View
A remedy in search of answers
By Chuck Schonder | Mar 17, 2013

The Burton Island coal ash dump from the NRG Indian River Power Plant is the subject of a remediation plan proposed by the company (NRG) and the Delaware Department of Natural Resources and Environmental Control (DNREC). The DNREC hearing on the plan, Feb 6, at the Millsboro Fire Hall, brought more questions than answers.

The Delaware chapter of the Sierra Club opposes this plan of remediation action for the Burton Island coal ash dump site.

Because of its hazardous characteristics, coal ash and other coal combustion wastes are expected to undergo EPA rulemaking in the near future, which would increase the standards that DNREC must meet in environmental remediation plans. We feel as though the NRG and the Voluntary Cleanup Program have not addressed the hazardous nature of the coal ash dump site. As per the rules of the VCP, this would offer NRG an insurance policy against future legal action or future cleanup when the EPA finishes their hazardous waste rulemaking for coal ash.

It places nearby communities and aquatic life at risk from infiltration of hazardous pollutants into ground water and the Inland Bays, and provides a potential for catastrophic failure of the site from storm surge, tidal action, heavy rains and sea level rise. The 2011 Sea Level Rise Vulnerability Assessment for the State of Delaware reveals the location of the Burton Island Coal Ash Dump site to be in an area of vulnerable coastal wetlands.
Delaware's Inland Bays waters, which have been designated as "waters of exceptional recreational or ecological significance" under the state's water quality standards, have also been designated as "impaired waters" under the Federal Clean Water Act. The documented

concentrations of coal ash compounds (arsenic, aluminum, barium, cobalt, copper, mercury, and selenium) that have leached into the shoreline sediment, offshore sediment, surface water and ground water from the old Burton Island coal ash dump site demand that this are be treated as a hazardous waste landfill and receive an appropriately rigorous level of remedial action.
The National Listing of Fish and Wildlife Advisories a compiled database of all fish advisory samples in Indian River, indicates that there has been no testing for toxins in fish since the early 1990s.

The corrective options offered in the remediation plan include DNREC's preferred plan that covers the top of the two-and-a-half-acre dump with fabric and 12 inches of soil. This plan does not address the perimeter shoreline of the dump which is protected by permeable fabric and rip rap and vulnerable to leaching toxins. This option is estimated to cost $2 million. The second option is to truck out the entire waste spoils with thousands of truck loads over approximately twenty-three years at a cost of approximately $300 million.

The Remediation Action Plan is ill-informed as to the extent of environmental and public health risk, and should be revised to consider the impact that the toxic properties of the dump site have had, and are anticipated to have in the future to surrounding bodies of water, wildlife, aquatic life and nearby communities in an effort to eliminate those risks.

The remediation plan needs to address the following questions:

- Where is the data that demonstrates safety from seeping arsenic and other toxins from storms and tidal changes?
- Why is DNREC's preferred corrective action ($2million) not fully addressing the leaching of toxins into the Indian River Bay?
- Where are the specifics from the "long-term stewardship plan" for monitoring? Who, when and how are inspections and sampling carried out and reported?
- Does DNREC's proposed remediation plan consider EPA's new findings as to the exposure levels of toxins that can cause health risks from the human consumption of shellfish and finfish?
- Do the EPA's new findings as to health risks from the human consumption of shellfish and finfish change the Inland Bays status under Delaware's Hazardous Substances Cleanup Act?

DNREC is required by the Clean Water Act to manage resources so that bodies of water are fishable, drinkable, and swimmable. This Plan does not come close to accomplishing those goals and is inadequate to protect the Inland Bays or public health. Instead, it appears to be a least-cost way of passing the risks of toxic waste to taxpayers and future generations. We ask the State of Delaware to reject this plan of remediation of the Burton Island Coal Ash Dump.

DNREC has extended the public comment period until March 29. You may contact DNREC's project manager at gregorydecowsky@state.de.us with your concerns on the remediation plan.

Chuck Schonder
Delaware Chapter of the Sierra Club
Ocean View

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DNREC SIRS response:

We will attempt to deal with the numerous questions and comments raised by Mr. Schonder (in italics) individually.

- *"when the EPA finishes their hazardous waste rulemaking for coal ash"*

DNREC cannot base its actions on speculation as to what might be in a future EPA rulemaking. We are bound to consider the proper remedy for this site on the basis of the law as it exists now and the science as our best efforts give us to understand it. We have done so for nearly 8 years at this site, as can be seen in the extensive administrative record.

- *The National Listing of Fish and Wildlife Advisories a compiled database of all fish advisory samples in Indian River, indicates that there has been no testing for toxins in fish since the early 1990s.*

According to DNREC's Dr. Greene, "...the sampling for the special study of total and inorganic arsenic in fish and shellfish from the IBs [Inland Bays] was conducted in 2002. In addition, we collected/analyzed fish samples in 2004, 2005, 2006, and 2009 from the Indian River Inlet, nearshore Atlantic Ocean, or lower Delaware Bay. Species included bluefish, Atlantic croaker, tautog, and bluefin tuna. Except for bluefin tuna, these species migrate into and out of the Inland Bays on a seasonal basis from the Atlantic Ocean and lower Delaware Bay."

- *"This plan does not address the perimeter shoreline of the dump...."*

The perimeter shoreline, OU1, is not at issue in this proceeding. It has already been addressed by a Final Plan of Remedial Action (FPRA) and a remedial action conducted pursuant to that FPRA. The issue in this proceeding is the interior of the disposal area, OU2. This comment does not pertain to OU2.

- *"Where is the data that demonstrates safety from seeping arsenic and other toxins from storms and tidal changes?"*

AND

- *"Why is DNREC's preferred corrective action ($2million) not fully addressing the leaching of toxins into the Indian River Bay?"*

Repeating a portion of our response to Mr. Callanen:

This issue was addressed in great detail in the OU2 Remedial Investigation (RI) Report (*https://onlinedocs.dnrec.delaware.gov/docfinity/servlet/repository?j_username=DNRECAPI&j_password=API@dnrec2012&id=2c9ff3053c426633013c959a971e17c6&clearRedaction=false&annotate=true&thumb=false&pdf=true*) (especially Sections 3.3 and 3.4 and Appendices I and J) and in additional comments published on the DNREC web site. In particular, see Dr. Richard Greene's (DNREC Watershed Assessment) "An Assessment of Arsenic Concentrations in Upper Indian River Due to Mass Loading from the Burton Island Historical Ash Disposal Area, Millsboro, DE" (this is an Excel spreadsheet and does not lend itself to reproduction here; it will be emailed separately) and Attachment C in NRG's response to DNREC SIRS comments on the OU2 RI, dated 7/22/2011 (http://www.dnrec.delaware.gov/whs/awm/Info/Documents/NRG-IRGS%20RIR%20responses%20to%20comments_July2011_final.pdf).

A full understanding of the topic requires reading the bulk of this material. A VERY BRIEF summary of this discussion is that modeling (based on groundwater studies conducted as part of the OU2 RI) shows that although some runoff and leaching of contaminants including into groundwater and surface water may be expected, the magnitude of the arsenic loading will not be sufficient to cause a significant impairment of surface water or groundwater quality.

- *"Where are the specifics from the "long-term stewardship plan" for monitoring? Who, when and how are inspections and sampling carried out and reported?"*

General requirements for the Long-Term Stewardship (LTS) Plan are set forth in the OU2 PPRA as follows:

> "The LTS Plan will specify requirements including, but not limited to:
>
> - Frequency and nature of inspections and reporting;
> - Disturbance of the soil cover by erosion, fire, burrowing animals, trespassers, etc., or through loss of existing or newly installed vegetation;
> - Inspections before, during, and after major storm or flooding events or other events that may affect the remedy;
> - Control of invasive species in remediated areas;
> - Periodic monitoring of groundwater, surface water, and sediment;
> - Site security; specifically prevention and reporting of trespassing;
> - Potential future impacts of sea level rise or extreme weather related to climate change;
> - Corrective action as and when needed."

The PPRA also provides that compliance with the LTS Plan will be enforced by a Uniform Environmental Covenant.

The full LTS Plan, including specific schedules for the required work, will be proposed by NRG/IRPLLC based on the above requirements and must be approved by DNREC SIRS (with any revisions that may be imposed by DNREC SIRS) before implementation. This is the normal procedure under HSCA; DNREC SIRS is not aware of any factors that would necessitate deviating from it.

"Does DNREC's proposed remediation plan consider EPA's new findings as to the exposure levels of toxins that can cause health risks from the human consumption of shellfish and finfish?"

AND

"Do the EPA's new findings as to health risks from the human consumption of shellfish and finfish change the Inland Bays status under Delaware's Hazardous Substances Cleanup Act?"

> In the absence of greater specificity as to EPA's alleged "new findings," DNREC SIRS cannot comment on those findings or their effect. The PPRA fully complies with all legal requirements of HSCA.

- *"Why was the building of a concrete wall or bulk heading around the 12,079 linear foot perimeter of Burton Island not included as an option in the feasibility study?"*

The "wall" option WAS included as an option in the OU2 Feasibility Study (FS), which is already part of the record. On page 2-4, the FS states:

> "Not applicable for OU2 soil (i.e., limited soil mixed with fine-grained fly ash): sheet piling vertical barrier.... The human health risk drivers for the site are ingestion of or dermal absorption of the OU2 soil. The sheet piling vertical barrier is a technology that would not mitigate potential risk of exposure to surface soils. Sheet piling vertical barriers were eliminated from further consideration."

This was also shown in Table 2-1 on page 2-5.

An Assessment of Arsenic Concentrations in Upper Indian River Due to Mass Loading from the Burton Island Historical Ash Disposal Area, Millsboro, DE

Prepared by: Rick Greene, DNREC Watershed Assessment
Date: March 25, 2011

Introduction: A Remedial Investigation (RI) Report for the Indian River Generating Station Operable Unit No. 2 Burton Island Historical Ash Disposal Area was recently submitted to the Department (Shaw 2011). The RI report includes an estimate of the amount of arsenic released from the ash disposal area to adjacent surface water (i.e., upper Indian River and Island Creek) via groundwater discharge and overland flow. The methods used were technically sound, were based on site-specific data, and yielded conservative estimates overall. Releases from both pathways were expressed as mass per time, which is equivalent to mass loading rate. Mass loading for the groundwater to surface water flow pathway was expressed as a range between 0.067 pounds per day and 0.366 pounds per day. Mass loading for the overland flow pathway was provided as a single value of 0.09 pounds per year, which is the same as 0.000246 pounds per day. Hence, groundwater loading is far greater than overland flow, representing between 99.6% to 99.9% of the estimated arsenic loading to surrounding surface water (not accounting for former breaches in berms known to have occurred and since corrected).

The RI report indicates that the lower end of the groundwater to surface water loading range is considered more representative, and I would agree for several technical reasons, including but not limited to the fact that arsenic is strongly removed from solution via sorption and coprecipitation, especially by iron and especially at redox boundaries such as the sediment - surface water interface (e.g., Johnstone et.al., 2011). Hence, although arsenic may be released from the ash pile via groundwater discharge, a significant fraction may become sequestered at the sediment-water interface, thereby reducing the amount of arsenic that actually enters, mixes, and circulates in the surface water environment. Fate issues aside, it is important to place the arsenic loading rates from the RI report into perspective in terms of potential ***increases*** in ambient arsenic concentrations in the upper Indian River and provide comparisons to applicable water quality criteria for the protection of human health and aquatic life. This was not done as a part of the RI report but rather is presented in this spreadsheet assessment to provide DNREC decision makers with regulatory context for the loading rates.

Objectives: The purpose of this assessment is to determine whether arsenic loading from the Burton Island historical ash disposal area is expected to cause exceedances of applicable water quality criteria in upper Indian River, and if so, how frequently and under what circumstances those exceeedances are expected to occur. This objective is accomplished through a simple steady-state, tidally-averaged mass balance model along with proper consideration of the water quality criteria. The modeling framework and underlying assumptions are described below as are the applicable water quality criteria.

Methods: The tidally averaged, steady-state concentration of arsenic in Indian River and Island Creek adjacent to Burton Island was calculated by dividing the arsenic mass loading from Burton Island (via groundwater + overland flow) by the net advective freshwater flow expected at Burton Island. Two scenarios were considered: first, that the long-term groundwater loading of arsenic equals the low end of the range provided by Shaw (2011); and second, that the long-term groundwater loading equals the high end of the range provided by Shaw (2011). The single overland flow loading of 0.09 pounds per year was added to the groundwater loading in both scenarios. The net advective freshwater flow at Burton Island is the measured flow at the Millsboro Pond outlet (USGS gage 01484525, drainage area = 61.7 sq mi), plus the estimated flow from the Iron Branch watershed (15.43 sq mi), plus the estimated flow from the Swan Creek watershed (10.54 sq mi). The flows for Iron Branch and Swan Creek were estimated by multiplying the flow at Millsboro Pond by the ratio of the ungaged drainage area to the area upstream of the Millboro Pond gage. For example, the flow for Iron Branch was estimated by multiplying the flow at Millsboro Pond by 0.25 (i.e., 15.43 sq mi divided by 61.7 sq mi). The daily flow values for Millsboro Pond were downloaded from the USGS web site (USGS, 2011). Daily flow values were available for the period 5/1/1986 through 9/30/1988 and 3/16/1991 through the present. Only values approved for publication by the USGS were used in this analysis and so provisional data beginning 2/1/2011 and ending on 3/17/2011 were not used. In all, this resulted in 8146 daily flow values that were used, representing over 22 years of flow data. Note that the published daily flow for 8/30/1998 was zero. To allow mass balance calculations for this particular day, a flow of 0.5 cfs was assigned, which represents one-half of the lowest non-zero flow in the record. The published flows at the Millsboro Pond outlet (including the modified value of 0.5 cfs on 8/30/1998), appear on the tab 'Arsenic Mass Balance Calcs'. The estimated flows for Iron Branch and Swan Creek also appear on that tab.

The increase in arsenic concentration due to the loading from Burton Island was predicted (i.e., hindcasted) for each day that had an approved daily flow value at Millboro Pond. Hence, this provided 8146 arsenic concentrations in upper Indian River near Burton Island over the period 5/1/1986 through 1/31/2011 using the low end loading estimate provided by Shaw (2011). It provided an additional 8146 arsenic concentrations using the upper end loading estimate provided by Shaw (2011). The actual calculations for the low end and high end loading scenarios appear on the tab 'Arsenic Mass Balance Calcs'. The strength of this approach is that it provides a distribution of concentrations which can then be assessed in terms of magnitude, duration, and frequency of occurrence. The weakness is that we are forced to make several assumptions. First, it is assumed that the mass loading from Burton Island is and has been constant over time (either at the low end or at the high end of the range, depending on the scenario). Surely loading is a dynamic, non-constant process but there is insufficient information to fully characterize time variable loading. Although we have predicted variability in the concentrations of arsenic in upper Indian River, that variability is due entirely to daily variation in net advective flow. In fact, based on the modeling framework used, in-stream concentrations of arsenic are predicted to vary linearly and inversely with net advective flow (Chapra, 1997) and nothing else. So, no other fate processes that would act to reduce the concentration of arsenic in the water column (e.g., coprecipitation at the sediment-water interface and subsequent sediment-water interactions) are considered. In this regard, the hindcasted arsenic concentrations should be considered conservative (protective), provided we accept that the mass loading estimates are also conservative. The other key point that should be kept in mind is that the modeling framework used in this analys predicts the ***increase*** in arsenic concentration in Indian River due soley to the Burton Island loading, independent of any other sources and independent of background. This is not a

flaw but rather a strength since it allows us to determine whether the specific source of interest, namely Burton Island, has a reasonable potential to cause exceeedances of applicable water quality criteria in-and-of-itself, without any confounding issues. In situations where one or more sources cause exceedances of applicable water quality criteria, DNREC lists the affected waters on Delaware's Clean Water Act 303(d) list and schedules those waters for Total Maximum Daily Loads (TMDLs). Delaware's most recent (2010) CWA 303(d) list does not identify arsenic as a contaminant of concern in any segment of the Inland Bays. That position is not likely to change based upon a comprehensive review ambient concentrations of arsenic in the water, sediment, biota, and air within the Inland Bays (Greene, 2010).

The applicable water quality criteria considered in this assessment are taken from Delaware's Surface Water Quality Standards (DNREC, 2004). Specifically, the applicable human health criterion for arsenic is 10 ug/L. This is interpreted as a long-term average concentration since it relates to long-term, chronic exposure in the human population. The applicable aquatic life criteria are 36 ug/L to protect marine organisms from chronic toxicity and 69 ug/L to protect marine organisms from acute toxicity. Both of these criteria are expressed on a dissolved basis and strictly speaking, both apply only to trivalent arsenic. Further, chronic aquatic life criteria are 4-day average concentrations not to be exceeded more than once in any 3 year period, while acute aquatic life criteria are 1-hour average concentrations not to be exceeded more than once in any 3 years. To properly account for the 4-day averaging period associated with the chronic aquatic life criteria, moving 4-day average concentrations were calculated from the predicted daily arsenic concentrations. Those calculations appear on the tab 'Arsenic Mass Balance Calcs'). The individual daily values were compared to the acute aquatic life criteria. Finally, for the aquatic life criteria comparison, the conservative assumptions are made that all of the arsenic released from Burton Island remains in the dissolved phase and further that all of the arsenic is in the trivalent oxidation state. Although conservative, the first assumption is reasonable in that standard equilibrium partitioning (EqP) equations (Chapra, 1997) predict that between 96% and 72% of arsenic in the water column is expected to be dissolved for typical suspended solids concentrations between 5 mg/L and 50 mg/L, respectively. These percentages assume a partition coefficient (log K_d) of 3.9 L/kg for arsenic, which represents the mean ratio of sorbed to dissolved arsenic based upon data compiled from the literature (EPA, 2005). The second assumption (that all the arsenic is trivalent) is somewhat more conservative based upon research performed in the nearby Patuxent Estuary (Nice et.al., 2008). Measurements there indicate that the ratio of dissolved arsenate, As(V), to dissolved arsenite, As(III), vary as a function of space and time and range between approximately 20:1 to 1:1. Hence, at most, 50% of the dissolved arsenic in the Patuxent Estuary is trivalent. If a similar maximum percentage occurs in the upper Indian River, then clearly, assuming 100% for purposes of this analysis is conservative, essentially introducing a safety factor of 2 as it relates specifically to compliance with the applicable aquatic life criteria.

Findings: Based on the modeling framework, assumptions, and criteria described above, it is concluded that:

1. Under the low end groundwater loading scenario, the average increase in arsenic concentration in the Indian River near Burton Island over the 22+ year hindcast is 0.17 ug/L. The median (50th percentile) increase is 0.12 ug/L; the 99th percentile

increase is 0.68 ug/L; and the maximum increase is 17.6 ug/L, which occurred on one day (8/30/1998) during an extreme low flow event. The second highest increase was 8.8 ug/L, which occurred the day after the maximum. Recall that 8/30/1998 is the day that the USGS recorded no flow over the spillway at Millsboro Pond and so a flow of 0.5 cfs was assigned as a part of this analysis in order to permit mass balance calculations. Hence, although we have calculated an arsenic concentration on that day, the value is highly uncertain and may have been higher. Even so, the arsenic concentration on the very next day when the flow was reported to be 1 cfs was 8.8 ug/L. By trial and error, it was determined that any flow less than 0.87cfs at Millsboro Pond would result in an increase in arsenic concentration at Burton Island greater than 10 ug/L. Based on an analysis of flow frequencies, a flow of 0.87 cfs is only expected to occur 0.0213% of the time, which is an extremely rare event. Viewed from another perspective, the net advective flow moving through upper Indian River is large enough to keep the increase in arsenic concentration from the Burton Island loading less than 10 ug/L 99.98% of the time. Since the human health criterion of 10 ug/L is interpreted as a long-term average, we conclude with a high degree of confidence that the arsenic loading from the ash pile (under the low end loading scenario) is not likely to exceed the criterion by itself. Likewise, the low end arsenic mass loading from Burton Island was never large enough to cause an exceedance of the acute or chronic aquatic life criteria in Indian River near Burton Island. Of note, the maximum 4-day average concentration was predicted to be 6.8 ug/L (between 8/30/1998 and 9/2/1998). This is much less than the marine chronic aquatic life criterion of 36 ug/L, which is a 4-day average value not to be exceeded more than once in any 3 year period.

2. Under the high end groundwater loading scenario, the average increase in arsenic concentration in the Indian River near Burton Island over the 22+ year hindcast is 0.93 ug/L. The median (50th percentile) increase is 0.67 ug/L; the 99th percentile increase is 3.7 ug/L; and the maximum increase is 95.6 ug/L. Again, the maximum increase was predicted to occur on 8/30/98 during extreme low flow. And again, there is great uncertainty regarding what the actual flow was on that day and therefore there is associated uncertainty with the predicted increase in arsenic concentration. In addition to the high value predicted on 8/30/1998, the modeling indicates that the high end load may have been large enough to result in a concentration increase greater than 10 ug/L on 20 other days as well. That's 21 days out of 8,146 days or a frequency of 0.26%, which corresponds to days when the flow at Millsboro Pond falls below 4.78 cfs. This analysis also suggests that the net advective flow moving through upper Indian River is sufficient to keep the predicted increase less than 10 ug/L 99.74% of the time. Again, since the human health criterion of 10 ug/L is interpreted as a long-term average, we conclude that the mass loading from the Burton Island ash pile is not likely to exceed the human health criterion by itself, even under the high end groundwater loading scenario. For aquatic life, the predicted increase in arsenic was large enough (95.6 ug/L) on a single day (8/30/1998) to potentially exceed the acute criterion of 69 ug/L. Recall however that this criterion is actually for trivalent arsenic, which, based upon high quality measurements performed elsewhere, is expected to represent no more than one half of the dissolved arsenic present. So, a very rough estimate of the dissolved trivalent arsenic concentration present on 8/30/1998 is 47.8 ug/L (= 95.9/2), which is less than the acute criterion. Even if all of the arsenic present was in the trivalent oxidation state, the frequency of occurrence, 1 day out of 8,146 days (or 22.3 yrs) is far less than the allowable frequency of 1 in 3 years. Finally, the maximum 4-day average increase in arsenic concentration in Indian River due to the Burton Island ash pile loading under the high end loading scenario is 36.8 ug/L. Coincidentally, this is almost identical to the 4-day duration chronic aquatic life criterion of 36 ug/L. This criterion,

like the acute criterion, applies to trivalent arsenic. If the predicted total dissolved concentration is divided by 2 to provide a worst case estimate of trivalent arsenic, then the maximum 4-day average concentration becomes 18.4 ug/L, which is less than the chronic criterion. Again, even if all of the arsenic present was dissolved trivalent arsenic, the frequency of occurrence is only once in 22.3 years which is far less frequent than the allowable exceedance frequency of once in 3 years.

3. Summarizing, this anlysis used the arsenic mass loading estimates provided by Shaw (2011) along with a conservative mass balance modeling framework to assess the likelihood that the loading has caused exceedances of applicable human health and aquatic life criteria in upper Indian River. It is concluded that exceedances due to the Burton Island loading are extremely

PROPOSED PLAN OF REMEDIAL ACTION

Burton Island Ash Disposal Site
Operable Unit 2
Dagsboro, Sussex County, Delaware
DNREC Project No. DE-1399

January 2013

Delaware Department of Natural Resources and Environmental Control
Division of Waste and Hazardous Substances
Site Investigation & Restoration Section
391 Lukens Drive
New Castle, Delaware 19720

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PROPOSED PLAN OF REMEDIAL ACTION

Burton Island Ash Disposal Site
Operable Unit 2
Dagsboro, Sussex County, Delaware
DNREC Project No. DE-1399

Approval:
This Proposed Plan meets the requirements of the Hazardous Substance Cleanup Act.

Approved by:

Marjorie A. Crofts, Director
Division of Waste and Hazardous Substances

1.8.13
Date

What is the Proposed Plan of Remedial Action?

The Proposed Plan of Remedial Action (Proposed Plan) summarizes the clean-up (remedial) actions that are being proposed to address contamination found at the Site for public comment. A legal notice is published in the newspaper for a 20-day comment period. DNREC considers and addresses all public comments received and publishes a Final Plan of Remedial Action (Final Plan) for the Site.

What is the Burton Island Ash Disposal Site OU2?

The Burton Island Ash Disposal Site (Site) is an inactive and unoccupied area on the premises of the Indian River Generating Station (IRGS).

The Site consists of three Operable Units (OUs), as follows:

- **OU1:** shoreline, intertidal zone, and vicinity within the footprint of the portion of the erosion control project surrounding the landfill.
- **OU2:** the landfill/land areas landward (inside) of the footprint of the erosion control project.
- **OU3:** the subtidal sediments and the waters seaward (outside) of the footprint of the erosion control project.

NOTE: *Except for the requirements for a site-wide Operations and Maintenance Plan and a Uniform Environmental Covenant, this Proposed Plan applies only to OU2. OU1 and OU3 were addressed previously in August 5, 2008 Final Plan of Remedial Action.*

What happened at the Burton Island Ash Disposal Site OU2?

IRGS is an active coal-fired electrical generating facility which has operated from 1957 through the present. The previous owner-operator of IRGS, Delmarva Power & Light Company (DP&L) used the Burton Island Ash Disposal Site for ash disposal from 1957 to 1979. Also, the Site has been reported to have been used for disposal of dredge spoils. The current site owner/operator is Indian River Power LLC (IRPLLC) (a subsidiary of NRG Energy), which purchased IRGS from DP&L in 2001.

In the summer of 2005, DNREC personnel observed erosion of ash-like material into Indian River and Island Creek. DNREC conducted a Site reconnaissance and obtained one sample each

of sediment and soil. Both samples were found to be contaminated with metals above DNREC's Uniform Risk-Based Standards (URS).

DNREC notified IRPLLC and DP&L of the need for investigation and possible remediation. IRPLLC entered into a Voluntary Cleanup Agreement with DNREC-SIRS to address the contamination. DP&L has refused to participate in site investigation or remediation activities.

What is the environmental problem at the Burton Island Ash Disposal Site OU2?

Soil, groundwater, pond water, and pond sediment are contaminated with coal ash containing several metals (most importantly arsenic, barium, mercury, selenium, and thallium). This contamination poses risks to certain aquatic and terrestrial wildlife and, under certain extreme circumstances, a slight potential cancer risk to humans.

What does the owner want to do at the Burton Island Ash Disposal Site OU2?

Following completion of the remedy, the Site is intended to be maintained in an undeveloped condition and will not be accessible to the public.

What additional clean-up actions are needed at the Burton Island Ash Disposal Site OU2?

DNREC proposes the following remedial actions for the Site, which need to be completed before a Certificate of Completion of Remedy (COCR) can be issued:

1. Grading of bare areas or other targeted areas of OU2 (about 2.5 acres), including pond banks, to stable slopes and covering of bare areas with at least 12″ of clean imported soil (including a topsoil layer of at least 3″). Marker fabric shall be used under the clean soil cover to provide a visual indication of the boundary between ash and clean fill.
2. Revegetating the covered areas with appropriate native vegetation, including grass seed mix(es) as well as shrubs and trees.
3. Implementation of daily (initially) perimeter patrols to inspect for signs of trespassing.
4. Implementation of a site-wide (all OUs) DNREC-approved Long-Term Stewardship (LTS) Plan to ensure the continued integrity of the remedy. The LTS Plan will specify requirements including, but not limited to:
    - Frequency and nature of inspections and reporting;
    - Disturbance of the soil cover by erosion, fire, burrowing animals, trespassers, etc., or through loss of existing or newly installed vegetation;
    - Inspections before, during, and after major storm or flooding events or other events that may affect the remedy;
    - Control of invasive species in remediated areas;
    - Periodic monitoring of groundwater, surface water, and sediment;

- Site security; specifically prevention and reporting of trespassing;
- Potential future impacts of sea level rise or extreme weather related to climate change;
- Corrective action as and when needed.

5. A site-wide (OU1 & 2) Environmental Covenant, consistent with Delaware's Uniform Environmental Covenants Act (Title 7, Del. Code Chapter 79, Subtitle II) (UECA), will be recorded in the office of the Recorder of Deeds to include the following:

    - Land Use Restrictions restricting future land use at the entire Site to non-residential (commercial/industrial);
    - Prohibit interference with the remedy;
    - Prohibit land disturbing activities without prior written approval by DNREC;
    - Comply with the established Long Term Stewardship Plan;
    - Prohibit the installation of groundwater wells for drinking water purposes without the prior written approval of DNREC.

What are the long term plans for the Site after the cleanup?

The Site is intended to be maintained in an undeveloped condition and will not be accessible to the public. Use of the Site will be restricted to non-residential (commercial/industrial) purposes by recording the environmental covenant.

How can I find additional information or comment on the Proposed Plan?

The complete file on the Site including the Remedial Investigation Report and other reports are available at the DNREC office, 391 Lukens Drive in New Castle, 19720. Most documents are also found on: http://www.nav.dnrec.delaware.gov/DEN3/

The 20-day public comment period begins on January 16, 2013 and ends at the close of business (4:30 pm) on February 8, 2013. Please send written comments to the DNREC office at 391 Lukens Drive, New Castle, DE 19720 to Gregory DeCowsky, Project Officer, or Robert Newsome, Public Information Officer. A Public Hearing will be held on this matter on Thursday, February 7, 2013, at 6:00 pm at Indian River Civic Center, located at 214 Irons Avenue in Millsboro. Verbal or written comments for the record may be submitted at this time.

Figure 1: Site Location.
Figure 2: Site map showing location of Burton Island Ash Disposal Site in relation to Indian River Generating Station.
Figure 3. Approximate proposed targeted soil cover areas.
Figure 4: OU1 (shoreline stabilization armoring) with OU2 beyond.
Figure 5. One of the ponds at the east end of OU2.

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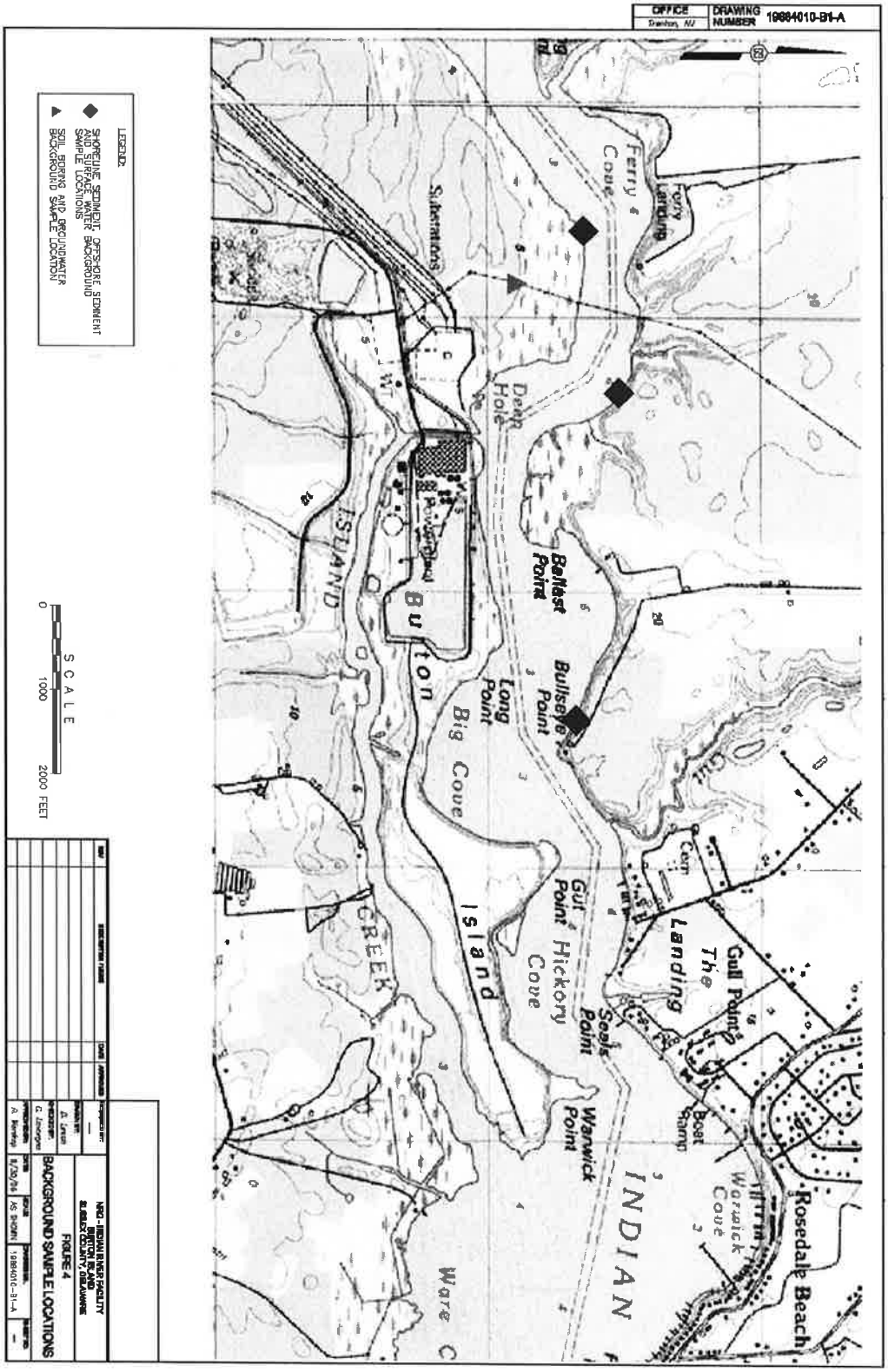

Figure 1: *Site Location.*

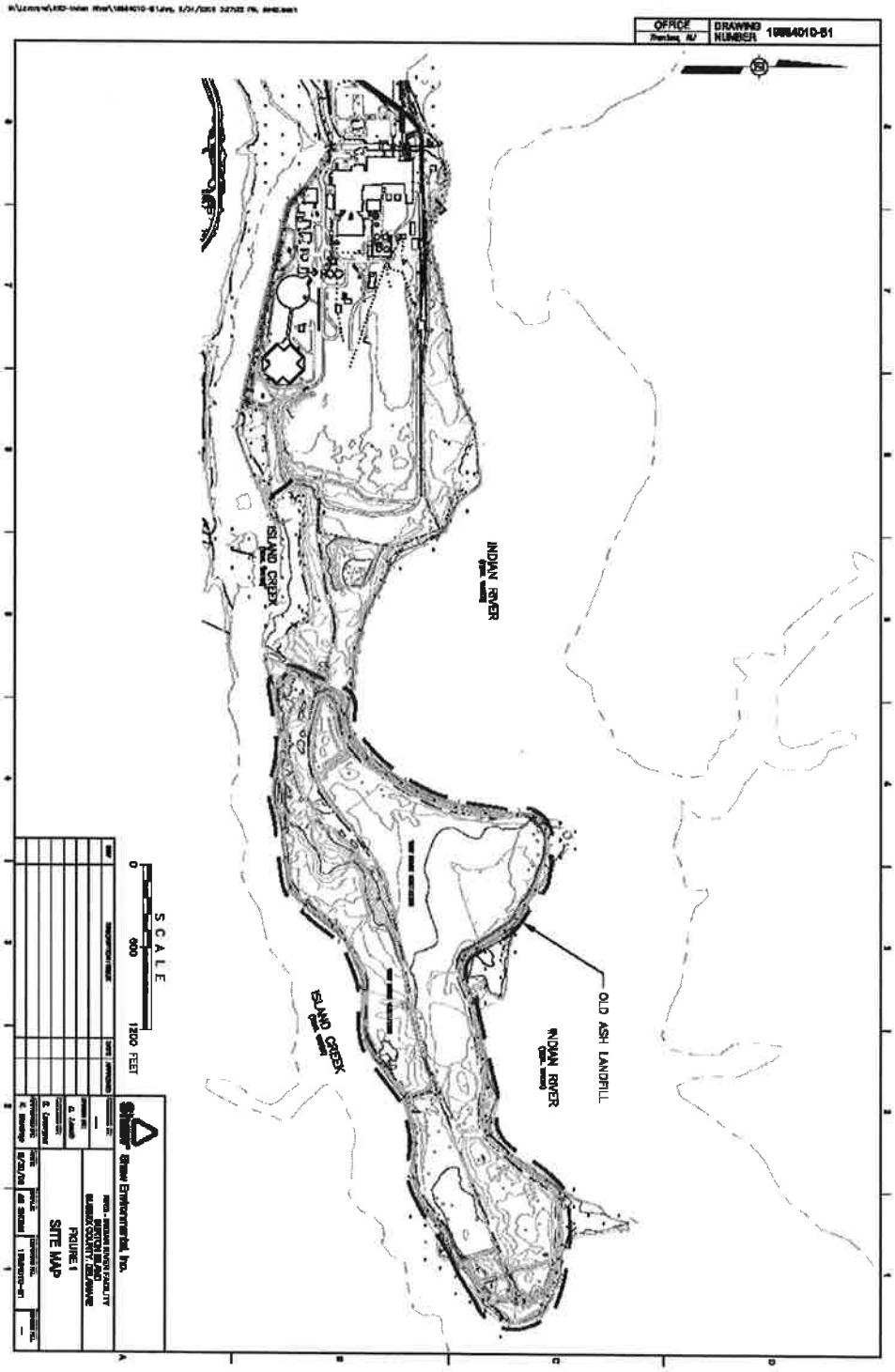

Figure 2. *Site map showing location of Burton Island Ash Disposal Site in relation to Indian River Generating Station.*

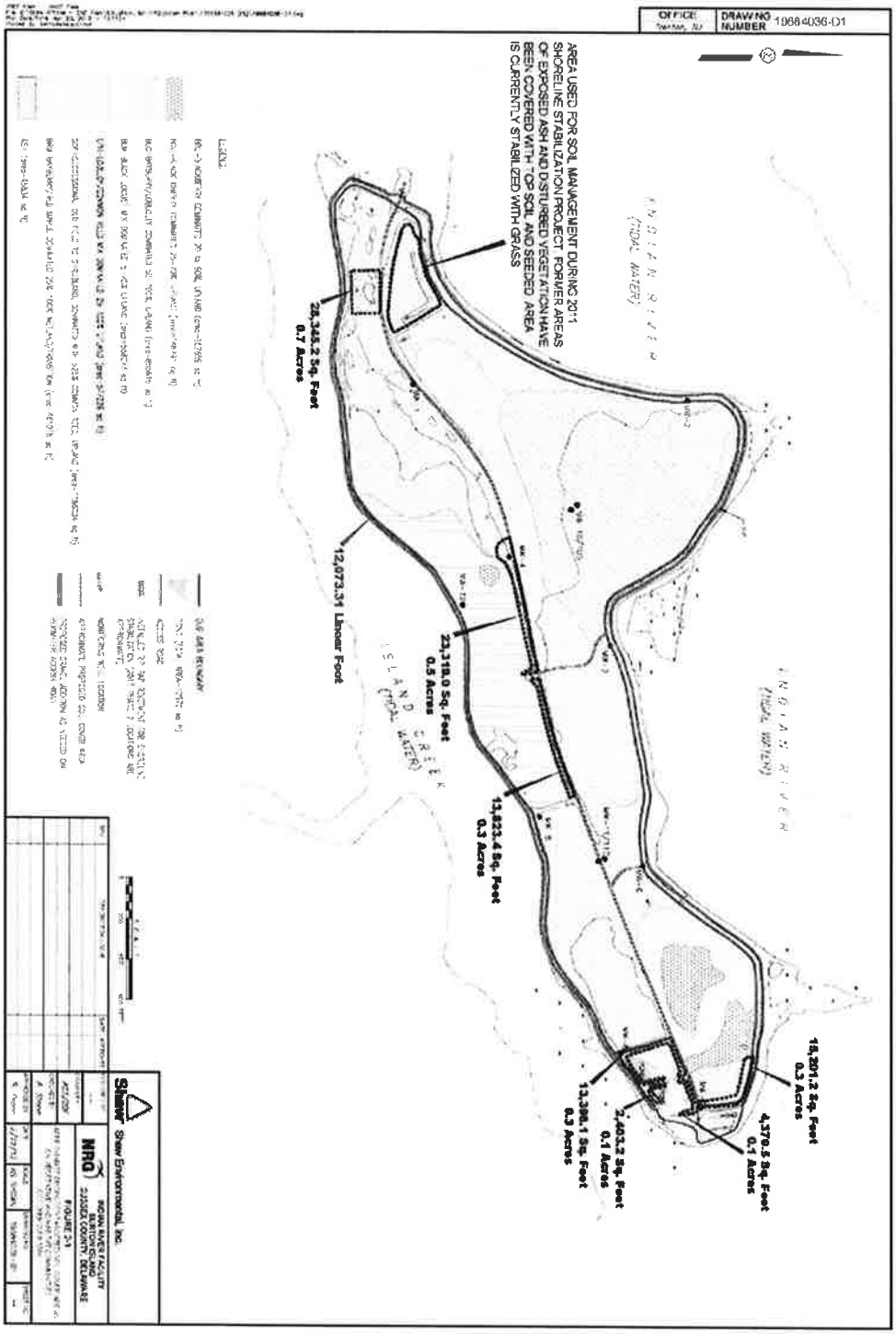

Figure 3. *Approximate proposed targeted soil cover areas (dark blue). (Figure 2-1 from Final Feasibility Study by Shaw Environmental for NRG.)*

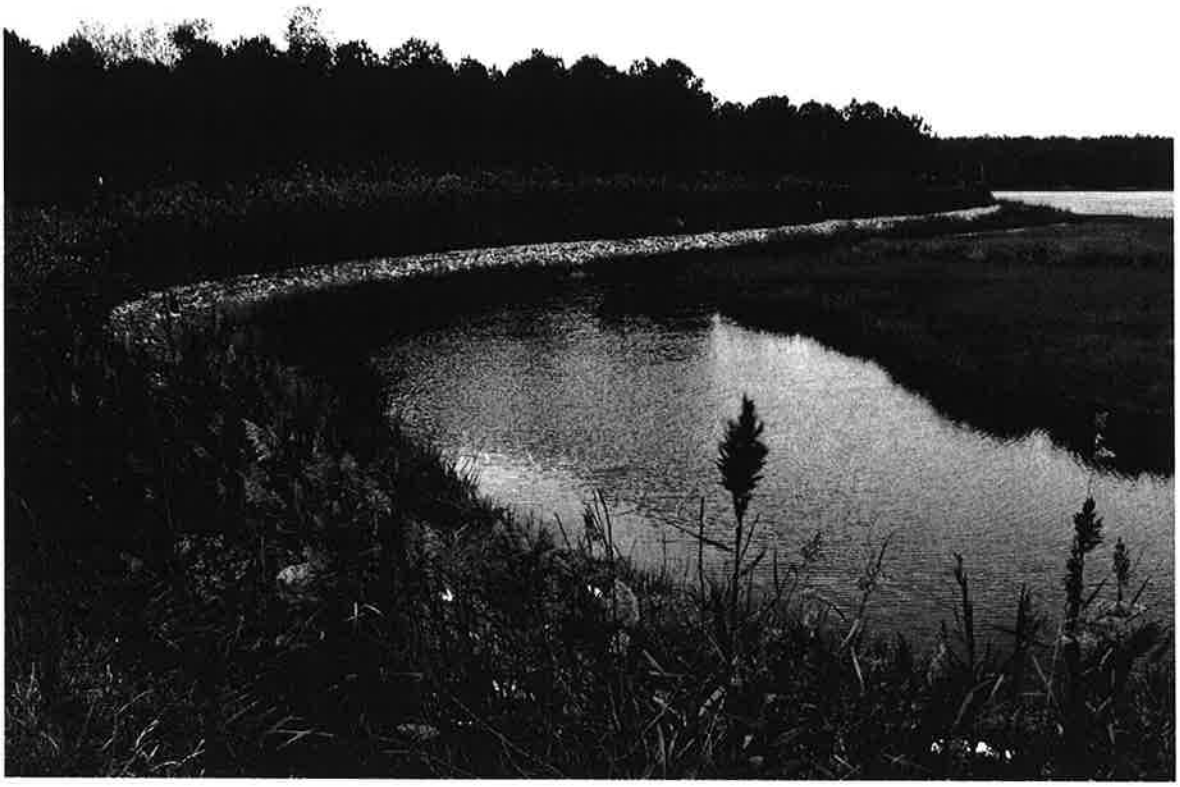

Figure 4. *OU1 (shoreline stabilization armoring) with OU2 beyond.*

Figure 5. *One of the ponds at the east end of OU2.*

Glossary of Terms
Used in this Proposed Plan

Aquifer	A geologic formation, group of formations, or a part of a formation capable of yielding groundwater to wells or springs.
Certificate of Completion of Remedy (COCR)	A formal determination by the Secretary of DNREC that remedial activities required by the Final Plan of Remedial Action have been completed.
Contaminant of Concern (COC)	These are potentially harmful substances, *e.g.,* metals, at concentrations above acceptable levels.
Contamination	The introduction of harmful or hazardous matter into the environment.
Facility Evaluation (FE)	If the initial investigation indicates a release or imminent threat of release, DNREC conducts an FE to assess the related risk. This may consist of a review of general facility and existing information and/or a field investigation, including sampling of soil, air, groundwater, surface water, sediments, and animals or plants as appropriate. The scope is flexible and depends on the specific conditions of the facility.
Feasibility Study (FS)	A study undertaken to develop, screen and evaluate options for remedial action, performed after or in combination with a Remedial Investigation (RI).
Final Plan of Remedial Action (FPRA)	DNREC's proposal for cleaning up a hazardous site after it has been reviewed by the public and finalized.
Groundwater	Water below the land surface in the zone of saturation.
Hazardous Substance	(a) Any hazardous waste as defined in 7 *Delaware Code*, Ch. 63, or any hazardous waste designated by regulation issued under 7 *Del. C.*, Ch. 63; (b) Any hazardous substance as defined in CERCLA or regulations issued under CERCLA; (c) Petroleum, including crude oil or any fraction thereof; however, any release of hazardous substances from an underground storage tank which is regulated by 7 *Del. C.*, Ch. 74 or regulations issued under it is not subject to these regulations except that such a release is eligible for funding under Subsection 14.1; (d) Any substance in sufficient concentrations which the Secretary through regulation determines may present risk to the public health, welfare, or the environment.
Hazardous Substance Cleanup Act (HSCA)	Delaware Code Title 7, Chapter 91. The law that enables DNREC to identify parties responsible for hazardous substances releases and requires cleanup with oversight of the Department.

Operable Unit (OU)	The cleanup of a site can be divided into a number of operable units depending on the complexity of the problems associated at a site. Operable units may address geographic portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions that are concurrent but located in different parts of a site. The determination of an operable unit may vary over time as a result of change in activity or need.
Operations & Maintenance (O&M)	The activities necessary to provide for continued effectiveness and integrity of a remedial action after it is completed. O&M includes all activities needed to ensure effective operation of the remedy under both normal conditions and emergencies. Post-cleanup compliance monitoring (regular testing to determine if the prescribed cleanup levels have been met and if the treated effluent or emission meets discharge requirements) is often included under O&M.
Owner or Operator	(a) Any person owning or operating a facility. (b) Any person who previously owned, operated, or otherwise controlled activities at a facility. (c) The term "owner or operator" does not include an agency of the State or unit of local government that acquired title or control of the facility involuntarily through bankruptcy, tax delinquency, abandonment or other circumstances. (d) The term "control" does not include regulation of the activity by a federal, state or local government agency. (e) The term "owner or operator" does not include a person, who, without participating in the management of a facility, holds indicia of ownership primarily to protect his security interest in the facility.
Proposed Plan of Remedial Action (PPRA)	A plan for cleaning up a hazardous site submitted by DNREC and subject to public comments.

Release	Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing of a hazardous substance, pollutant or contaminant into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but exclud[ing]: (a) any release which results in exposure to a person solely within his or her workplace, with respect to a claim which such person may assert against his or her employer; provided, however, that this exclusion does not apply to any such release which also results in exposure to the environment; (b) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine; (c) the appropriate and legal application of fertilizers and pesticides; and (d) any discharges in compliance with State permits issued in conformance with Title 7 of the *Delaware Code* and federally permitted releases under CERCLA.
Remedial Investigation (RI)	A detailed evaluation of a release or imminent threat of release of a hazardous substance. An RI is conducted to determine the extent of contamination and the risks to public health and welfare and the environment. It typically includes site characterization, field investigations, and performance of risk assessments as well as collection of engineering data that may be required to complete a feasibility study and or remedial design.
Remedy	Any action, response, or expenditure consistent with the purposes of HSCA, or any regulations or guidance issued under HSCA to identify, minimize, or eliminate any imminent threat posed by any hazardous substances, including preparation of any plans, conducting of any studies and any investigative, oversight, or monitoring activities, and any health assessments, risk assessments, or similar studies conducted to determine the risk or potential risk to public health or welfare or the environment.
Risk	Likelihood or probability of injury, disease, or death.
Sediment	A loose unconsolidated deposit of weathering debris, chemical precipitates, or biological debris that accumulates on Earth's surface; often under water. Sediments which become contaminated are often difficult and expensive to clean up, and provide a pathway for exposure of aquatic animals to hazardous substances.

Site Investigation and Restoration Section (SIRS)	The section within DNREC's Division of Waste and Hazardous Substances (DWHS) which carries out HSCA and the *Delaware Regulations Governing Hazardous Substance Cleanup*, overseeing cleanup and restoration of hazardous substance sites.
Uniform Environmental Covenant (UEC)	A standardized form of a land use restriction that is recorded on the deed and runs with the land. Provisions governing UECs are found in the Uniform Environmental Covenants Act (UECA).
Voluntary Cleanup Program (VCP)	The remedial process established by DNREC under HSCA, that a party willingly enters into (provided its application is approved by DNREC) for the purpose of conducting a remedy at a facility. When a property is contaminated with hazardous substances there are liabilities under Federal and State laws, regardless of who caused the contamination and when it was caused. Because of these liabilities, old industrial sites (with contamination) may not readily attract developers or buyers. Under the VCP, developers and buyers performing the cleanup of contaminated properties are provided protection from potential liabilities for past contamination, provided certain requirements are met.