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UniStar
NUCLEAR ENERGY

February 12, 2009

UN#09-138

Mr. William P. Seib
Chief, Maryland Section South
U.S. Army Corps of Engineers – Baltimore District
10 S. Howard Street
Baltimore, Maryland 21201

Subject: Joint Federal/State Application of Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC, Calvert Cliffs Nuclear Power Plant Site, Lusby, Calvert County, Maryland, USACE Tracking No. NAB-2007-08123-M05

Dear Mr. Seib

Enclosed please find a response to 13 Questions that were raised during a Multi-Agency site visit at the Calvert Cliffs Nuclear Plant on January 15th and 16th, 2009.

Please do not hesitate to contact me at 410-470-5524 if you have any questions concerning the attached response.

Sincerely,

Dimitri Lutchenkov

Enclosures

cc: Kathy Anderson - USACE
Thomas Fredirichs – NRC
Susan Gray – PPRP
Robert Tabisz- MDE
Jeff Thomson - MDE

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## Question 1

**Provide write up on thermal issues associated with new discharge. (316-A)**

## RESPONSE

Under restrictions imposed by Section 316 of the Fedaral Clean Water Act, closed-cycle cooling is the only practical alternative for CCNPP Unit 3 that would meet both the Section 316(b) intake requirements at new facilities, as well as the Section 316(a) thermal requirements at this multi-facility site. The CWS at CCNPP Unit 3 dissipates up to $1/108 \times 10^{10}$ BTU/hr ($2.792 \times 10^{9}$ Kcal/hr) of waste heat rejected from the main condenser and the Closed Loop Cooling Waster System (CLCWS) during normal plant operation at full station load.

The primary external impact will be the discharge of cooling tower blowdown water to the Chesapeake Bay. A common retention basin will hold cooling tower blowdown and effluents from the Desalination Plant and the wastewater treatment plant before discharging, further reducing thermal impacts to receiving waters.

The CCNPP Unit 3 discharge system, including the multi-port diffuser system, assumes a delta-T of 12° F for modelling* purposeand is designed to minimize the potential impact of the thermal plume as it enters the Chesapeake Bay. The subsurface diffusers create rapid mixing of the thermal effluent with ambient tidal flows. Tidal currents driven by the rise and fall of tides in the Chesapeake Bay largely determine plume size and shape.

* A conservative assumption based on the once through cooling system of Calvert Cliffs Units 1 & 2.

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## Question 2

**Provide write up on proposed fish screens and fish return.**

## RESPONSE

CCNPP Unit 3 will employ impingement/entrainment mitigation techniques (low velocity approach, screens, etc.) to protect aquatic species consistent with the intent of Clean Water Act Section 316(b) regulations. To achieve this, the Unit 3 inlet piping is oriented perpendicular to the Units 1 & 2 intake flow which itself is perpendicular to the tidal flow of the bay. The intake velocity is further reduced through the use of a common forebay and subsequently separate CWS and UHS Intake Structures. All these appurtenances result in further reducing the inlet flow at the Units 1 & 2 inlet bay from 0.5 ft/s to flow velocities at the circulating water makeup structure and the UHS makeup structure of less than 0.3 fps(0.09 mps) and less than 0.1 fps (0.03 mps), respectively.

To further protect aquatic species, a fish return system and outfall from the CCNPP Unit 3 intake will reduce the mortality of aquatic species even further. Design features of the system incorporate fish-friendly buckets on the screen panels to minimize the impact on aquatic resources. The new Unit 3 fish collection/holding system will be similar to that of Units 1 and 2. It will be located on the east side (bay side) of the Unit 3 Intake Forebay. Screen wash water and fish collected from the traveling screens of the Unit 3 Circulating Water Makeup Intake Structure and UHS Intake Structure will be diverted to the new Fish Return System and will be released to the Chesapeake Bay via a buried pipe to a new shoreline outfall. The outfall will be submerged below low tide level to minimize any drop at the exit to facilitate the fish return to the Chesapeake Bay water. No modification to the existing fish return and holding system for Units 1 and 2 is necessary.

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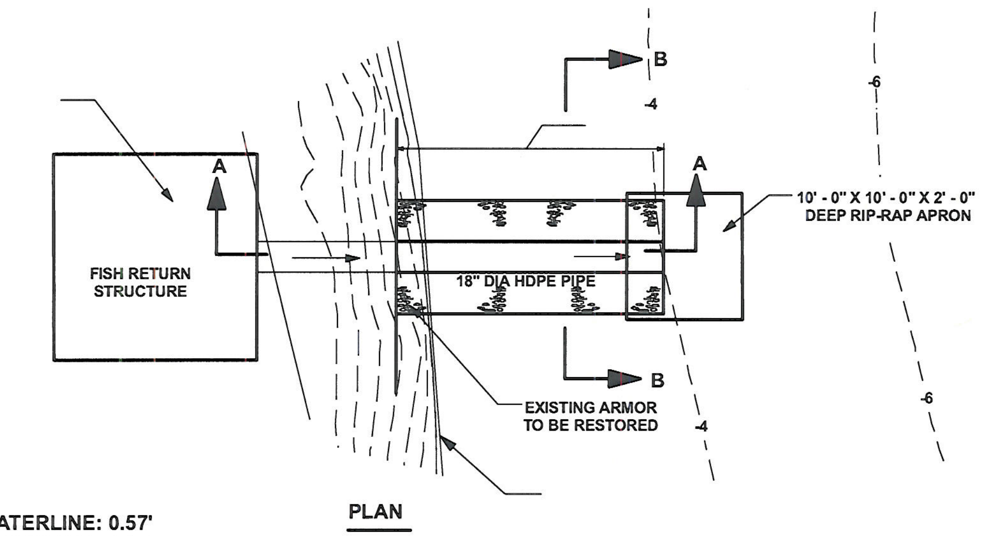
## Question 3

**Provide depth from the top of pipe to mean low water for discharge pipe and fish return.**

## RESPONSE

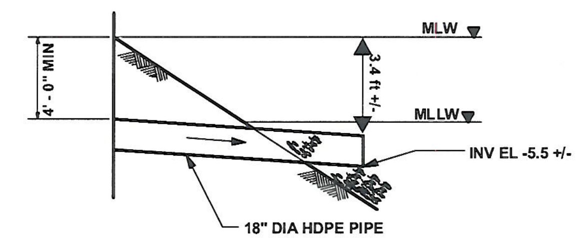
The clearance for the top of the fish return at mean low water is approximately 3.4 ft as noted in Revised Figure 4A (attached). The clearance for the top of the discharge pipe at mean low water is approximately 6.0 ft as noted in Revised Figure 5C (attached). The discharge pipe will be identified by markers as required.

TIDAL

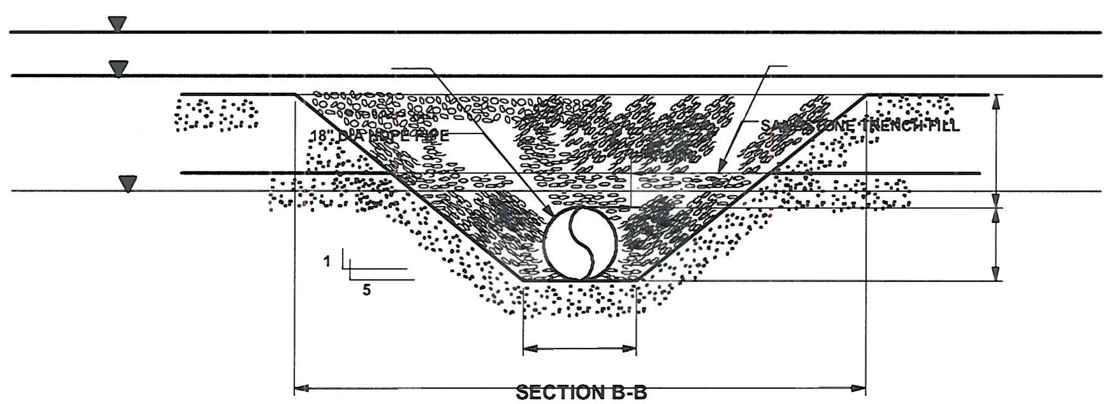



PLAN

NOTES: 1. -MEAN HIGH WATERLINE: 0.57'
-MEAN LOW WATERLINE: -0.60'
-MAXIMUM SPRING WATERLINE: 1.47'
-THE DISTANCE FROM THE TOP OF THE FISH RETURN PIPE TO THE MEAN LOW WATER LINE WILL BE APPROXIMATELY 3.4 FT +/-




SECTION A-A




SECTION B-B

| | | |
|---|---|---|
| PURPOSE: PLANT EXPANSION<br>DATA SOURCE:<br>BECHTEL CORPORATION<br>DATUM: (NGVD 29)<br>PROJECT LATITUDE/LONGITUDE:<br>38.424133<br>-76.441598 | **FIGURE 4A**<br>**FISH RETURN**<br><br>SCALE IN FEET<br><br>**NOT TO SCALE** | **CALVERT CLIFFS NUCLEAR POWER PLANT**<br>IN:<br>PATUXENT / WEST CHESAPEAKE BAY<br>COUNTY OF: CALVERT STATE: MD<br>IN RESPONSE TO:<br>USACE RAI 1/16/09 QUESTION 3<br><br>DATE: 5/09/08 REV 2 2/12/09 |

Map Document: (G:\Calvert Cliffs\frozen_5_1_08\404\Final Figures\figure4__key.mxd)
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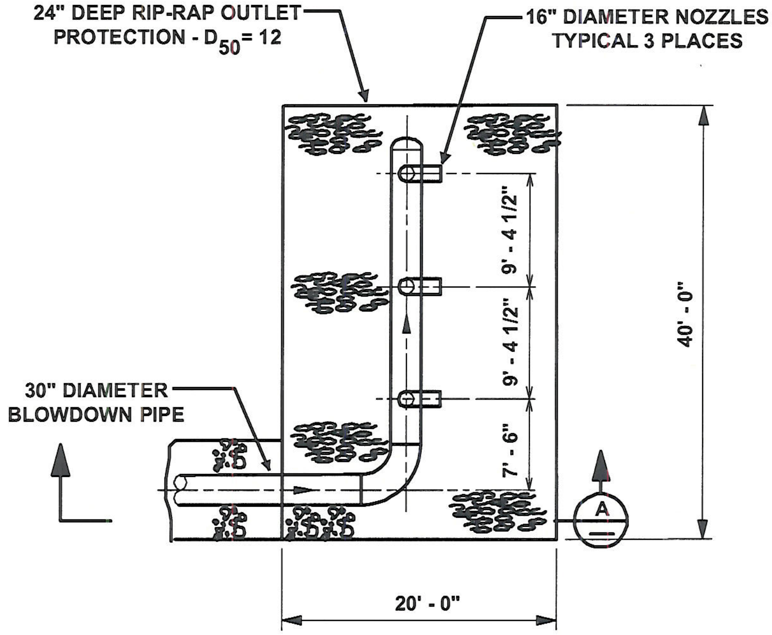
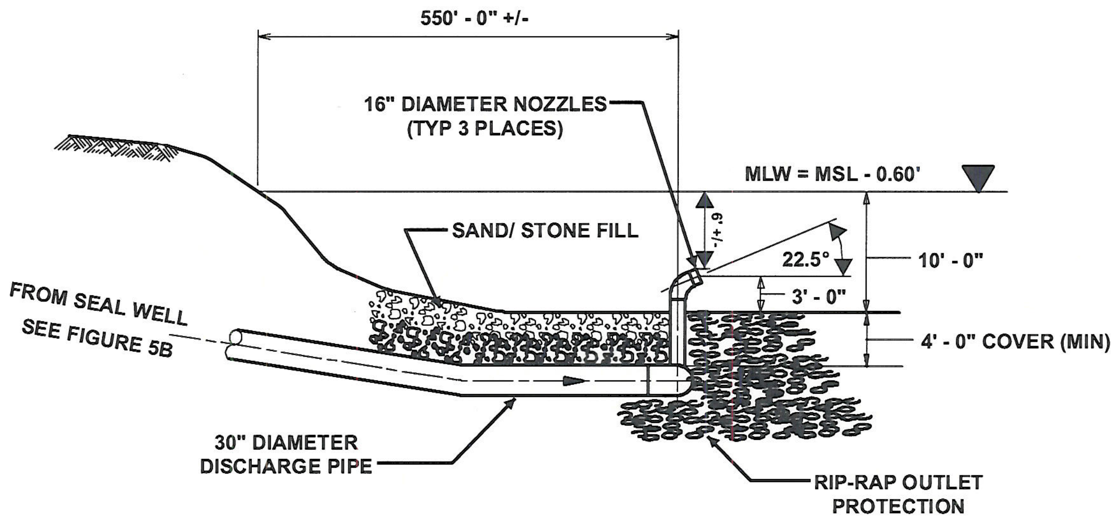
TIDAL




DIFFUSER PLAN VIEW




SECTION A

NOTES: 1. -MEAN HIGH WATERLINE: 0.57'
-MEAN LOW WATERLINE: -0.60'
-MAXIMUM SPRING WATERLINE: 1.47'
-THE DISTANCE FROM THE TOP OF THE DISCHARGE PIPE TO THE MEAN LOW WATER LINE WILL BE APPROXIMATELY 6 FT +/-

| | | |
|---|---|---|
| PURPOSE: PLANT EXPANSION<br>DATA SOURCE:<br>BECHTEL CORPORATION<br>DATUM: (NGVD 29)<br>PROJECT LATITUDE/LONGITUDE:<br>38.424133<br>-76.441598 | **FIGURE 5C<br>DISCHARGE OUTFALL DETAILS**<br><br>SCALE IN FEET<br><br>**NOT TO SCALE** | **CALVERT CLIFFS NUCLEAR POWER PLANT**<br><br>IN:<br>PATUXENT / WEST CHESAPEAKE BAY<br>COUNTY OF: CALVERT STATE: MD<br>IN RESPONSE TO:<br>USACE RAI 1/16/09 QUESTION 3<br><br>DATE: 5/09/08 REV 2 2/12/09 |

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## Question 4

**Quantify the total area of Phragmites south of the barge slip area and justify the need for impact which is due to the reconstruction of the barge slip. Why is this impact needed? Clarify whether there will be any disturbance south of the LOD for the barge slip reconstruction, and whether the tiger beetle habitat will be impacted.**

## RESPONSE

The total area of Phragmites south of the barge slip area comprises approximately 9,768 square-feet (0.22 acre) within the area of accumulated sediment. The Phragmites will be removed during the removal of the accumulated sediment mound below the existing culvert as part of the barge slip restoration. The removal of the sediment and Phragmites is necessary to provide for drive-off of large components from barges onto the proposed concrete apron and pull-off apron. The ability to drive-off large components greater reduces safety hazards related to removing large components from barges with cranes. The removal of this sediment is maintenance dredging and will not result in disturbance south of the barge slip restoration.

The Co-Applicants retained Dr. Barry Knisley of Randolph Macon University, who is an expert in tiger beetles with site specific experience including preparation of the report titled "Current Status of Two Federally Threatened Tiger Beetles at Calvert Cliffs Nuclear Power Plant, 2006," October 26, 2006, and a supplement to that report, "A Summary of the Current Status of Two Federally Listed Tiger Beetles at Calvert Cliffs Nuclear Power Plant," August 29, 2008 (See *Attachment 1*). His review confirmed that the proposed Project activities within the Intensely Developed Area 500 foot buffer area (development of a heavy haul road down to the barge dock and construction activities associated with the barge slip that would also extend south of the intensely developed area by no more than 100 feet) portion of the will not have any impact on the tiger beetles or their habitat. Dr. Knisley also confirmed that the bluff top activities in the vicinity of Camp Conoy, including the demolition of the Eagles Den building and the proposed forest mitigation plantings would not impact the beetles or their habitat. Impacts from activities in the Eagle's Den area would only be expected if the activities impact cliff face. The Co-Applicants will manage activities in the Eagle's Den area by undertaking a geotechnical evaluation of the stability of the area in order to determine appropriate construction loads and methods of construction to complete the proposed work in a safe manner that would avoid and/or minimize impacts to the tiger beetle. A figure depicting Tiger Beetle habitat areas and buffer locations is provided as *Attachment 2*.

ATTACHMENT 1

A SUMMARY OF THE CURRENT STATUS OF TWO FEDERALLY LISTED TIGER BEETLES AT CALVERT CLIFFS NUCLEAR POWER PLANT

C. Barry Knisley, Dept. of Biology, Randolph-Macon College, Ashland, VA 23005
August 29, 2008

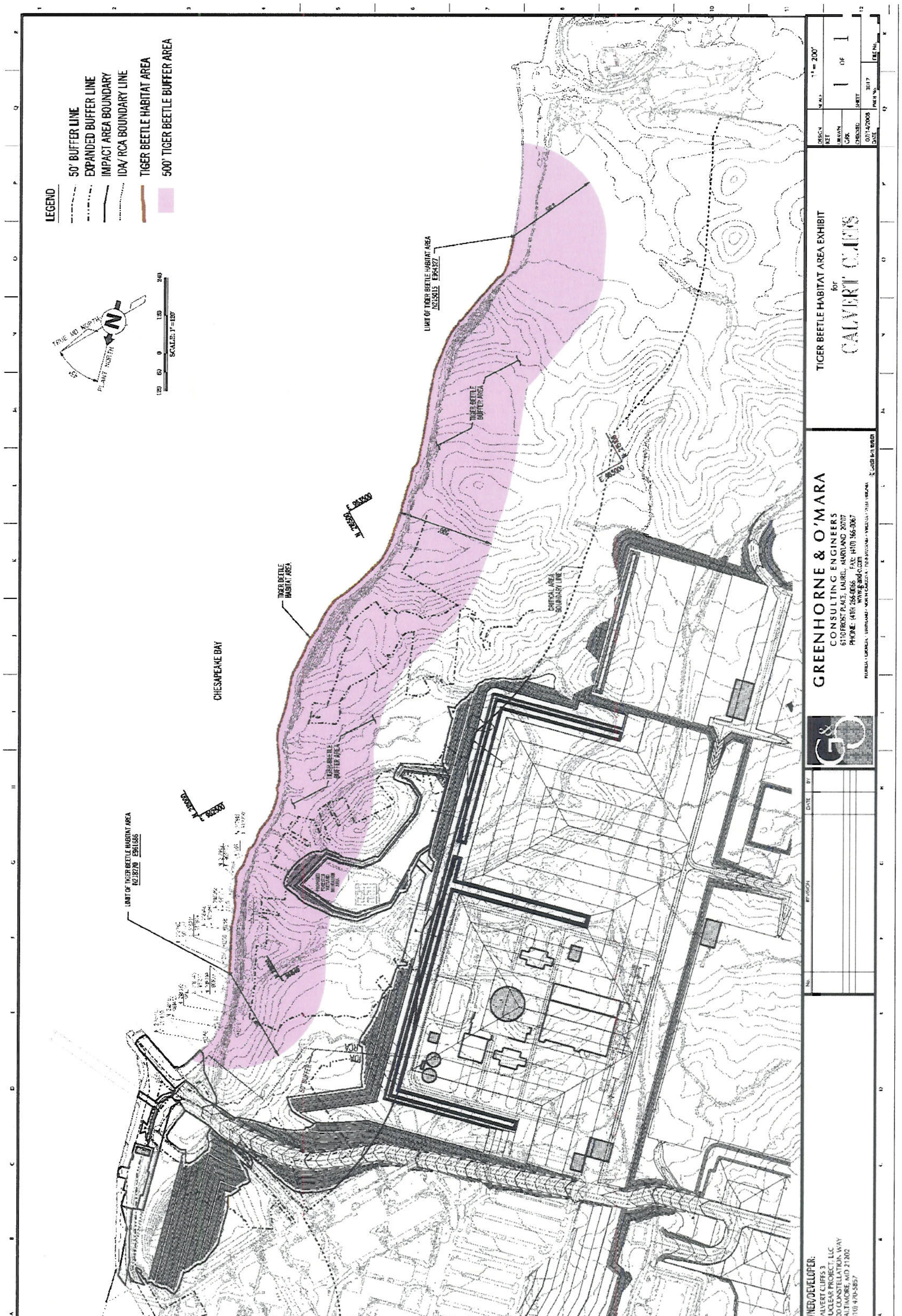
Included here is an updated supplement to an earlier report (Knisley 2006) assessing the status of the Puritan (*Cicindela puritana*) and Northeastern Beach (*Cicindela dorsalis dorsalis*) Tiger Beetles at Calvert Cliffs Nuclear Power Plant. This site has been surveyed for tiger beetles each year for most of the last 10 years, and most recently in July 2008. Northeastern Beach tiger beetles have been found only once at the site several years ago when a few were present adjacent to Flag Ponds with the northern most 100 m of shoreline. This beetle will thus not be affected by any planned construction or related activities. Also, no beetles have been found adjacent to the Plant site in recent years and the Flag Ponds population has now declined to the point of near extinction (2 adults in 2008). The Puritan Tiger Beetle is present in scattered sections of the shoreline and adjacent cliffs south of the existing barge dock. Numbers of adults have varied greatly but their distribution along the shore has changed only slightly.

As result of my earlier and most recent 2008 surveys, I conclude that the Puritan Tiger Beetle population at Calvert Cliffs Nuclear Power Plant will not be adversely affected by any of the proposed construction activities in the areas nearest tiger beetle habitat. The planned construction of a heavy haul road to the barge dock will have no impact because these activities will be at a distance sufficient to avoid disturbance to both beetles and habitat. My mapping and habitat examination showed no larval habitat within 300 m of this area and only rarely do a few adults forage on the beach within 200m of the barge dock. In fact, this whole northern 500 m section of the cliffs is marginal habitat. It is my judgment also that the proposed demolition of the Eagles Den building and the installation of the forested wetlands mitigation area would not impact Puritan tiger beetles which could be present on the upper cliff face in this area. This cliff area is marginal habitat and larvae may or may not occur there, but if so, numbers should be low. Larvae would only be affected by severe disturbance to the cliff face in which they are found.

Literature Cited:

Knisley, C. Barry. 2006. Current status of two federally threatened tiger beetles at Calvert Cliffs Nuclear Power Plant, 2006. Draft report to Constellation Generation Group, Baltimore, MD

ATTACHMENT 2



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## Question 5

**Explain rationale for wedge-shape pool**

## RESPONSE

The wedge shaped pool allows for withdrawal of water from behind existing baffle wall while minimizing impact to existing operating units. In addition, the existing intake sheet pile wall is anchored with ties back into the soil therefore excavating near the existing wall to build a new intake would jeopardize the existing support system. Also, a number of existing plant features (concrete slab, underground utilities, security fencing, etc.) would have a significant impact on construction if we were to build adjacent to the existing intake.

## Question 6

**Provide further information regarding federal and state approval for existing intake channel for Units 1 & 2.**

## RESPONSE

Approval for the existing Units 1 & 2 intake channel was provided via the following:

- The ACOE authorization number is NABOP-P 135 issued June 25, 1971.
- A State Tidal Wetland License 71-45 was originally issued March 2, 1971.

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## Question 7

**Provide justification for utilizing the installed-dredged trench technique rather than horizontal directional boring (HDB) of discharge pipe. Can directional bore be used if pipe is installed deeper. (e.g. U shaped tunnel). Compare trenching vs. HDB for construction. Describe sheet pile pit (e.g. size, materials, temporary or permanent).**

## RESPONSE

The outfall design includes a 30" diameter HDPE discharge pipe with three 16" single port diffusers terminating approximately 550' from the shoreline. The proposed installation method includes dredging a trench and lowering the pipe into the dredged trench and backfilling the pipe with the in-situ material and placing stone armor, or rip rap protection around the diffuser section.

In an attempt to avoid dredging in this area the trenchless technique of directional drilling has been evaluated. Directional drilling is commonly used for crossing beneath open waters and this approach is generally used from shoreline to shoreline and not terminating within the body of water. To terminate an installation within a body of water using this technique, would result in drilling fluids (used to keep the bore open) escaping into the open water, once the drilling operation reaches the exit point. Additionally, due to the nature of the soils in this area, the depth of the pipe would need to be kept well below the bay bottom. This particular installation is further complicated by the arrangement of the outlet which requires installation of a 90-degree bend and the three port diffusers. In other words, directional drilling works well for straight point to point installations, but does not facilitate the installation of bends which would need to be installed underwater, after the straight portion of the outfall has been installed.

The proposed installed – dredged trench is anticipated to take approximately 1 month and only requires divers for inspection of the outfall alignment and placement of stone protection around the outfall. HDB is anticipated to take approximately 4 months and requires a more extensive use of diving teams to complete the installation and final inspections . In addition to the added cost and schedule, the technical risk and personal safety concerns increase significantly with the HDB approach versus the installed-dredged trench approach.

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## Question 8

**Will it be possible to translocate eels from the Camp Conoy Pond before draining it? If so, where would they be placed?**

## RESPONSE

It will be possible to relocate eels from the Camp Conoy Pond before draining. Specific details of the collection and relocation will be included in the mitigation plan; however, a summary of the proposed approach is as follows:

The surface water connection from the Camp Conoy Pond to downstream environs will be blocked using a barrier such as silt fencing fabric, placed at an angle so that elvers cannot traverse the barrier into the Camp Conoy Pond. A variety of methods will be used to collect eels until the point at which eels are no longer captured (depletion sampling). As the pond is drained, the discharge will be monitored to collect eels that may have escaped collection during the depletion sampling, and once the pond is drained, a visual inspection will be conducted to ensure that eels do not remain in the pond.

Collected eels will be relocated to on-site portions of Johns Creek and Goldstein Branch in areas that have habitat suitable for sustaining eels. During depletion sampling activities, eels will be transported at regular intervals to these release points in aerated containers to minimize stress.

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## Question 10

**Provide information for non-tidal wetland impact in Assessment Area IX, why the project must impact this area and why it is needed including justification relative to cost and construction schedule.**

## RESPONSE

The approximately 10 acre plot along side the construction haul road and adjacent to the Independent Spent Fuel Storage Installation will play a critical role in the staging of equipment and materials during the construction of Unit 3, especially material off-loaded from barges that are expected to be utilized for delivery of components and construction materials. In addition, this area will be needed to assemble/disassemble large cranes, some of which will require over 100 tractor trailer material shipments for assembly, and in excess of 500 ft length will be required for the assembly process.

With respect to barge usage, we anticipate in excess of 30 barge shipments of equipment greater than 100 tons. The largest of these shipments will be the 4 steam generators each weighing around 600 ton and 80 feet in length. This equipment, once offloaded, will need to be staged for installation. Early estimates also reflect an additional 100 equipment shipments of between 20 and 100 tons, most, if not all, of which will be barge shipped.

Additionally, there are many potential preassemblies that are being considered that will need to be shipped by barge. These include tanks, liners, equipment assemblies, piping racks, precast slabs, and various preassembled civil work. We also anticipate that 16,000 ton of Turbine building structural steel and a large part of the over 280,000 feet of large bore piping will be barged and will require considerable barge slip time to offload equipment and material. There will also be approximately 2,000,000 cubic yards of aggregate, structural fill, bedding, subbase, and crushed stone that is expected to be barged. Using the largest available barges, this will result in over 1,000 shipments. This will further add to the congestion at the barge slip and will add to the need for staging materials as close to the barge slip as efficiently as possible.

Thus, the location of the lay down area is critical to the project, as it is situated close to the barge slip and heavy haul road, without significant interference with the majority of on site construction traffic and it provides the most direct routing from the staging area to the installation location.

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## Question 11

**Provide information on how the beavers and phragmites control will impact water levels in St. Johns Creek and how this will be dealt with to ensure survival of the proposed forest mitigation plantings in the area.**

**RESPONSE**

During site reconnaissance in 2008, beaver (*Castor canadensis*) dam and tree and shrub girdling/cuttings were observed within the downstream portion of the Johns Creek reach. Beaver ponds and the establishment of dams within riverine systems generally slow the water flow from drainage areas and alter silt deposition. The control of beaver within Johns Creek is a component of the compensatory mitigation plan for the CCNPP Unit 3 project. Rather than trapping with a body gripping/conibear device or live trapping with relocation, passive means will be utilized to control the activities of beavers in Johns Creek. The removal of beaver dams is generally not successful, as beavers will readily construct new dams as long as sufficient building material is available. Dam destruction may also release a surge of water and silt, which will impact downstream waters. With these considerations, a water control flow device will be used to regulate water flow through the beaver dam(s) within Johns Creek. The beaver control activities will be implemented within the proposed wetland mitigation enhancement area in Johns Creek.

Beavers require ponded conditions to feel secure. When beavers lose the ability to store and control water depth, they abandon a site. Therefore, a water control flow device, or beaver pipe, will lower the water held behind the beaver dam causing the beavers to lose control of storing water, thereby abandoning the site. Various water control flow devices are designed to be installed through beaver dams, are readily available. The beaver pipe is installed through the dam with a wire cage constructed around the inlet and outlet to prevent beavers from clogging the pipe with debris. The installation of the water control flow devices within Johns Creek (beaver dams) may not eliminate the activities of beavers, but their use will reduce depth of flooding from impoundment activities by beavers, as well as the duration and extent of flooding. The survivorship of the woody species plantings (wetland trees and shrubs) within the proposed wetland mitigation enhancement area in Johns Creek will increase with the control of the flow regime (via the water control flow device) within the floodplain of the creek. Without the control of the flow regime, impounded conditions will become more pronounced. Under impounded conditions, the depth of the water in the planting area will exceed recommended threshold water depths for planting. Finally, the installation of the water control flow device within Johns Creek (beaver dams) will allow for periods of seasonal drawdown within the floodplain, thereby allowing for the recruitment of wetland hardwood seedlings.

To enhance the bottomland hardwood habitat for wildlife within the proposed wetland mitigation enhancement area in Johns Creek, wetland fill material may be deposited along the floodplain, in a non-uniform pattern, to create a mosaic of hummocks. These hummocks will be planted with native hydrophytic trees and shrubs. The selected tree species will consist of containerized and/or bare root stock protected by tree shelters (i.e., TUBEX® or Miracle Tube tree shelters). The tree shelters will provide protection from beavers and is an important component of the passive control of this species. The tree shelters will also reduce depredation of the planted material by other wildlife species.

The control of phragmites (*Phragmites communis*) through herbicide application is proposed under the compensatory mitigation plan for the CCNPP Unit 3 project. Phragmites is a large, coarse, perennial grass that usually forms large, dense stands reducing the diversity of plant and wildlife species. These stands exist in various locations within the CCNPP property. Phragmites can grow to more than 10 ft in height. Flowering and seed set occur between July and September. Germination occurs in spring on exposed moist soils. Vegetative spread by below-ground rhizomes (roots) can result in dense patches with up to 20 stems per square foot. Phragmites is capable of vigorous vegetative reproduction and often forms dense, nearly monospecific stands, as has occurred in the sediment basins of the Lake Davies Disposal Area and within Johns Creek and other forested wetland areas on the CCNPP Unit 3 site. The eradication of phragmites within the mitigation sites will include multiple treatment events, as the density/biomass of this nuisance species within the mitigation sites is very high. With the control of phragmites and the growth of the planted woody species, the bottomland hardwood forest community of Johns Creek will thrive. Water levels within the mitigation sites are not expected to be impacted as a result of the implementation of the phragmites control program.

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## Question 12

**In the area by the tennis courts, provide explanation on the elevations at the outlet and how storm water management will be addressed to prevent erosion and destabilization of the cliffs.**

## RESPONSE

According to the Calvert Cliffs Unit 3 Storm Water Management Plan (Bechtel, October 2008), Maryland stormwater management ordinances were followed to satisfy water quality requirements, recharge volumes, channel protection storage volume, overbank flood protection volume, and spillway design. Runoff from the developed areas will be collected via ditches, swales and culverts and routed to detention basins. Discharge from the detention basins will be controlled through the outlets so that it is at or below inflow discharge. In the area by the tennis courts, a series of wetland cells are being created, which will also serve to detain stormwater (SWB1) before it is discharged into the channels draining to the Chesapeake Bay.

Based on the current design of the forested wetlands, flow will be diverted from the upper wetland cell to the middle wetland cell and from the middle wetland cell to the lowest wetland cell through orifices and connecting pipes. One foot of water will be stored in each wetland cell before the discharge pipe becomes activated. This volume of water is designed to draw down over the course of 24 hours. The outlet pipe from the lowest wetland cell is 8-inches. Storm runoff above the volume that fills the three wetland cells will be diverted through a principal spillway in the uppermost cell to the south where it will flow into the channel draining Camp Conoy. Therefore discharge from the lowest wetland cell will be very small and is not anticipated to increase from pre-development conditions.

Further attention will be given in the final design to stormwater management systems feeding the channel to the south of the forested wetlands in order to maintain the existing hydrology in that system.

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## Question 13

**Is it possible to improve wildlife habitat in the laydown areas post-construction. Can plantings be used where security and other concerns won't prohibit their use? Is it possible to modify the shape of the stormwater retention basins to include curves that reflect more natural features? Where this is not possible, provide justification.**

## RESPONSE

As security concerns allow, laydown areas will be converted to grassland communities during the post-construction phase. The conversion of non-sensitive security laydown areas to grassland communities will increase biodiversity by providing habitats not currently available to on-site wildlife species. Grassland communities should consist of native warm season grasses and forbs. The rich diversity of grasses and forbs will also increase insect and pollinator populations. Additional benefits include increased soil fertility, soil stabilization and reduced erosion. Native grass species are drought resistant and require minimal maintenance once established.

Preparation of the site includes disking to loose soil and kill existing weeds. Native warm season grasses may be established by drilling or broadcasting, using high quality seed from a local seed source. Since native warm season grasses do not compete well with less desirable non-native cool season grasses (e.g. fescue, Bermuda grass, Johnson grass), some competition control may be necessary. In the absences of fire, mechanical and chemical application may be used to help establish the habitat. Once the native grasses are established, maintenance of habitat would require only annual mowing to inhibit woody plant growth.

The shape of the stormwater retention basins has been designed to minimize their footprint and maximize their required storage volume. If they were reshaped to be more curvilinear, then either critical design volume would be lost or the limits of disturbance would have to increase to accommodate the change.