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UniStar
NUCLEAR ENERGY

10 CFR 52.3
10 CFR 52.79

March 5, 2009

UN#09-140

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Calvert Cliffs Nuclear Power Plant, Unit 3
Environmental RAIs No. 1001 through 1011

References: (1) NRC Letter to UniStar Nuclear Energy, dated February 3, 2009, Request For Additional Information Related To The Environmental Report For The Calvert Cliffs Combined License Application
(2) Email – Thomas Fredrichs to Paul Goldstein, dated February 27, 2009, Calvert Cliffs Summary of Telecons Feb 13 through 24, 2009, Regarding RAIs Issued Feb 3, 2009

The purpose of this letter is to respond to the requests for additional information (RAIs) identified in the NRC letter to UniStar dated February 3, 2009 (Reference 1). The RAIs address figures needed to publish the environmental impact statement (EIS) and information necessary for completion of regulatory reviews.

UniStar Regulatory Affairs staff, UniStar vendors for the Calvert Cliffs Nuclear Power Plant Unit 3 (CCNPP3) project, NRC headquarters staff, and NRC contractors supporting review of the CCNPP3 Combined License Application (COLA) environmental report discussed the scope of the RAIs (Reference 1) during four telephone conferences on February 13, 18, 19, and 24. The discussions focused on how UniStar can provide the NRC with graphics needed to develop the CCNPP3 Draft EIS and necessary additional details of environmental reviews performed by UniStar. The telephone conferences resulted in a common understanding of the NRC requests and how UniStar can provide the needed information (Reference 2).

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NRO

The NRC staff agreed that certain information regarding alternate sites is available in the Agencywide Documents Access and Management System (ADAMS). UniStar determined that some of the RAIs are linked to each other and could be combined.

Enclosure 1 provides a matrix of the RAIs forwarded by Reference 1 and requests withdrawn by the NRC per Reference 2. UniStar established a numbering convention for subparts of the RAIs based on the number of specific requests contained in each RAI.

Enclosure 2 provides UniStar responses to the RAIs. Some of the responses contain both black and white figures for use in the EIS and color figures for incorporation into the COLA. COLA impacts associated with these RAI responses are noted following the response to the requests. A Licensing Basis Change Request has been initiated to incorporate these changes into a future revision of the COLA. There are no new regulatory commitments in this correspondence.

If you have any questions regarding this transmittal, please contact me at 410-470-4205 or call Mr. Dimitri Lutchenkov at (410) 470-5524.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 5, 2009

Greg Gibson

GG/dl/kg

Enclosures:
1) List of RAIs, Tracking Numbers Assigned by UniStar, and RAI Status
2) UniStar Responses to Miscellaneous NRC COLA Part 3 Environmental Report RAIs, February 3, 2009

cc: U.S. NRC Region I Office
Thomas Fredrichs, NRC Environmental Project Manager, U.S. EPR COL Application
John Rycyna, NRC Safety Project Manager, U.S. EPR COL Application
Joseph Colaccino, Chief, EPR Projects Branch, Division of New Reactor Licensing
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2
Loren Plisco, Deputy Regional Administrator, NRC Region II (w/o enclosures)
Getachew Tesfaye, NRC Project Manager, U.S. EPR DC Application (w/o enclosures)

Enclosure 1

List of RAIs, Tracking Numbers Assigned by UniStar, and RAI Status

RAI No	Subject	Action	RAI Status
1001-1	Graphics and Illustrations ESRP 2.1.1 – 1 Fig 2.2-1	Revise figure	Included in this letter - see Enclosure 2.
1001-2	Graphics and Illustrations ESRP 2.4.1 – 1 Fig 2.4-1	Revise figure	Included in this letter - see Enclosure 2.
1001-3	Graphics and Illustrations ESRP 2.4.1 – 2	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-4	Graphics and Illustrations ESRP 2.5.1 – 1 Fig 2.5-3	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-5	Graphics and Illustrations ESRP 4.1.1 – 1 Fig 2.4-2	Revise figure	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-6	Graphics and Illustrations ESRP 4.1.1 - 2	Revise figure	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-7	Graphics and Illustrations ESRP 4.3.1 – 1 Fig 4.3-1	Revise figure	Included in this letter - see Enclosure 2.
1001-8	Graphics and Illustrations ESRP 4.3.1 – 2 Fig 4.3-2	Revise figure	Included in this letter - see Enclosure 2.
1001-9	Graphics and Illustrations ESRP 4.3.1 – 3 Fig 5-6	Revise figure	Included in this letter - see Enclosure 2.
1001-10	Graphics and Illustrations ESRP 4.3.1 – 4 Fig 5-7	Revise figure	Included in this letter - see Enclosure 2.
1001-11	Graphics and Illustrations ESRP 4.3.1 – 5 Fig 5-34	Revise figure	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-12	Graphics and Illustrations ESRP 4.3.2 - 1	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-13	Graphics and Illustrations ESRP 4.3.2 - 2	New figure required	Included in this letter - see Enclosure 2.
1001-14	Graphics and Illustrations ESRP 4.3.2 - 3	Provide missing figure	Included in this letter - see Enclosure 2.
1001-15	Graphics and Illustrations ESRP 5.3.4 - 1	New figure required	Included in this letter - see Enclosure 2.
1001-16	Graphics and Illustrations ESRP 9.3 – 1	New figure required	Included in this letter - see Enclosure 2.

1001-17	Graphics and Illustrations ESRP 9.3 - 2	New figure required	Included in this letter - see Enclosure 2.
1001-18	Graphics and Illustrations ESRP 9.3 - 3	New figure required	Included in this letter - see Enclosure 2.
1001-19	Graphics and Illustrations ER Fig 2.2-2	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-20	Graphics and Illustrations ER Fig 2.2-9	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-21	Graphics and Illustrations ER Fig 2.3-1	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-22	Graphics and Illustrations ER Fig 2.3-2	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-23	Graphics and Illustrations ER Fig 2.3-42	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-24	Graphics and Illustrations ER Fig 2.3-68	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-25	Graphics and Illustrations ER Fig 2.5-1	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-26	Graphics and Illustrations ER Fig 2.5-3	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-27	Graphics and Illustrations ER Fig 2.5-7	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-28	Graphics and Illustrations ER Fig 2.5-8	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-29	Graphics and Illustrations ER Fig 3.2-1	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-30	Graphics and Illustrations ER Fig 5.3-2	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-31	Graphics and Illustrations ER Fig 5.3-3	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-32	Graphics and Illustrations FSAR Fig 2.5-1	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-33	Graphics and Illustrations RAI 198 Fig 9.3-3	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-34	Graphics and Illustrations RAI 198 Fig 9.3-4	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-35	Graphics and Illustrations Fig 3 Final Wetland Rpt	Resolve legibility issues	Included in this letter - see Enclosure 2.
1001-36	Graphics and Illustrations Rare/Sig NMP	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-37	Graphics and Illustrations Rare/Sig Ginna	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-38	Graphics and Illustrations 2 View-Wetlands NMP	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)

1001-39	Graphics and Illustrations Public Land re NMP	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-40	Graphics and Illustrations Wetlands re Ginna	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1001-41	Graphics and Illustrations Public Land re Ginna	New figure required	RAI withdrawn based on tel-con with NRC staff (Reference 2)
1002-1	Hydrology ESRP 2.3 -1	Johns Creek impact re const/ops	Included in this letter - see Enclosure 2.
1002-2	Hydrology ESRP 3.4.4-1	Resolve flow rate discrepancies	Included in this letter - see Enclosure 2.
1003-1	Aquatic Ecology 2.4.2-1	Survey data re streams/habitats	Included in this letter - see Enclosure 2.
1003-2	Aquatic Ecology 2.4.2-2	More sampling data needed	Included in this letter - see Enclosure 2.
1003-3	Aquatic Ecology 2.4.2-3	Temp / variations re waste streams	Included in this letter - see Enclosure 2.
1004-1	Environmental Justice 2.5.4-1	Apparent discrepancy re minorities	Included in this letter - see Enclosure 2.
1005-1	Cool System 3.4.1-1	Desal Plant Op schedule / impact water use	Included in this letter - see Enclosure 2.
1005-2	Cool System 3.4.2-1	Intake structure changes	Included in this letter - see Enclosure 2.
1006-1	Cultural/Historical Resources 4.1.3-1	Assure no adverse impact before COL	Included in this letter - see Enclosure 2.
1007-1	Water-Related Impacts 4.2-1	Quantify water impacts re const/ops	Included in this letter - see Enclosure 2.
1007-2	Water-Related Impacts 4.2-2	Estimate dissolved solids	Included in this letter - see Enclosure 2.
1008-1	Ecological Impacts 4.3.1-1	Tidal Wetlands impacts re Tetra Tech in ER	Included in this letter - see Enclosure 2.
1008-2	Ecological Impacts 4.3.2-2	Barge dock usage – Backfill dredged area	Included in this letter - see Enclosure 2.
1008-3	Ecological Impacts 4.3.2-3	Aquatic impact – relocated impact	Included in this letter - see Enclosure 2.
1008-4	Ecological Impacts 4.3.2-4	Detailed information re fish return	Included in this letter - see Enclosure 2.
1008-5	Ecological Impacts 4.3.2-5	Intake system baffle wall installation	Included in this letter - see Enclosure 2.
1008-6	Ecological Impacts 4.3.2-6	Baffle wall armoring – missing Fig 3B	Included in this letter - see Enclosure 2.

1009-1	Radiological Monitoring 6.2	Additional Rad Mon per NEI / wells-locations	Included in this letter - see Enclosure 2.
1010-1	Energy Alternatives 9.2-1	Coal fired emission issues	Included in this letter - see Enclosure 2.
1010-2	Energy Alternatives 9.2-2	Gas combined cycle emission issues	Included in this letter - see Enclosure 2.
1011-1	Alternate Sites 9.3-1	NY need for power not in ER	Included in this letter - see Enclosure 2.
1011-2	Alternate Sites 9.3-2	Need for power – why MD?	Included in this letter - see Enclosure 2.
1011-3	Alternate Sites 9.3-3	Rating process-scores 13 sites	Included in this letter - see Enclosure 2.
1011-4	Alternate Sites 9.3-4	Selection process – screening or exception	Included in this letter - see Enclosure 2.
1011-5	Alternate Sites 9.3-5	Basis for NMP/Ginna as candidates	Included in this letter - see Enclosure 2.
1011-6	Alternate Sites 9.3-6	UniStar selection of Thiokol as alternate	Included in this letter - see Enclosure 2.
1011-7	Alternate Sites 9.3-7	Provide copy of Thiokol restrictive covenant	Included in this letter - see Enclosure 2.
1011-8	Alternate Sites 9.3-9	Thiokol rating re unexploded ordinance	Included in this letter - see Enclosure 2.
1011-9	Alternate Sites 9.3-10	Actions taken to locate/remove unexploded ordinance	Included in this letter - see Enclosure 2.
1011-10	Alternate Sites 9.3-11	Evaluate impacts on dwarf wedge mussel re selecting Thiokol site	RAI withdrawn based on tel-con with NRC staff (Reference 2)

Enclosure 2

UniStar Responses to
Miscellaneous NRC COLA Part 3 Environmental Report RAIs
February 3, 2009

RAI Number: 1001-1

Graphics and Illustrations

Figures provided with the environmental report (ER) were in color, with many layers of information. Many of these figures are not legible due to the number of layers and level of detail or resolution. Additionally, it would be helpful if the figures are legible in black and white for possible inclusion in the printed version of our environmental impact statement (EIS). To provide greater clarity of the information for technical evaluation and print quality for the EIS, the staff requests the figures listed below be submitted to meet the following specifications:

1. Figures should be submitted in color (if previously produced in color) *but must be able to be reproduced clearly in black-and-white only with legends in legible (larger) fonts, sized to fit within 1in. margins on one 8.5" x 11" page or less.*

2. When color is not practical, figures should be created in black-and-white only with legends in legible fonts, sized to fit within 1 in. margins on one 8.5" x 11" page or less.

3. The figures should focus on the information requested (but should keep appropriate landmarks, roads, etc.). To minimize clutter in figure appearance, texture that reduces figure legibility and nonessential elements should be minimized. For the figures requested, if no additional information is specified, then the request is being made because the figures are not legible in black-and-white.

Additional figures not previously provided are also requested in this list.

An alternative to this request is to provide staff with the GIS data for the requested figures, and our GIS team can make the needed changes.

ESRP 2.1.1 – 1

Provide a revised ER Fig 2.2-1 that specifically indicates the transmission line circuit to the proposed switchyard and onsite wetlands. The staff notes that agriculture is no longer practiced onsite but that the area previously used for this purpose is still shown in figure 2.2-1. The figure should be revised to either (1) remove the marking from the areas currently marked as agricultural, or (2) change the legend to state the areas show historic use of agriculture.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached black and white figure.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached color figure.

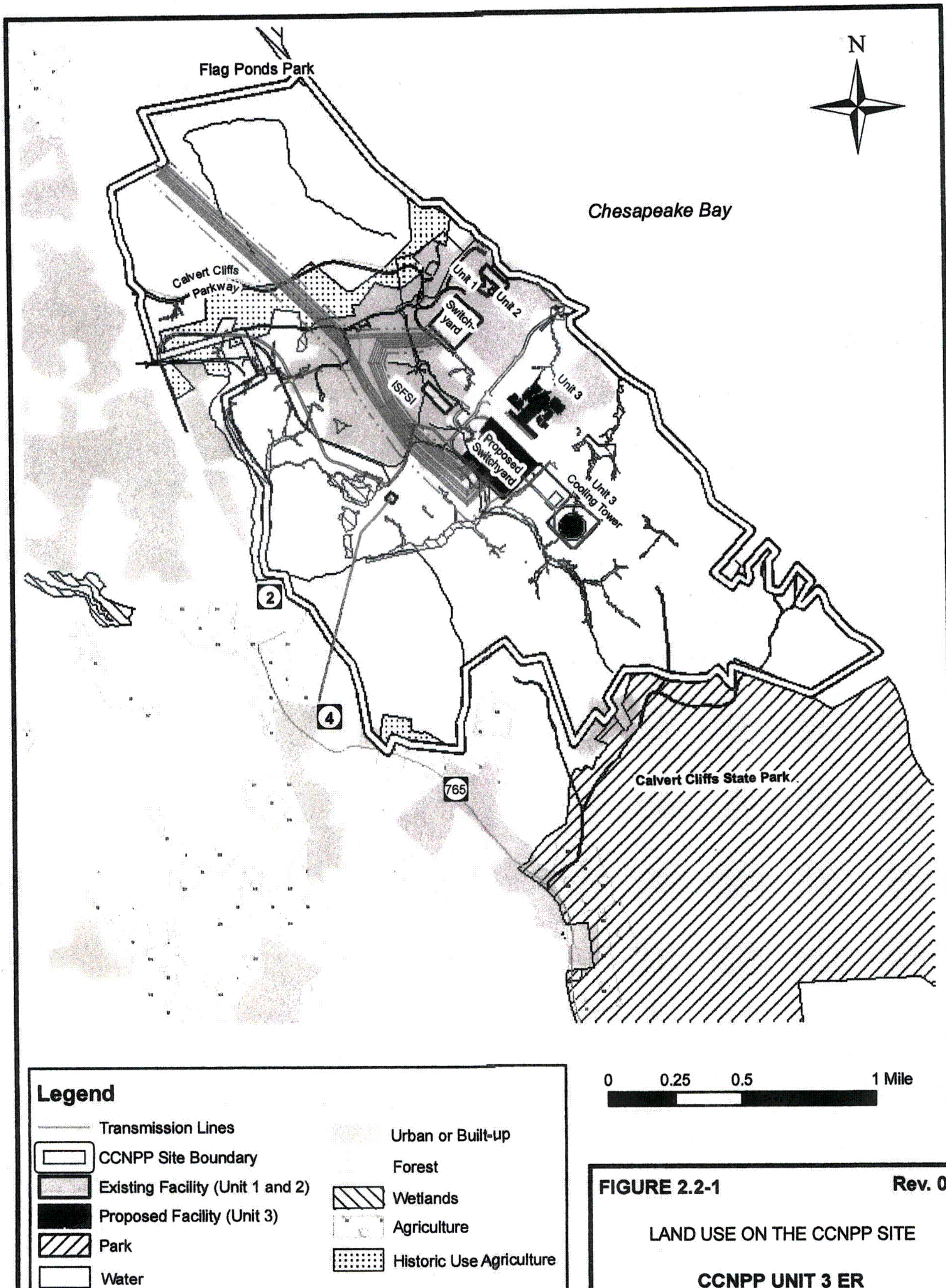


FIGURE 2.2-1 Rev. 0

LAND USE ON THE CCNPP SITE

CCNPP UNIT 3 ER

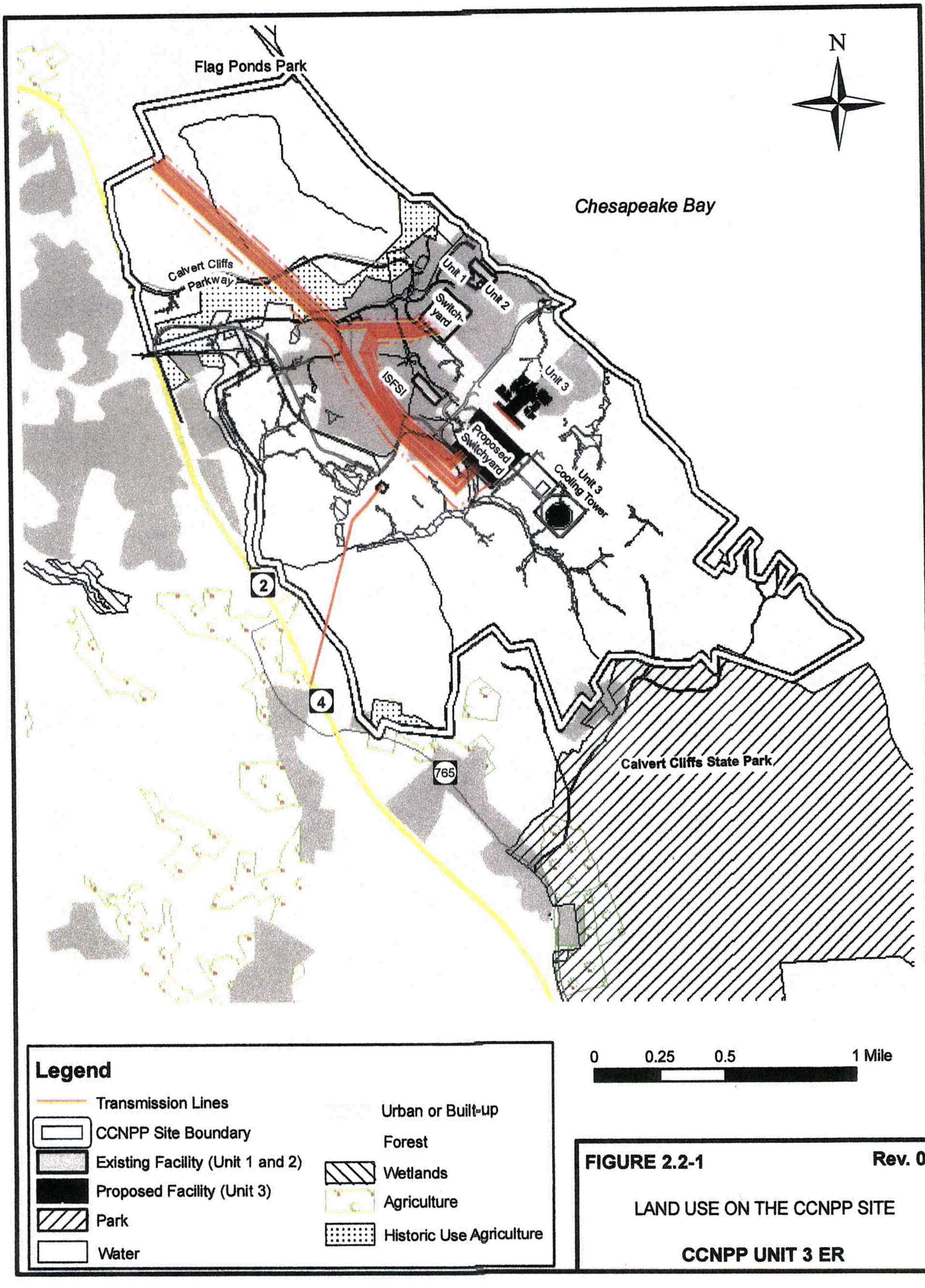


FIGURE 2.2-1 Rev. 0

LAND USE ON THE CCNPP SITE

CCNPP UNIT 3 ER

RAI Number: 1001-2

ESRP 2.4.1 – 1

Provide a revised version of ER Fig 2.4-1 with a legible legend depicting only the following attributes: Calvert Cliffs site boundary, Chesapeake Bay label, Plant communities: Mixed Deciduous Forest, Old Field (Phragmites and Other subtypes combined), Landscaping/Development, Mixed Deciduous Regeneration Forest, Well-drained Bottomland Deciduous Forest, Poorly Drained Bottomland Deciduous Forest, Herbaceous Marsh, Successional Hardwood Forest. In addition to the aquatic resources already labeled,

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached black and white figure.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached color figure.

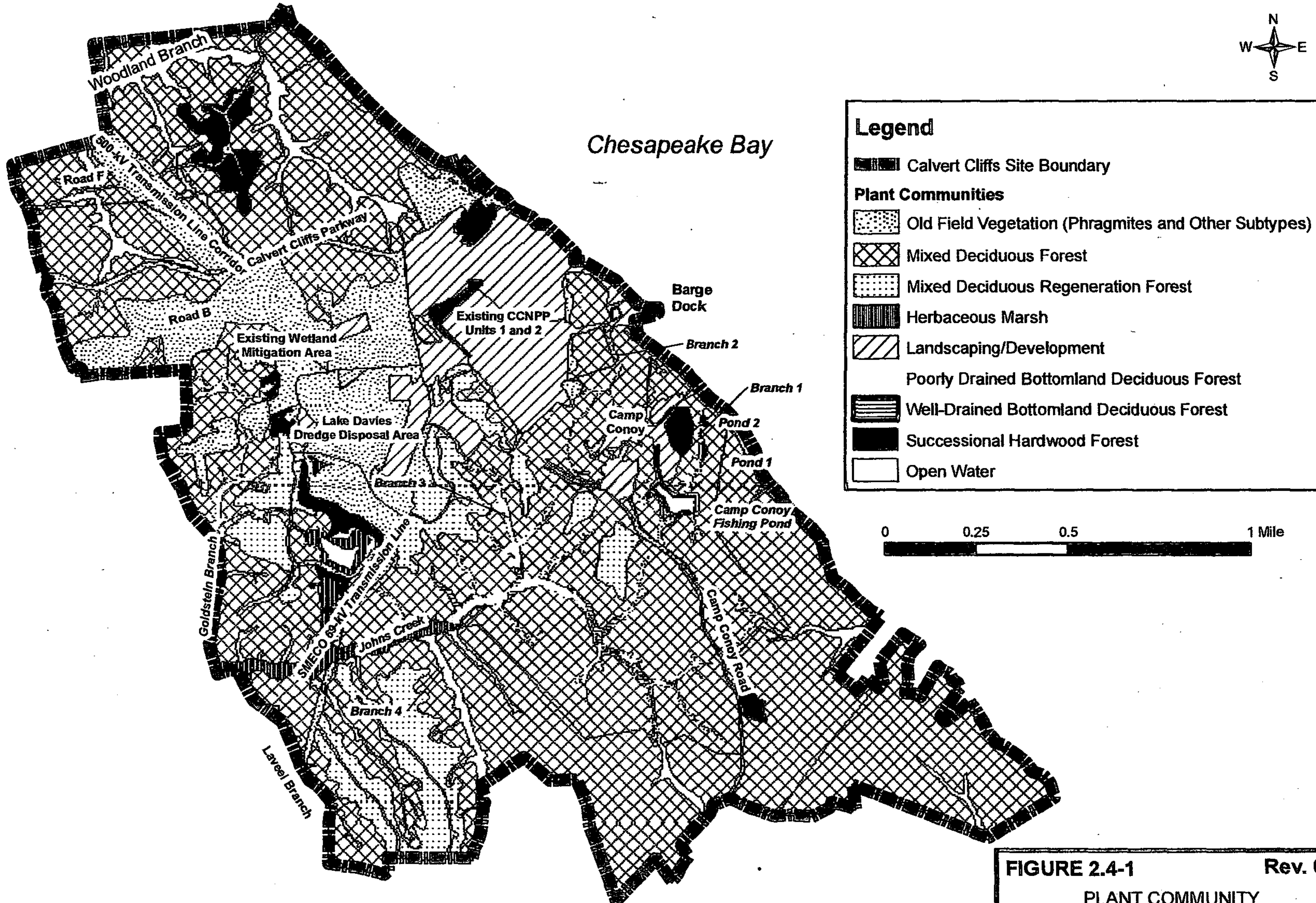


FIGURE 2.4-1 **Rev. 0**

PLANT COMMUNITY
(NATURAL HABITAT MAP)

CCNPP UNIT 3 ER

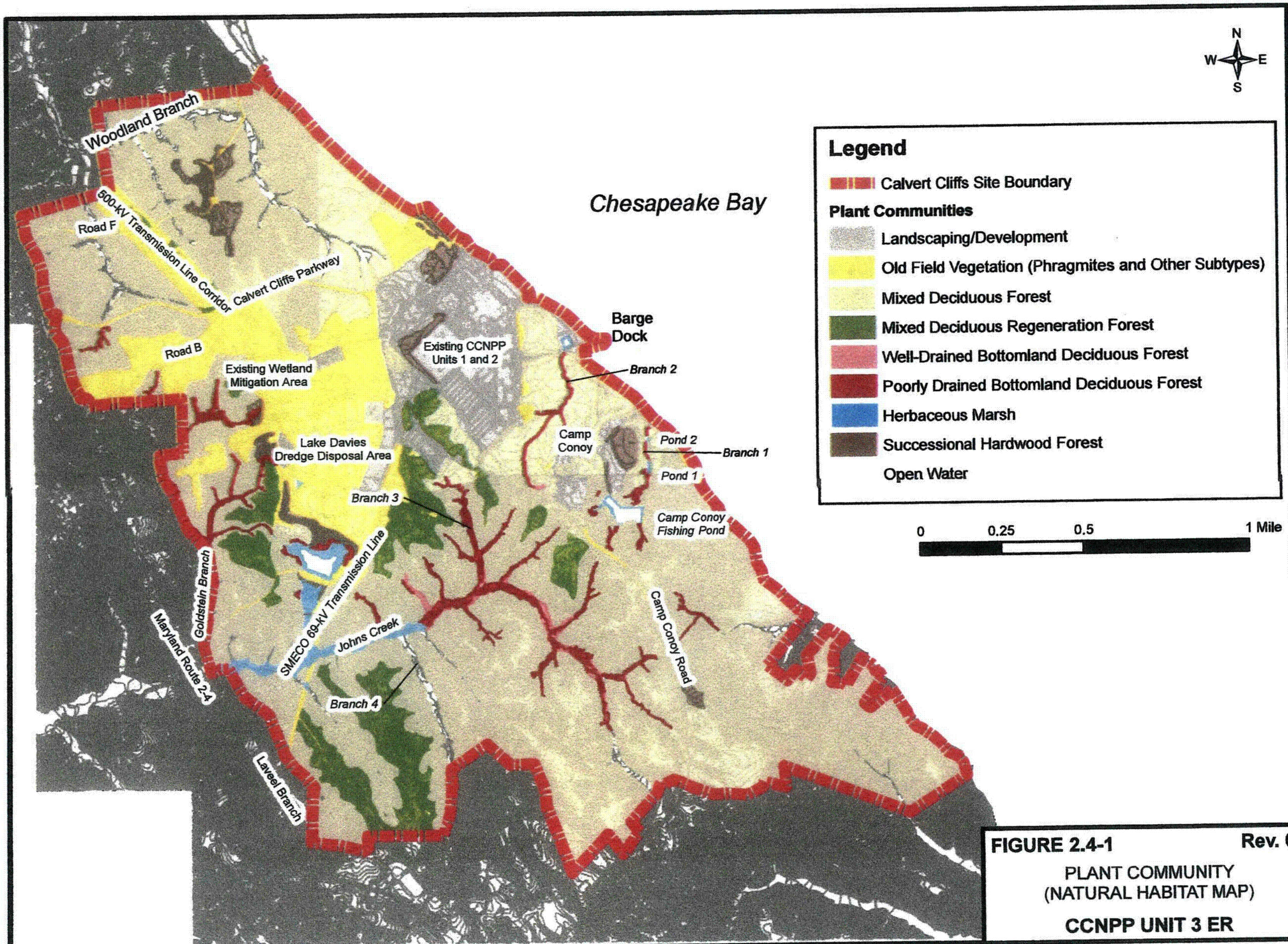


FIGURE 2.4-1 **Rev. 0**

PLANT COMMUNITY
(NATURAL HABITAT MAP)

CCNPP UNIT 3 ER

RAI Number: 1001-4

ESRP 2.5.1 - 1

Provide a legible graphic of ER Fig 2.5-3 so that it has sharper (not fuzzy) titles and no distracting background "textures."

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached black and white figure.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached color figure.

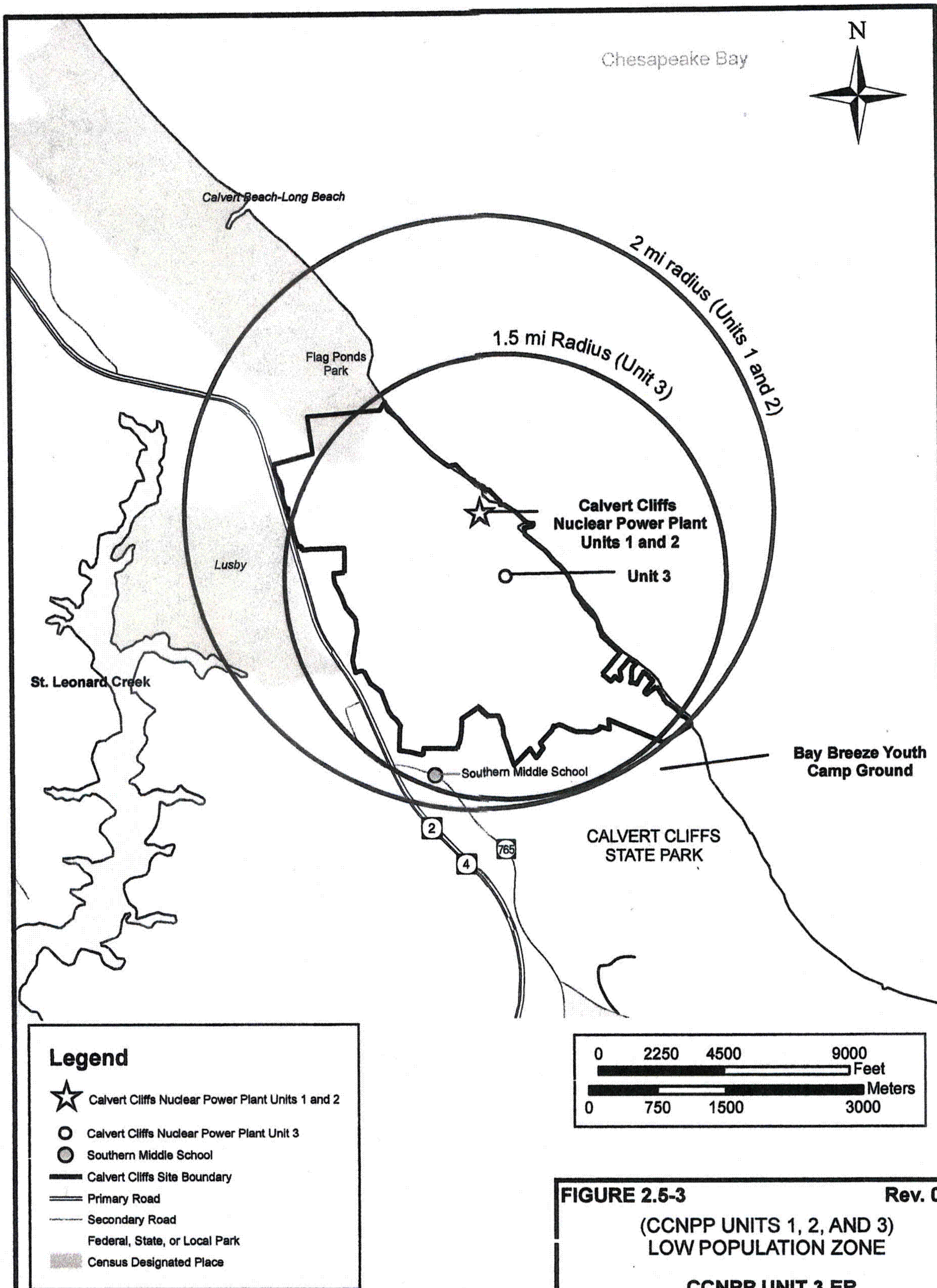


FIGURE 2.5-3 Rev. 0

(CCNPP UNITS 1, 2, AND 3)
LOW POPULATION ZONE

CCNPP UNIT 3 ER

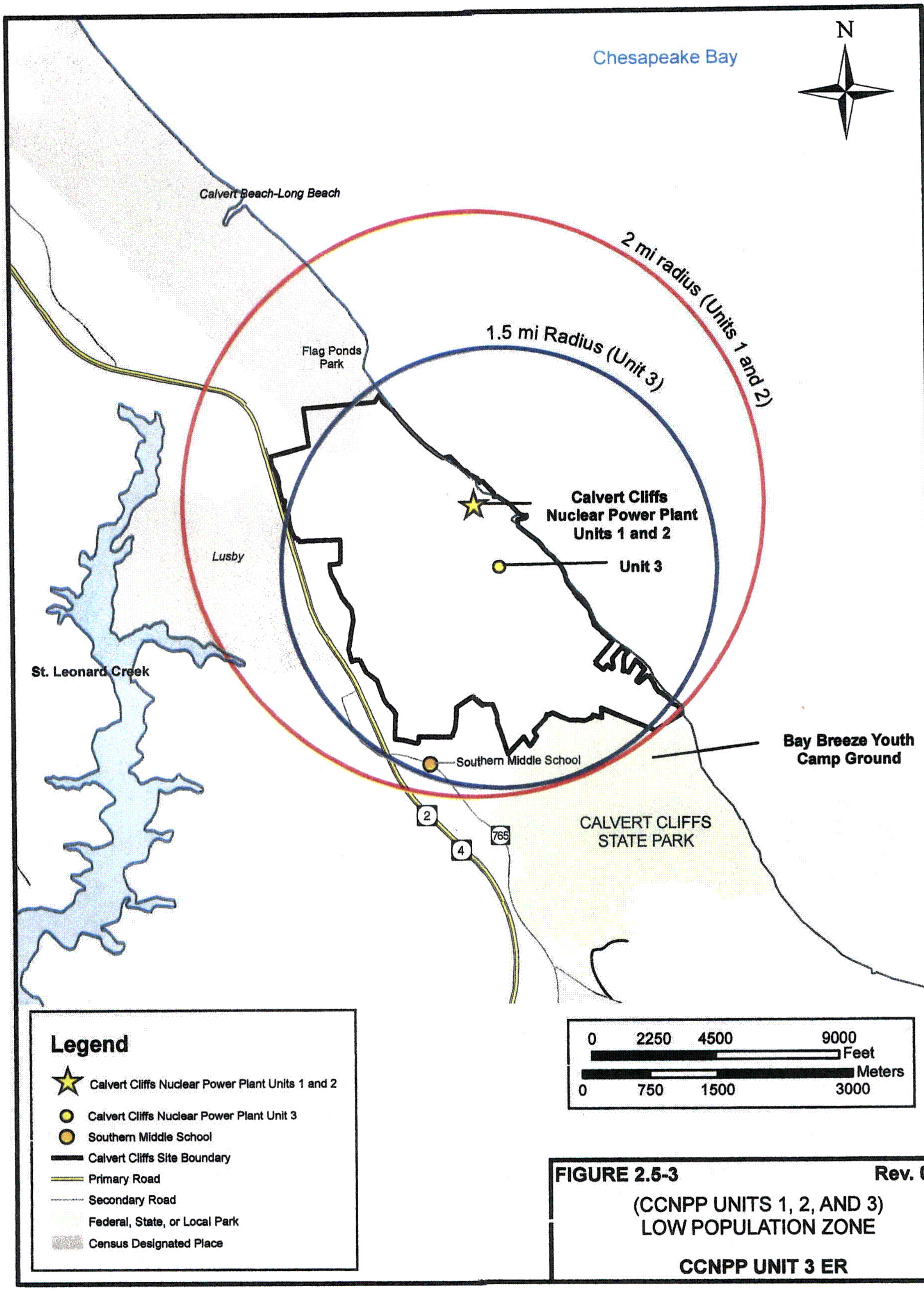


FIGURE 2.5-3 **Rev. 0**

(CCNPP UNITS 1, 2, AND 3)
LOW POPULATION ZONE

CCNPP UNIT 3 ER

RAI Number: 1001-7

ESRP 4.3.1 - 1

Provide a legible graphic of ER Fig 4.3-1 with a legible legend depicting only the following attributes: Calvert Cliffs site boundary, Chesapeake Bay label, Proposed construction areas and labels superimposed over the following plant communities: Mixed Deciduous Forest, Old Field (Phragmites and Other subtypes combined), Landscaping/Development, Mixed Deciduous Regeneration Forest, Well-drained Bottomland Deciduous Forest, Poorly Drained Bottomland Deciduous Forest, Herbaceous Marsh, Successional Hardwood Forest.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached black and white figure.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached black and white mark up.

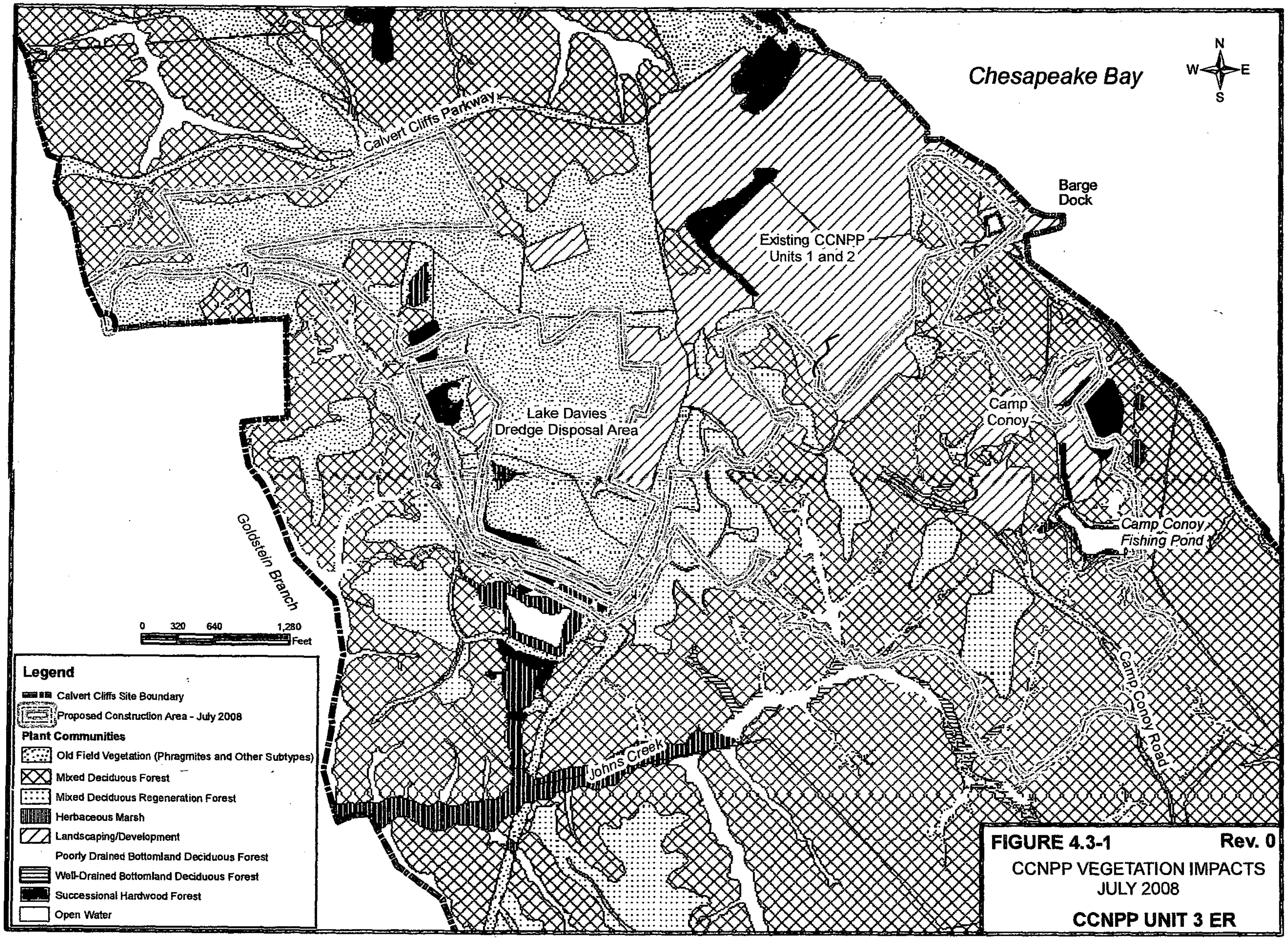


FIGURE 4.3-1 Rev. 0

CCNPP VEGETATION IMPACTS
JULY 2008

CCNPP UNIT 3 ER

RAI Number: 1001-8

ESRP 4.3.1 - 2

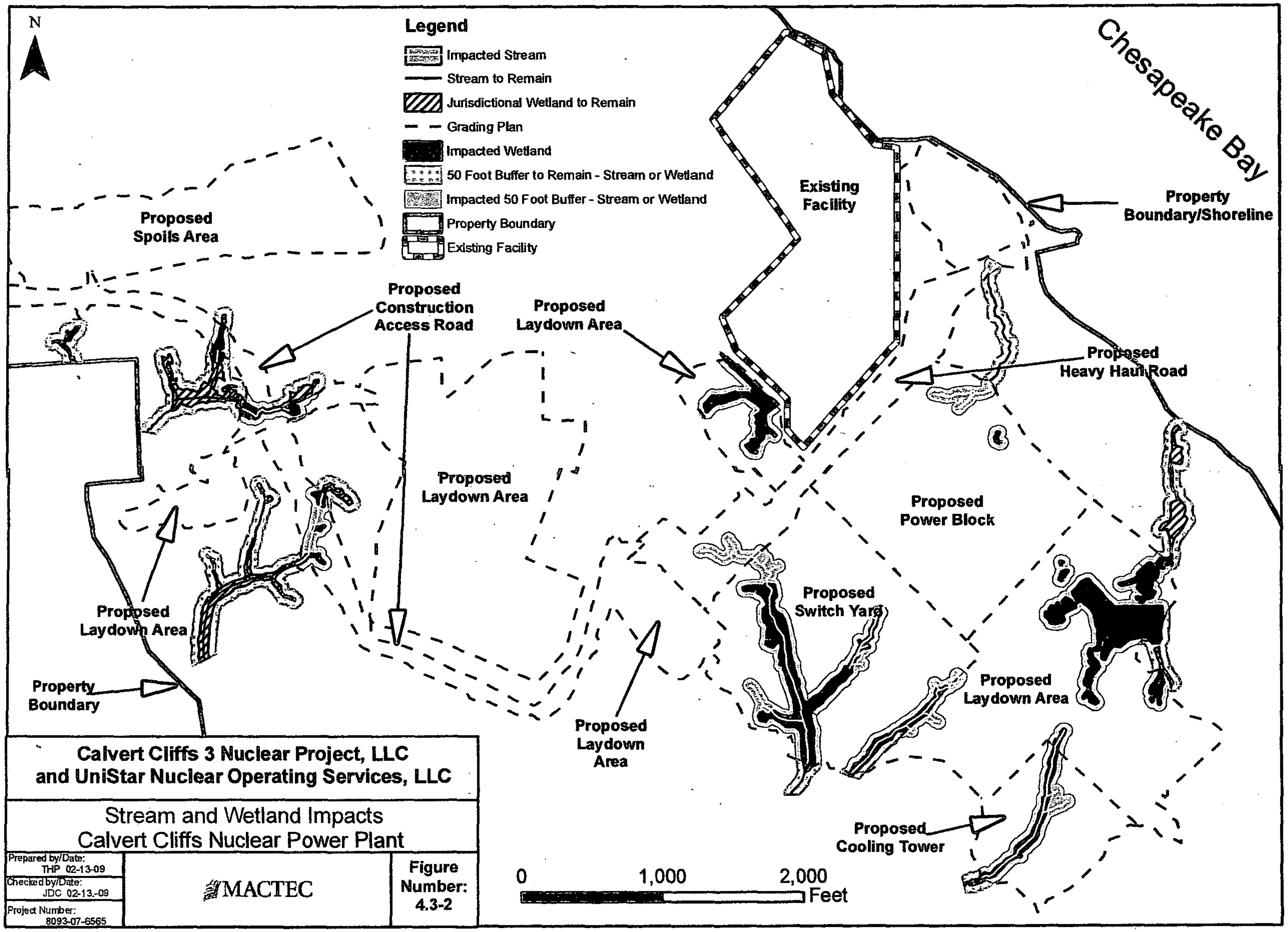
Provide a legible graphic of ER Fig 4.3-2 with a legible legend depicting only the following attributes: Calvert Cliffs site boundary, Chesapeake Bay label, proposed construction areas and labels superimposed over the wetlands and wetland buffers.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached black and white figure.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached black and white figure.



Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC

Stream and Wetland Impacts
Calvert Cliffs Nuclear Power Plant

Prepared by/Date: THP 02-13-09 Checked by/Date: JDC 02-13-09 Project Number: 8093-07-6565	MACTEC	Figure Number: 4.3-2

Map Document: (G:\Calvert Cliffs\frozen_5_1_08\RAI_figures_2_16_09\figure4.3-2.mxd)
2/13/2009 -- 3:29:53 PM

RAI Number: 1001-9

ESRP 4.3.1 - 3

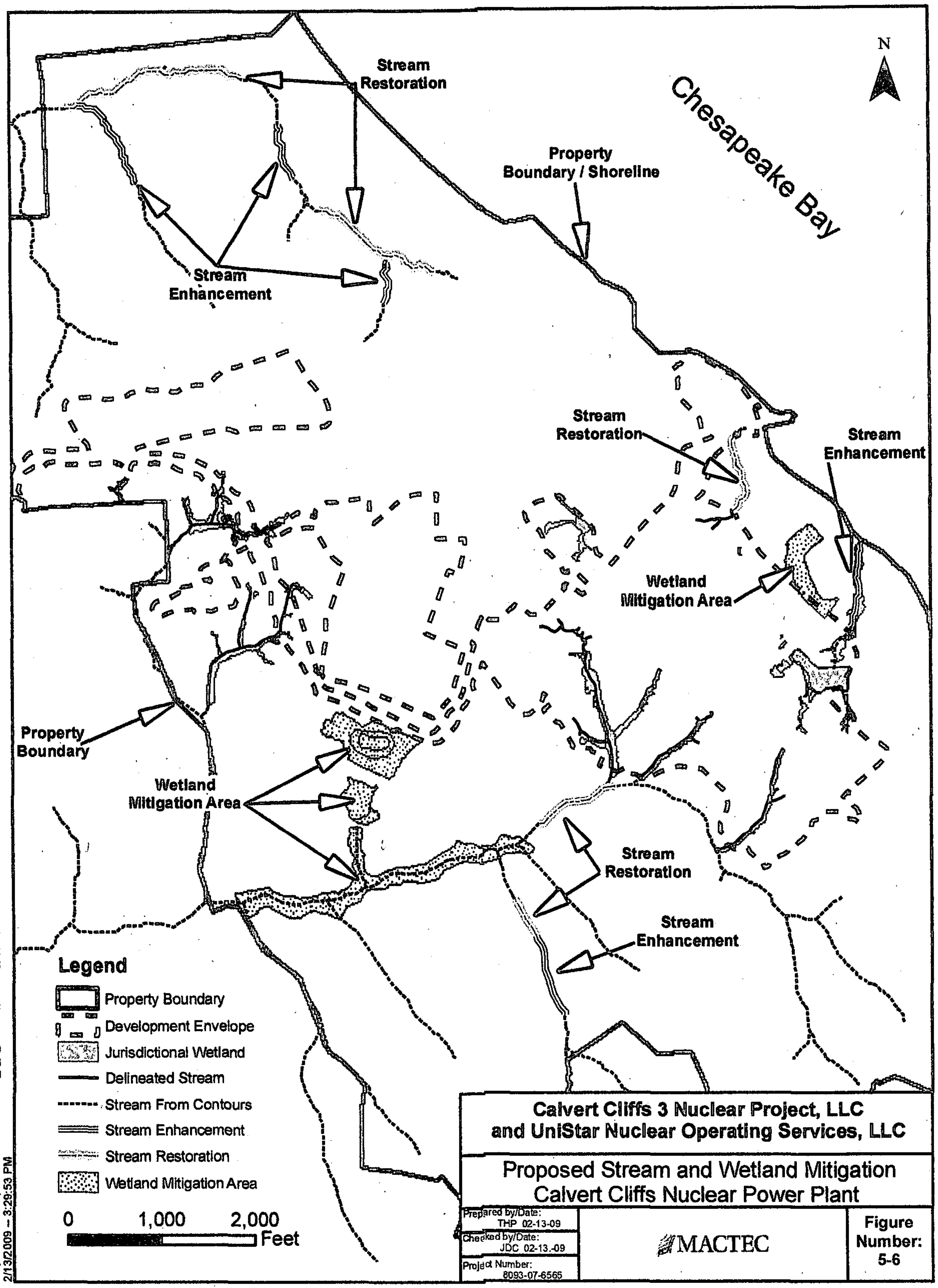
Provide a legible graphic of Fig 5-6 from CPCN Final Report 16 July 2008, with a legible legend depicting only the following attributes: Calvert Cliffs site boundary, Chesapeake Bay label, Wetlands, Development Envelope, and proposed Wetland Mitigation Actions.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC

Proposed Stream and Wetland Mitigation
Calvert Cliffs Nuclear Power Plant

Figure Number: 5-6

Map Document: (G:\Calvert Cliffs\frozen_5_1_08\RAI_figures_2_16_09\figure4.3-2.mxd)
2/13/2009 -- 3:29:53 PM

RAI Number: 1001-10

ESRP 4.3.1 - 4

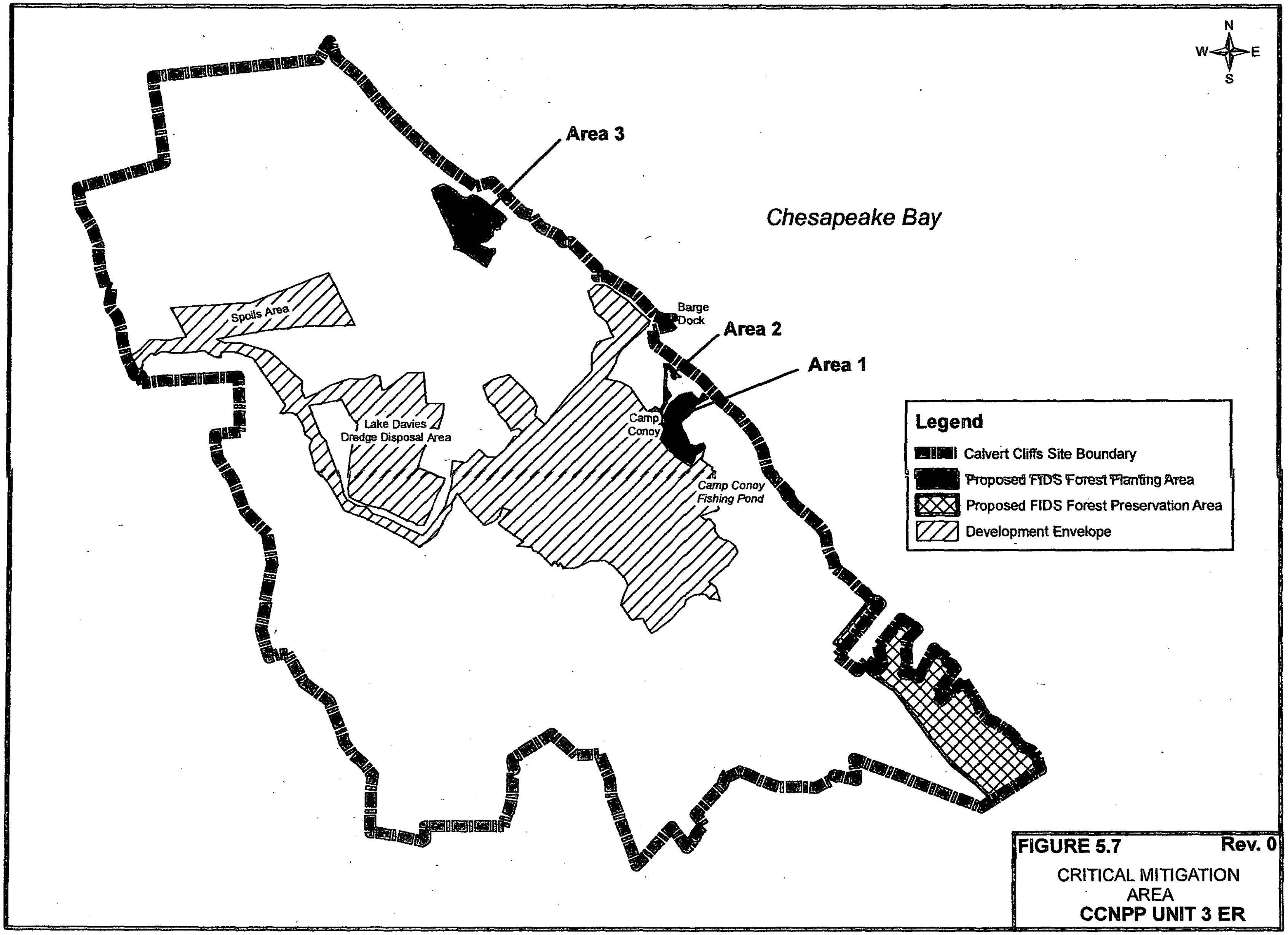
Provide a legible graphic of Fig 5-7 from CPCN Final Report 16 July 2008, with a legible legend depicting only the following attributes: Calvert Cliffs site boundary, Chesapeake Bay label, Development Envelope, proposed FIDS Forest Planting Area, Proposed FIDS Forest Preservation Area.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.


N
W
E
S
Area 3
Chesapeake Bay
Spoils Area
Barge Dock
Area 2
Area 1
Lake Davies Dredge Disposal Area
Camp Conoy
Camp Conoy Fishing Pond
Legend
Calvert Cliffs Site Boundary
Proposed FIDS Forest Planting Area
Proposed FIDS Forest Preservation Area
Development Envelope
FIGURE 5.7
Rev. 0
CRITICAL MITIGATION AREA
CCNPP UNIT 3 ER

RAI Number: 1001-12

ESRP 4.3.2 - 1

Provide a legible version of the figure provided in response to RAI AE-9 in June 2008. Include a legible legend depicting: the construction layout, the aquatic resources that would be affected, and labels for the aquatic resources onsite including Johns Creek, Laveel Branch, Goldstein Branch, Woodland Branch, Branches 1, 2, 3, and 4, and Ponds 1 and 2. It is not necessary to separately identify the wetlands assessment areas

UniStar Response:

UniStar's response to RAI 1001-2 and RAI 1001-22 provide the information requested by RAI 1001-12. ER Figure 2.3-2 attached to RAI 1001-22 identifies the construction layout and affected aquatic resources except ponds 1 and 2. ER Figure 2.4-1 attached to RAI 1001-2 identifies Ponds 1 and 2.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1001-13

ESRP 4.3.2 - 2

Provide new graphic with a legible legend depicting the locations of the intake system, fish return system, and discharge area for Units 1 and 2, the intake system, fish return system, and discharge pipe for proposed Unit 3, the barge dock area and the area to be dredged. The scale should be such that it includes the complete area from north of the current intake area (including any plant-related discharges north of the intake) to south of the barge dock facility.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

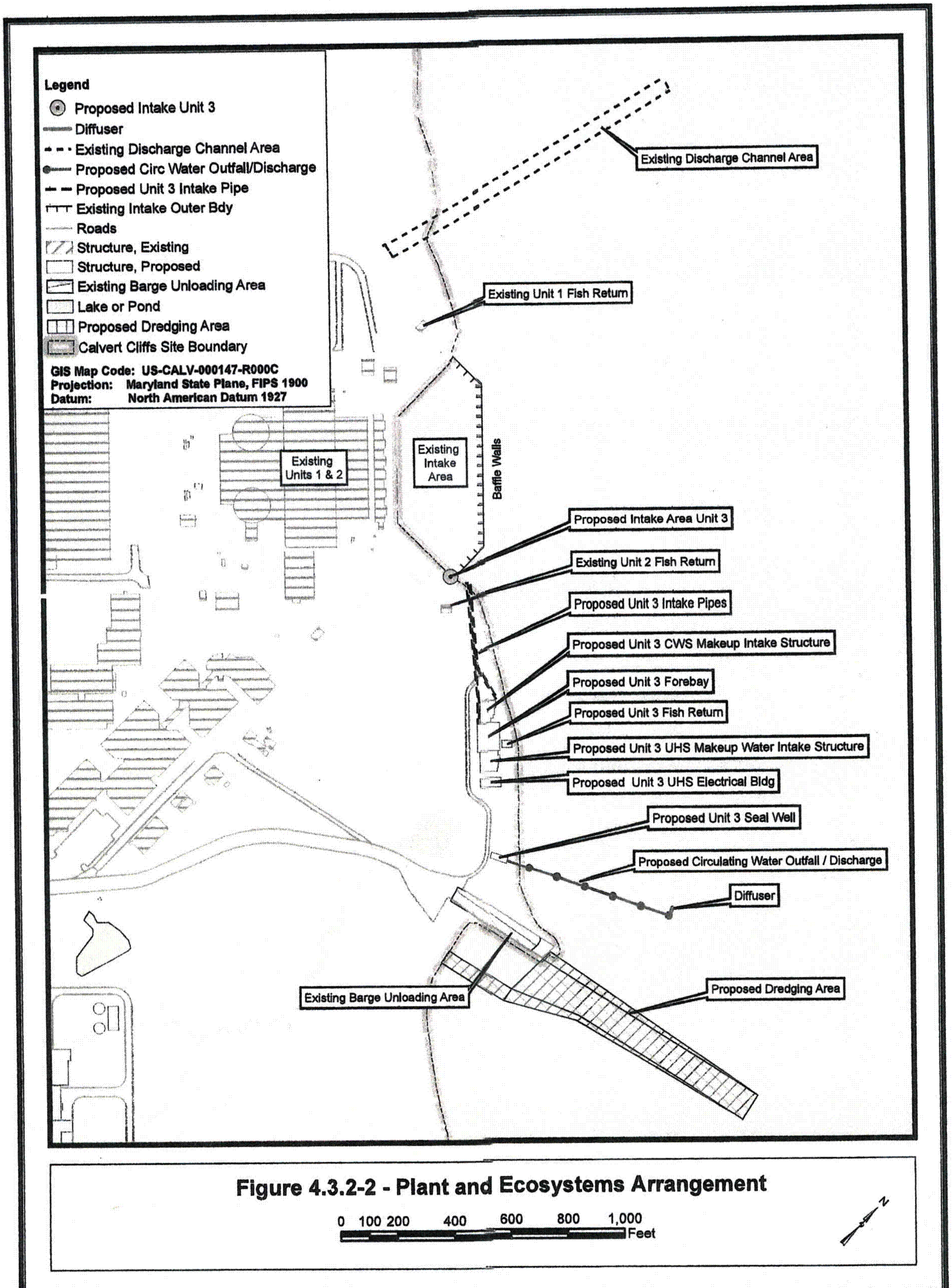


Figure 4.3.2-2 - Plant and Ecosystems Arrangement

RAI Number: 1001-14

ESRP 4.3.2 - 3

The September 29, 2008 RAI response to R AI #6 includes a Fig. 3A, which refers (within the figure) to Fig. 3B (Proposed Armor Protection—see Figure 3 B for Extent of Protection), which was not found. Provide this or a new graphic that shows the bayward extent of the armoring that would be added to protect the new baffle wall installed for the intake system for proposed Unit 3.

UniStar Response:

Figure 3, "Site Plan @ Unit 3 Intake Structure - Sht 1", is the figure that shows the bayward extent of the armoring as 75'-0" +/-. This figure references Figure 3A, "Site Plan @ Unit 3 Intake Structure - Sht 2", which provides a more detailed view of the wedged-shaped pool intake structure proposed for Unit 3. This figure, in turn, references Figure 3B, "Proposed Armor Protection".

Attached is the requested Figure 3B, "Proposed A rmor Protection". Figure 3B shows a cross section of the proposed armor protection. This figure identifies the 3:1 ratio of rise to run (i.e., depth to width of armor protection at the bay bottom) with a maximum bay bottom with of 95' – 0" +/- @ lowest elevation.

The NRC has requested additional clarification regarding two items: 1) "*Channelward*" dimension of 205 feet described in the Joint Permit Application Work Description and 2) the actual footprint of the proposed armor protection on the bay floor. In response to this request, attached is an annotated copy of Figure 3A, "Site Plan @ Unit 3 Intake Structure - Sht 2" which graphically presents the responses and is explained as follows:

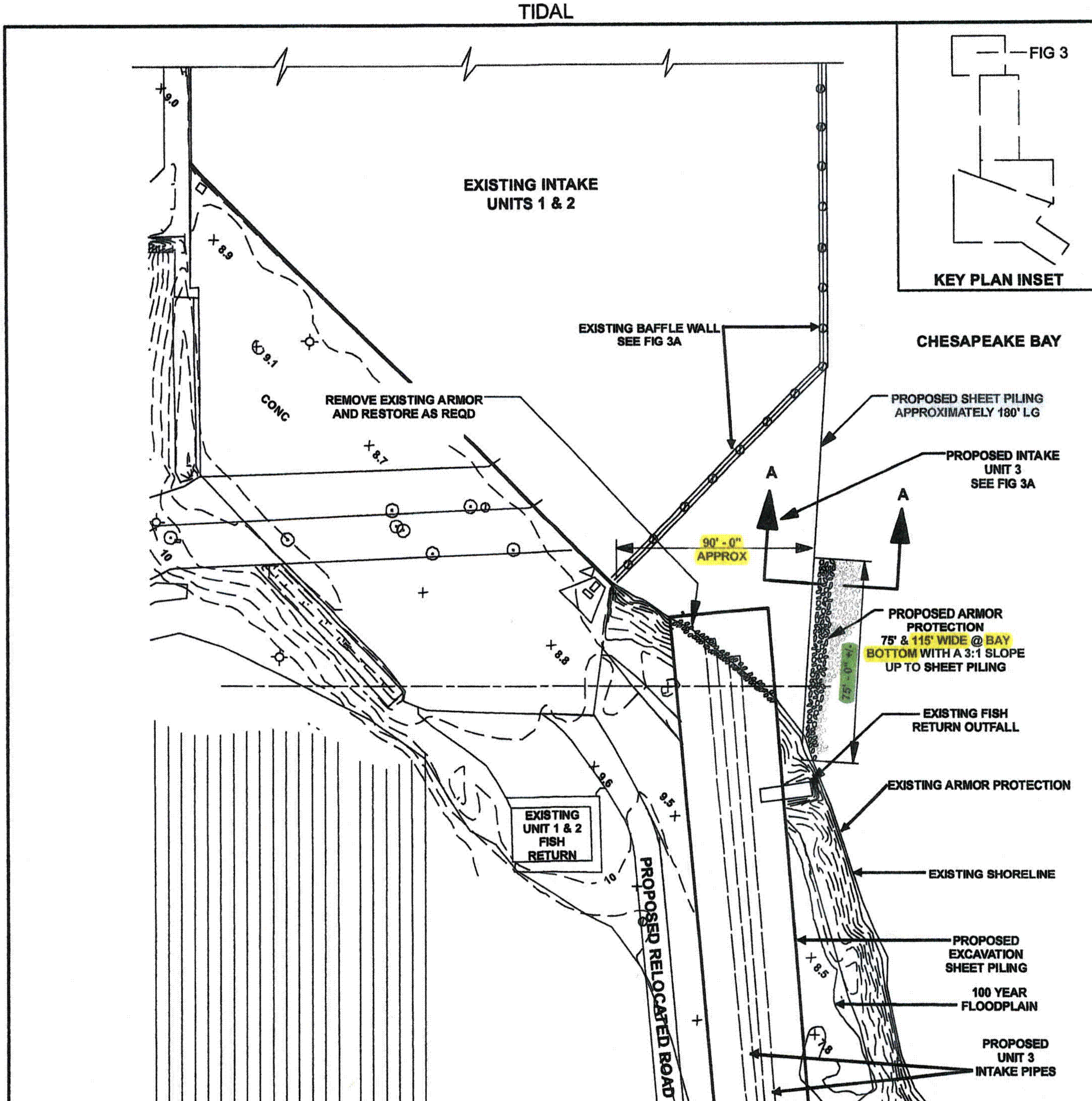
1) The term "*Channelward*" is an Army Corps term used to define an impact distance extending perpendicular to the existing s hore to the furthest extent of tidal work and was identified as 215'. For this project it is the sum of the width of the "Proposed Intake Unit 3" and the footprint of the armor protection and the bay floor. These dimensions are "90'-0" APPROX" and "115' WIDE @ BAY BOTTOM" as identified in yellow highlight on the attached annotated Figure 3. It should be noted that based on further refinements in design to reduce im pacts the 115' dimension has been updated/changed to 95' as shown in Figure 3B. As such, Figure 3 will be updated reflect this change. The attached annotated Figure 3A identifies the updated "*Channelward*" dimension as 185'.

2) The attached annotated Figure 3A shows that the "estimate" impact on the bay bottom by the armor protection is approximately 4650 sq ft. This "estimate" was derived graphically by assuming a hypothetical footprint of the armor protection bottom dimension utilizing the 3:1 ratio and the bay depth shown on the figure. Actual impact on the bay bottom will be determined when the final detailed design is developed.

COLA Impact:

Figure 3 Sht 1 will be updated to reduce 115' to 95' and Fig 3B will be incorporated into a future revision of the COLA. Annotated figures are for information only.

TIDAL



MATCH LINE (SEE FIGURE 4)

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	Figure 3 Annotated SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 1 SCALE IN FEET 0 50 100 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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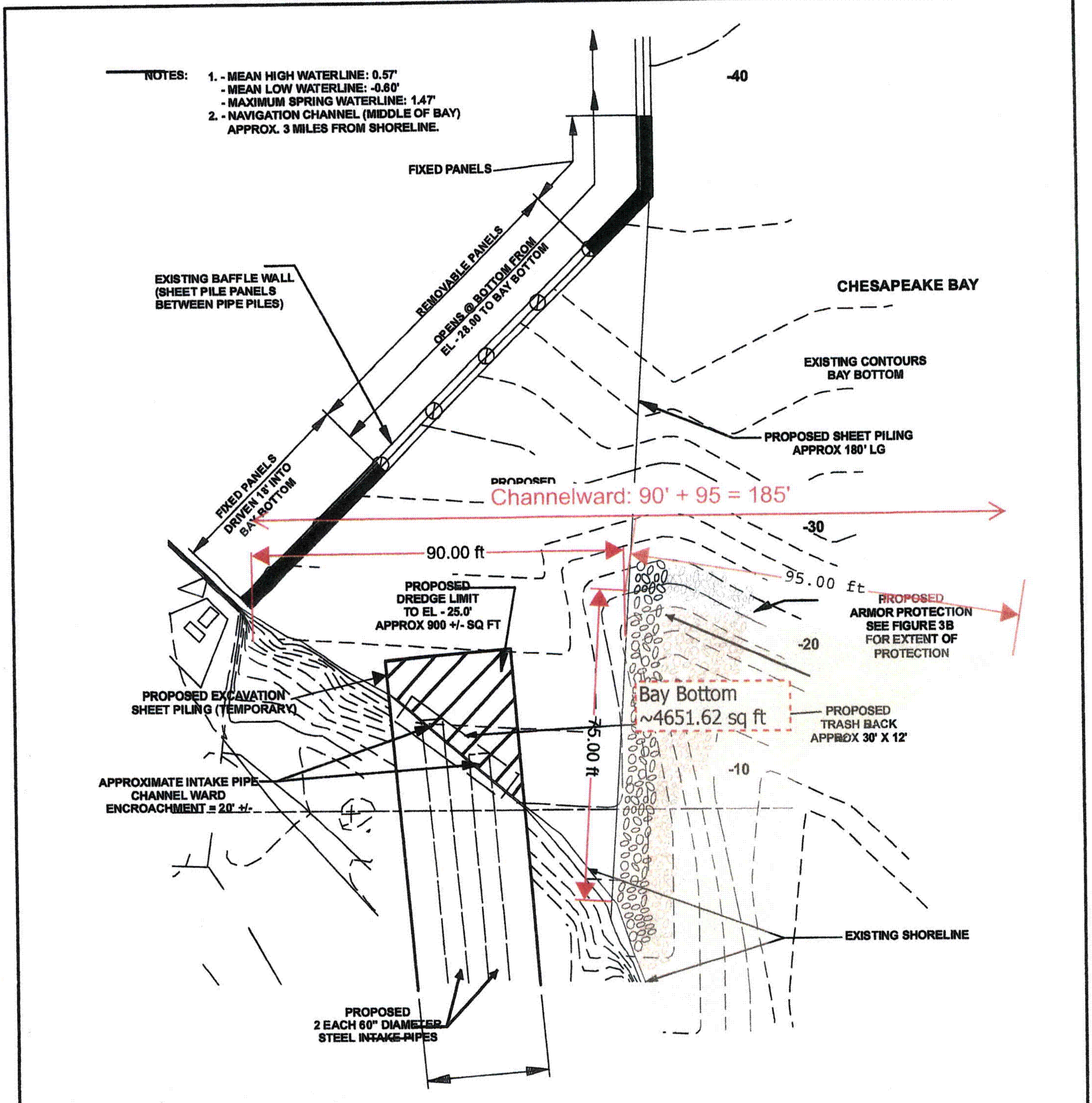
TIDAL



PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	Figure 3A Annotated Bay Bottom **SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 2** SCALE IN FEET 0 25 50 Feet 50.00 ft	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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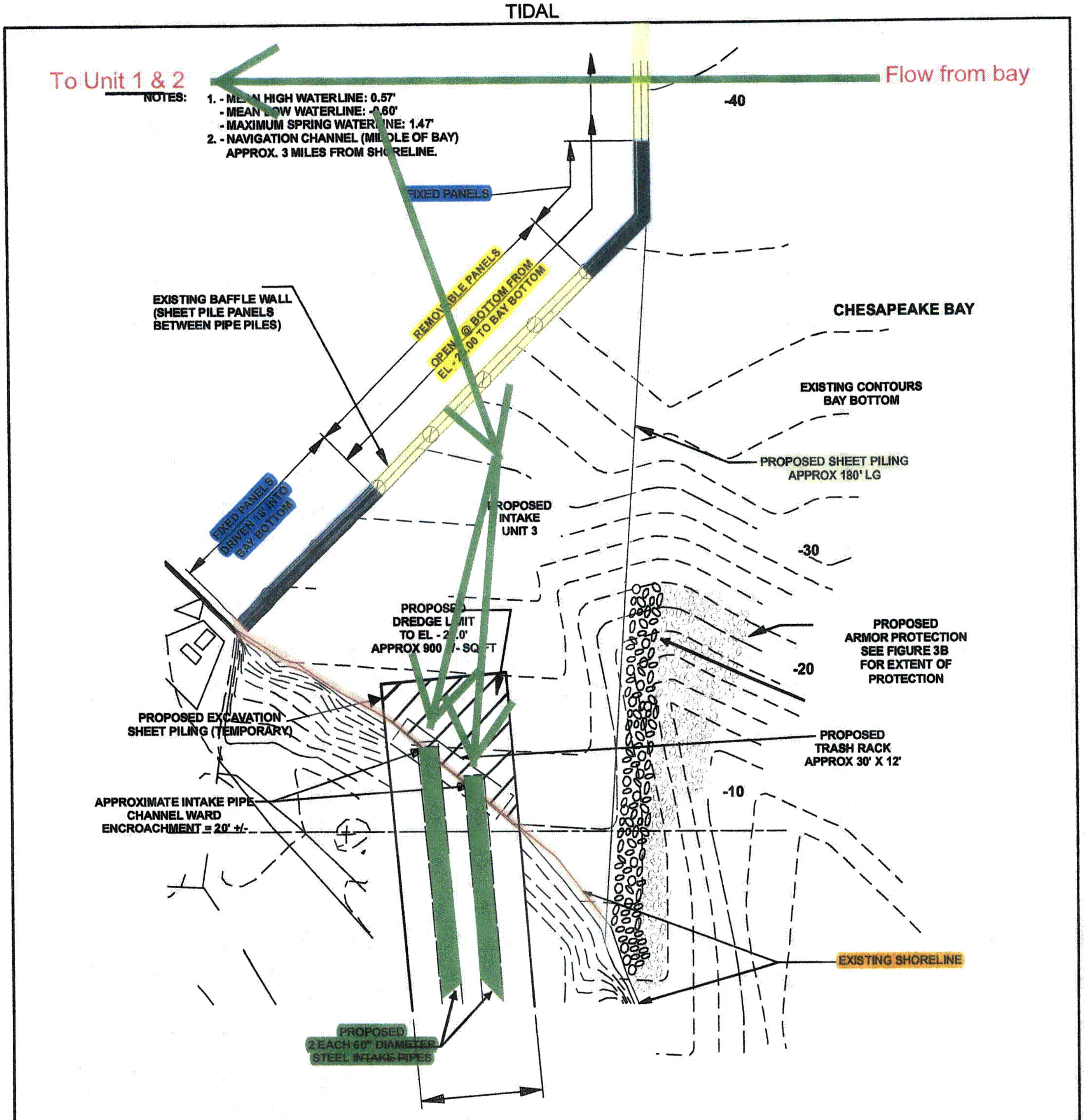

PURPOSE: PLANT EXPANSION
DATA SOURCE:
BECHTEL CORPORATION
DATUM: (NGVD 29)
PROJECT LATITUDE/LONGITUDE:
38.424133
-76.441598

N

Figure 3A Annotated Flow

SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 2

SCALE IN FEET
0 25 50
Feet

CALVERT CLIFFS NUCLEAR POWER PLANT

IN:
PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD

APPLICATION BY:
CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC
AND UNISTAR NUCLEAR OPERATING SERVICES,LLC

DATE: 5/09/08 REV1 7/14/08

Map Document: (G:\Calvert Cliffs\frozen_5_1_081404\Final Figures\figure4__key.mxd)
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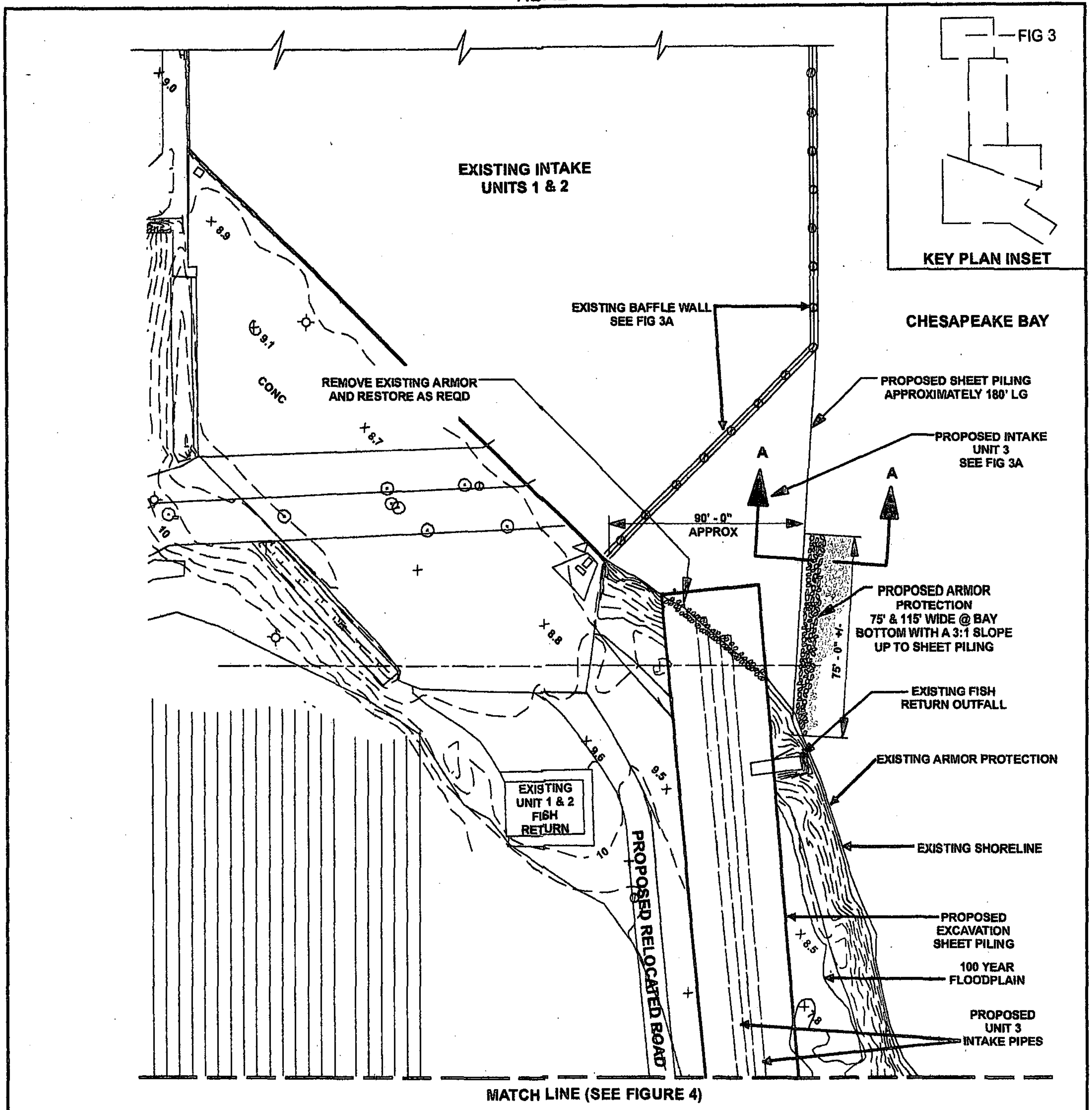

PURPOSE: PLANT EXPANSION

DATUM: (NGVD 29)

PROJECT LATITUDE/LONGITUDE:
38.424133
-76.441598

FIGURE 3
SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 1

SCALE IN FEET

0 50 100 Feet

CALVERT CLIFFS NUCLEAR POWER PLANT

IN:
PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD

DATE: 5/09/08 REV1 7/14/08

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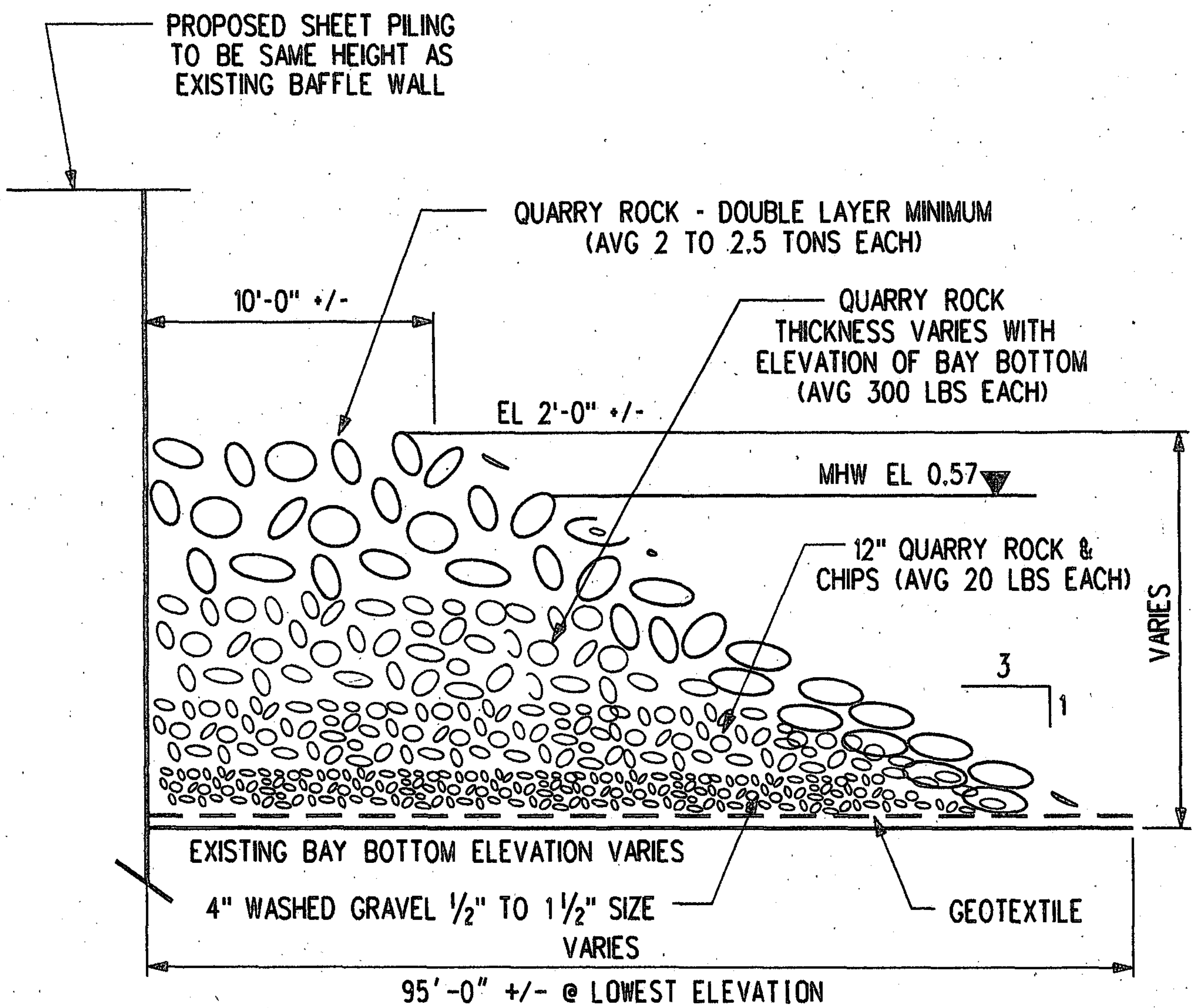


SEE FIGURE 3 FOR LENGTH OF PROPOSED ARMOR PROTECTION

SECTION A - A

PURPOSE: PLANT EXPANSION	FIGURE 3B PROPOSED ARMOR PROTECTION	CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 3
DATUM: (NGVD 29)		IN: PATUXENT/ WEST CHESAPEAKE BAY
PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	SCALE NOT TO SCALE	COUNTY OF: CALVERT STATE: MD APPLICATION BY: UNISTAR NUCLEAR ENERGY SHEET OF DATE:

RAI Number: 1001-15

ESRP 5.3.4 – 1

Provide a new graphic with a legible legend depicting the boundary of the NOB 19-2 (Natural Oyster Bar), the locations of the discharge area for Units 1 & 2, and the discharge pipe for proposed Unit 3, the historical thermal plume predictions for Units 1 & 2, the thermal plume predicted for Unit 3, and the proximity to the two recreational parks flanking the plant (Flag Ponds Park and Calvert Cliffs State Park). The scale should be such that it includes both the northern and southern boundaries of the plant and the entire NOB 19-2 boundary.

UniStar Response:

Subsequent to the issuance of the foregoing, a teleconference with USNRC Staff took place on 19 February, 2009 to discuss Graphics and Ecology. As a result of these discussions 2/19/2009 "notes" provided by USNRC clarified this question as follows: 2. RAI 1001, item ESRP 5.3.4-1, natural oyster bed. UniStar will provide historical data of Units 1 and 2 plume temperature.

The attachment, "Calvert Cliffs Nuclear Power Plant Thermal Discharge Study" was submitted to the Maryland Department of Environment (MDE) on 30 August, 2004. This report documents original physical modeling performed to study the discharge of heated water to the bay to select the most favorable operational conditions and physical arrangements for the plant in order to satisfy the requirements of Section 316 A for the plants National Pollution Discharge Elimination System (NPDES) Permit.

The original NPDES Permit allowed a 10 degree F (5.5 degree C) increase in condenser cooling water temperature. A summer time maximum temperature of 90 degrees F (32.2 degrees C) and a wintertime maximum of 60 degrees F (15.6 degrees C) was permitted. Later studies resulted in a permissible increase in condenser cooling water temperature of 12 degrees F (6.7 degrees C).

Operational studies were conducted to characterize the plants discharge in the context of the Maryland State mixing zone criteria. With an actual 12 degree F (6.7 degree C)temperature increase, the measured plume length at the 2 degree C isotherm was 1.81 km. The affected bottom area was measured to be 0.34 square km.

COLA Impact:

No changes to the COLA are required

Calvert Cliffs Nuclear Power Plant
Thermal Discharge Study

Calvert Cliffs Nuclear Power Plant is a two unit, pressurized water reactor, steam electric generating station located on the western shore of the Chesapeake Bay in Calvert County, Maryland. The NPDES discharge permit for the site, 02-DP-0187 (MD0002399) became effective June 1, 2004.

Special Condition 'Q' of the new permit contains the following requirement:

Thermal Discharge Study

1. Within three months after the effective date of the permit, the permittee shall submit to the Department for approval a study plan and schedule for determining compliance with state water quality standards for thermal discharges for Outfall 001. The study plan shall be implemented and the final results provided to the Department no later than 18 months after approval of the study plan by the Department.

2. In lieu of submitting a study plan, the permittee may substitute a re-evaluation of the existing study no later than three months after the effective date of the permit. If approved, the Department shall rescind the requirement to submit a study plan and perform a new study.

Calvert Cliffs has elected to perform a re-evaluation of the existing study.

Background:

Because of the concerns that arose when this first nuclear power plant was proposed on the Chesapeake Bay, considerable effort was applied to ensure the environmental impacts would be acceptable. In 1968, a scale model of a 34-mile long section of the Chesapeake Bay was constructed to study the discharge of heated water from the Calvert Cliffs plant site and select the most favorable combination of plant components and operations to minimize the impact of thermal discharges (Ref. 1). The plant was originally designed and licensed to increase the temperature of the condenser cooling water discharge ("delta T" or ΔT) by 10° F (5.5° C) or less (Ref. 2).

The Calvert Cliffs Nuclear Power Plant Unit 1 began commercial operation in May 1975 and Unit 2 in April 1977. The plant uses a once-through cooling system, utilizing large volumes of Bay water to condense steam after electricity is produced. Water is directed toward the plant through a deep, 1460m long channel. A baffle wall encloses the intake basin. Cooler, bottom water is drawn through openings in the wall 8.5m below the surface. Each of the two generating units has six water intakes and 12 traveling screens that keep objects and aquatic life from entering the plant. Cooling water is drawn through the plant by twelve, vertical, centrifugal pumps, each with a capacity of 200,000 gallons per minute. While the 2.4 million gallon per minute flow is significant, it represents only 0.7% of the tidal flow in the area of the plant (Ref. 2).

Thermal Studies:

The first NPDES permit (Permit number 74-DP-0187; 1974) limited the ΔT to 10° F and established a maximum discharge temperature of 90° F in the summer and 60° F in the winter. In 1978, a study was proposed to asses the physical and biological effects on the entrained and receiving waters in the vicinity of the plant if operations increased the delta T to 12° F (6.7° C) (Ref. 3).

A comprehensive assessment of the plant's thermal performance and impacts was conducted and included in a formal submittal to satisfy the requirements of Sections 316(a) and (b) of the Clean Water Act. The report, *Assessment of Thermal, Entrainment and Impingement Impacts on the Chesapeake Bay in the Vicinity of the Calvert Cliffs Nuclear Power Plant* (Ref. 4), was submitted in 1981 and established the current delta temperature (ΔT) limit of 12° F.

The thermal portion of this study involved dye tracer studies performed in April and August 1979. Phytoplankton and zooplankton entrainment studies were also performed during 1979 – 1980 when the ΔT approached 12° F. These studies showed no substantial changes from the earlier studies performed at maximum ΔT of 10° F. All of the studies were performed under full and steady plant load conditions.

The Maryland thermal mixing zone criteria for discharges to tidal waters has three components [See COMAR 26.08.03.03 (D)(1)(a-c)]. The results of the investigations indicate compliance by substantial margins.

a. <u>The length of the full-load 2° C isotherm may not exceed one-half the average ebb tide excursion</u>. Studies showed the maximum ΔT (12° F) produces a 2° isotherm length of 1.81 km, less than one-half the ebb tide excursion distance of 5.3 km.

b. <u>The 2° C full-load thermal barrier may not exceed 50% of the cross section of the receiving water body</u>. The width of the Bay between Kenwood Beach and Cove Point varies from 14.3 to 9.1 km. The plume length measured will always occupy less than 50% of this cross section.

c. <u>The bottom area touched by waters of the 2° C isotherm may not exceed 5% of the bottom area beneath the ebb tide excursion</u>. With an excursion of 5.3 km and an average estuary width of 11.7 km, the measured affected bottom area of 0.34 km^2 for the 12° F ΔT would amount to 0.5% of the bottom area swept by the average ebb tide.

Contributing to the effects (lack of) were: the still relatively low delta T, the short exposure time through the plant (approximately 4 minutes), the short generation time for phytoplankton and zooplankton, the low abundance of ichthyoplankton representing important species in the site vicinity , and the insignificant amount of water withdrawn by the site compared to the flow past the site.

As a result, the next NPDES permit (79-DP-0187; 1982) included the following Special Condition E - Thermal Compliance:

> The Permittee has conducted studies in accordance with COMAR 08.05.04.13C(2) to determine compliance with thermal discharge mixing zone criteria, to determine whether entrainment affects a spawning or nursery area of consequence, and to estimate impingement losses. The Plant was found to meet thermal mixing zone requirements, not to affect spawning or nursery areas of consequence, and to have a modest impingement loss. The present once-through cooling system is in compliance with COMAR 08.05.04.13 and continued use of the system will be permitted. Therefore, alternate effluent limitations as put forth in Section 316(a) of the Clean Water Act are not necessary.

Summary:

The design of the cooling water system has not changed since the studies noted above were performed. Cooling water system operation also has not changed since the studies were performed. The extensive studies submitted in 1981 demonstrated that Calvert Cliffs Nuclear Power Plant meets the thermal mixing zone requirements without any alternate effluent requirements. Since 1981, the regulatory requirements for thermal discharges have not changed, the thermal discharge from the Calvert Cliffs Nuclear Power Plant has not changed and the hydrographic conditions in the Chesapeake Bay have not changed. We suggest that sufficient evidence remains to support continued compliance with the thermal discharge standards and that no new studies are necessary.

References:

1. Lantz, C. H. 1969. Summary report of Calvert Cliffs model studies for Baltimore Gas & Electric Company. Alden Research Laboratories.

2. Baltimore Gas and Electric Company. 1970. Environmental Report – Calvert Cliffs Nuclear Power Plant. Report submitted to U. S. Atomic Energy Commission.

3. Academy of Natural Sciences of Philadelphia & Ecological Analysts, Inc. 1978. Study plan to conduct biological and hydrothermal studies at the Calvert Cliffs Nuclear Power Plant. Submitted by Baltimore Gas & Electric Company to the Maryland Department of Natural Resources.

4. Academy of Natural Sciences of Philadelphia. 1981. Assessment of Thermal, Entrainment and Impingement Impacts on the Chesapeake Bay in the Vicinity of the Calvert Cliffs Nuclear Power Plant.

RAI Number: 1001-16

ESRP 9.3 - 1

Provide a legible graphic with a legible legend depicting only the following attributes: Nine Mile point site boundary, proposed Unit 3 footprint, National wetlands inventory delineated wetlands, other delineated wetlands, and onsite streams and ponds.

UniStar Response:

In addition to the foregoing RAI question, extensive discussion took place during a teleconference with USNRC staff on 18 February 2009. During these discussions the important elements associated with this item were determined to be:

- To provide legible Graphics that would identify the regional location of the Nine Mile Point site.
- To provide a Graphic with a localized view of the site.
- To provide sufficient information on the site wetlands streams and ponds to enable an appropriate ecological analysis of the site.

Ultimately the requirements were summarized in the "Notes" of the 18 February teleconference to provide; "Tables and text describing the layout and acreage of site, plant footprint, and wetlands/streams should be provided."

Revised Figure 9.3-3 which is included in response to RAI 1001-33 clearly locates the Nine Mile Point site regionally. Rev. 0 of the Nine Mile Point COLA provides a site plan (Figure 2.1-1 – NMP3NPP Site and Proposed New Plant Layout) which clearly shows the footprint of the proposed plant. Figure 2.2-1 (Land Use at the Nine Mile Point Nuclear Station Site) shows the principal wetlands on the site and Figure 2.4-3 (Important Aquatic Species Habitat Communities in the Vicinity of NMP3NPP) shows the locations of on site streams and other water bodies. Table 2.2-1 (Land Use within the NMPNS Site) displays the site acreage associated with the plant as well as Wetlands and other Natural features. NMP3NPP COLA Rev. 0, Figures 2.1-1, 2.2-1, 2.4-3, Table 2.2-1 and descriptive text are included as an attachment to this RAI response.

It should be noted that more information than required or typically provided for "Reconnaissance Level" review of alternative sites is available for the Nine Mile Point site due to the COLA process associated with the proposed Nine Mile Point Unit 3 project. As such, this publicly available information is provided herein for completeness.

COLA Impact:

No changes to the COLA are required.

Figure 2.1-1—{NMP3NPP Site and Proposed New Plant Layout}

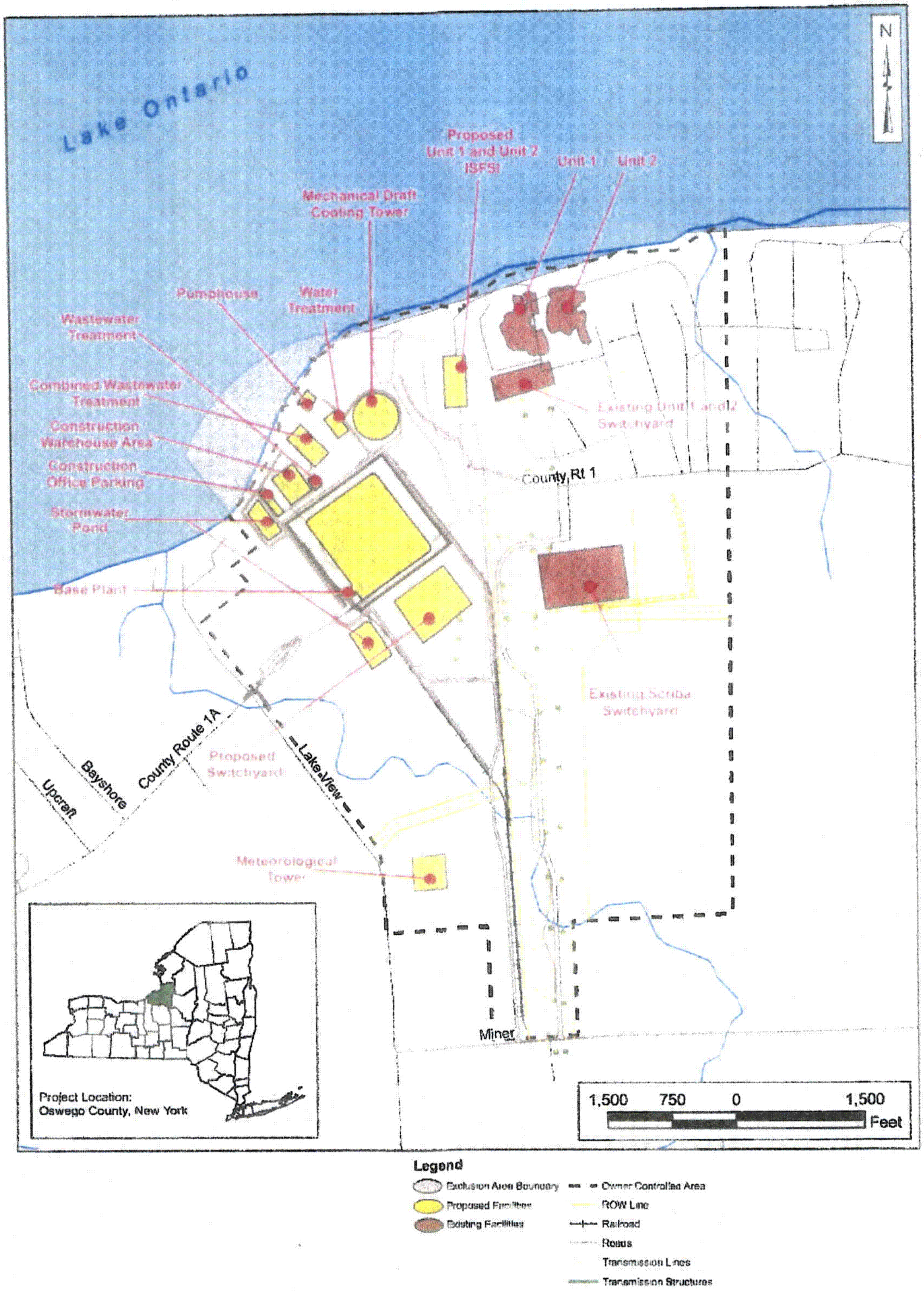


Figure 2.2-1—{Land Use at the Nine Mile Point Nuclear Station Site}

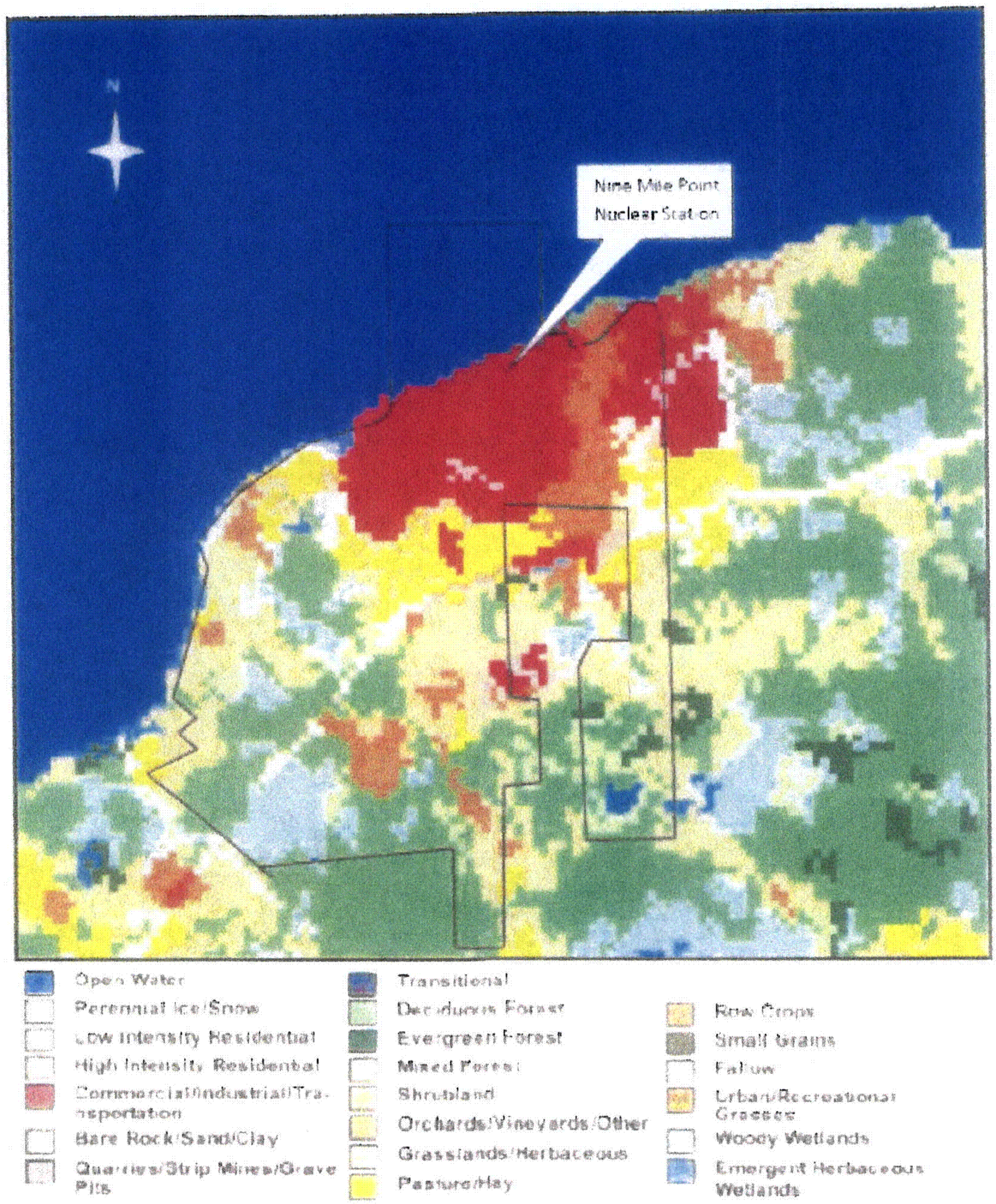


Figure 2.4-3—{Important Aquatic Species Habitat Communities in the Vicinity of NMP3NPP}

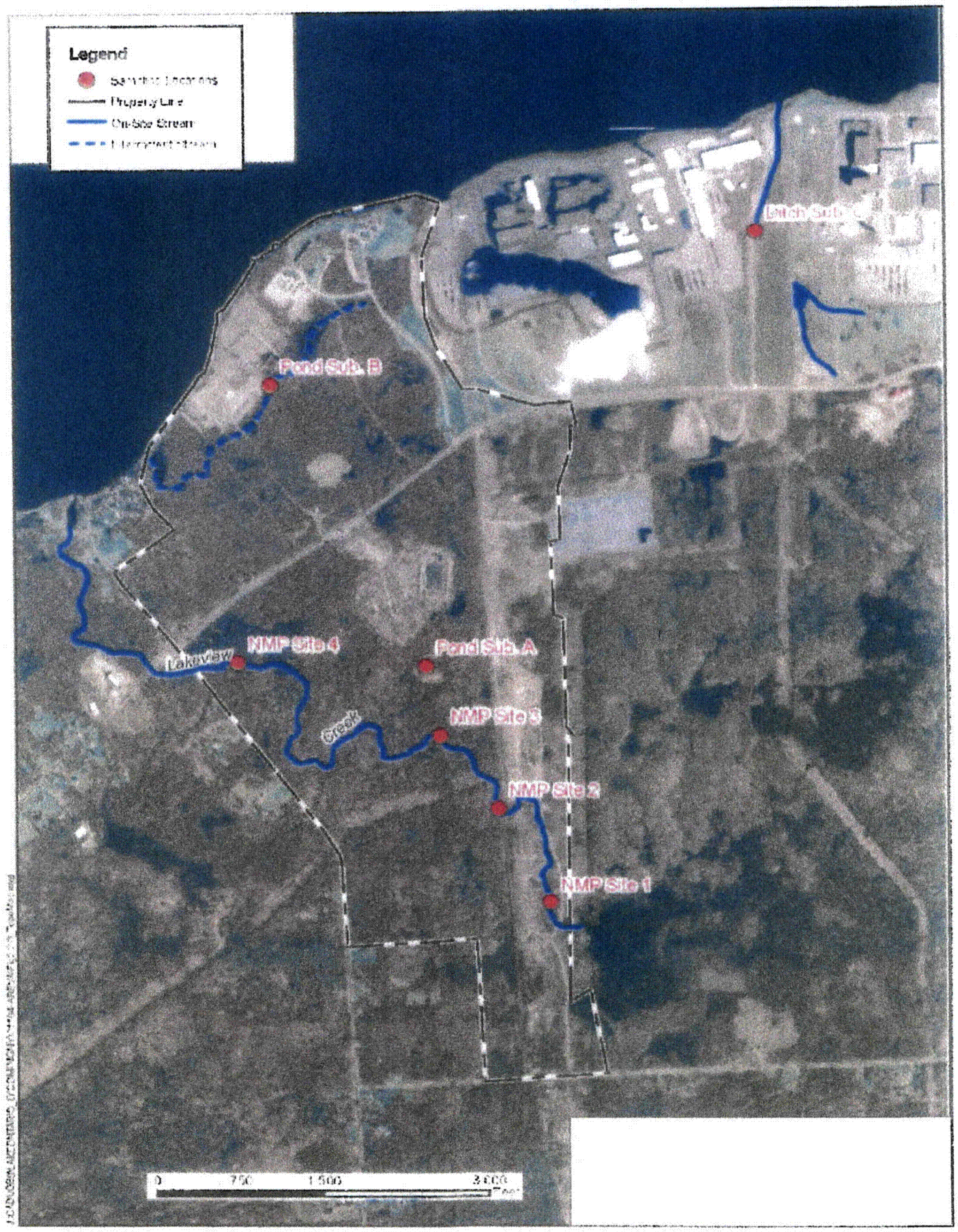


Table 2.2-1—{Land Use within the NMPNS Site}

Land Use Category	No. of Acres (ac)	No. of Hectares (ha)	Percent of Site (%)
Developed			
Heavy manufacturing	193	78	20.9
Communications	136	55	14.8
Recreation	18	7	1.9
Forest land			
Mixed forest	30	12	3.3
Deciduous forest	116	47	12.6
Rangeland			
Shrub and brush lands	255	104	27.7
Wetlands			
Shrub wetlands, bogs, marshes	26	10	2.7
Forested wetlands	35	15	3.8
Agricultural Land			
Active (orchard)	3	1	0.3
Inactive agriculture	109	44	11.8
Total	**921**	**373**	**100.0**

currently being exploited (OCEME, 2007). No hazardous waste storage or disposal sites are permitted by the state in the vicinity of the plant.

The majority of the 6 mi (10 km) radius surrounding NMPNS site is located in Lake Ontario. The Lake has a surface area (7,339 sq mi (1,908 sq km)) with a maximum depth of 802 ft (244.4 m) (GLP, 2008). The Lake is used recreationally as well as for commercial use. The shipping lanes for larger vessels do not come within the 6 mi (10 km) vicinity of the site.

The NMPNS site includes more than 1 mi (1.6 km) of shoreline on Lake Ontario. Approximately 188 ac (76 ha) of the property is occupied by the existing main plant structures, facilities and cooling towers (NMP, 2004) (NMP, 2006). Areas within the 494 acres (200 ha) selected for NMP3NPP include the Energy Information Center, picnic area, training facility (NMP Learning Center), a former construction and demolition landfill, and a firing range for purposes of training security personnel (NMP, 2004). The remaining area consists of undeveloped forest lands and the existing transmission line right-of-way. Based on wetland delineations conducted on-site in 2007 and 2008. (USDA, 2008a), one third of the proposed development area meets the definition of wetlands under the US Army Corps Criteria. The site is generally flat with small gently rolling hills with elevations ranging from 246 ft (75 m) above mean sea level (msl) at the shoreline to about 301 ft (91.7 m) above msl near the southern end of the developed portion of the site.

The NMP3NPP site is surrounded by Lake Ontario to the north and west, forested and agricultural land to the south, and the NMP Unit 1 and Unit 2 and JAFNPP to the east. Directly neighboring the station to the west is the Ontario Bible Camp, a non-profit Christian retreat, which rents cabins along the shore of Lake Ontario.

Located within the Town of Scriba, the vicinity is primarily rural with large areas of forested land and farmland (NMP, 1984). According to the US Census Bureau, approximately 7,331 people reside in Scriba. The largest city within the vicinity is the neighboring City of Oswego and contains about 17,954 residents (USCB, 2000). This city has a well-developed zoning plan and supporting zoning laws in place for land located inside the city limits. The Town of Scriba is one of the industrial centers of Oswego County, particularly for energy production. In addition to Nine Mile Point and the adjacent JAFNPP, two other fossil fuel power plant are also located in Scriba. This latter site occupies an area encompassing 190 ac (77 ha) located approximately 2 mi (3 km) west of the NMPNS site (NMP, 2004).

Six other smaller towns, villages and unincorporated areas are located wholly or partially within the vicinity of the NMPNS site, including: the Town of Mexico (9 mi (14.5 km), southeast), the Town of New Haven (5 mi (8 km), southeast), and the unincorporated villages of Lycoming (3 mi (4.8 km), southeast), Walker (5 mi (8 km), southwest), Demster (8 mi (12.9 km), southeast), and Texas (7 mi (11.3 km), east). The distances are based upon measurements between the site center points to the towns' center. The Town of Mexico has established Zoning or Land Use laws in place, including areas zoned for agriculture, residential or of business purposes.

The Town of Scriba is currently in the planning process for approving existing land use and zoning ordinances (OCDCDTP, 2007). However, existing land use maps illustrate a combination of medium to high industrial use adjacent to wetlands, forested areas and agricultural uses. The portion of the site not used for construction of NMP3NPP is planned to remain as forest, wetland or abandoned farmland. Since NMP Unit 1 and Unit 2 are within the State of New York's Coastal Zone, Federal-level zoning restrictions require Nine Mile Point 3 Nuclear Project, LLC. to comply with Section 307(c)(3)(A) of the Coastal Zone Management Act (16 USC 1456[c][3][A]). The Coastal Zone Management Act of 1972 (CZMA) grants the National Oceanic and Atmospheric Administration (NOAA) the authority to encourage and assist states and

RAI Number: 1001-17

ESRP 9.3 - 2

Provide a legible graphic with a legible legend depicting only the following attributes: R.E. Ginna site boundary, proposed Unit 3 footprint, National wetlands inventory delineated wetlands, other delineated wetlands, and onsite streams

UniStar Response:

In addition to the foregoing RAI question, extensive discussion took place during a teleconference with USNRC staff on 18 February 2009. During these discussions the important elements associated with this item were determined to be:

- To provide legible graphics that would identify the regional location of the R.E.Ginna site.
- To provide a graphic with a localized view of the site.
- To provide sufficient information on the wetlands streams and ponds to enable an appropriate ecological analysis of the site.

Ultimately the requirements were summarized in" Notes" of the 18 February teleconference to provide "Tables and text describing the layout and acreage of the site, plant footprint, and wetlands/streams should be provided".

Revised Figure 9.3-3 which is included in response to RAI 1001-33 clearly locates the R.E.Ginna site regionally. The License Renewal Application for the R.E.Ginna site (NUREG-1437, Supplement 14, January 2004) provides both 50 mile and 6 mile regional plans (Figures 2-1 and 2-2 respectively) and the accompanying text identifies the location, size and setting of the existing plant including the principal surface water features in the vicinity of the site. Figure 2-4 depicts the site boundary, the footprint of the existing plant, transmission lines, surface water and other site features. The footprint of the proposed new Unit at the Ginna site has not been specifically located but it would be on the western portion of the site. It is clear that much of the 488 acre (197 ha) would be used to accommodate a proposed new Unit which with associated development would probably occupy 300 acres (121 ha) or more.

The enclosed document describes the surface waters on the site which includes Deer Creek a wet-weather stream and Mill Creek which flows intermittently to Lake Ontario. These surface waters and associated wetlands would likely be affected by the construction of an additional Unit at the site. The need for and extent of any mitigation would necessarily be addressed should the Ginna site be developed.

It should be noted that more information than required or typically provided for "Reconnaissance Level" review of alternative sites is available for the Ginna site due to the License Renewal process associated with the existing Ginna unit. As such, this publicly available information is provided herein for completeness.

COLA Impact:

No changes to the COLA are required.

2.0 Description of Nuclear Power Plant and Site and Plant Interaction with the Environment

The R.E. Ginna Nuclear Power Plant (Ginna) is located 6 km (4 mi) north of Ontario, New York, in the northwest corner of Wayne County and on the south shore of Lake Ontario. The Ginna site is approximately 32 km (20 mi) east of the city of Rochester and 64 km (40 mi) west-southwest of Oswego, New York. The plant consists of one unit equipped with a nuclear steam supply system supplied by Westinghouse Electric Corporation that uses a pressurized water reactor (PWR) and a once-through cooling system. The plant and its environs are discussed in Section 2.1, and the plant's interactions with the environment are presented in Section 2.2.

2.1 Plant and Site Description and Proposed Plant Operation During the Renewal Term

The immediate area around the Ginna site is rural. There are no substantial population centers, industrial complexes, airports, transportation arteries, or parks within a 5-km (3-mi) radius of the site, and the only recreational facility within this radius is the Bear Creek boat ramp located about 2.4 km (1.5 mi) east of the site. The largest community within 16 km (10 mi) of the site is Webster, located in Monroe County. Webster, with a town population of about 38,000, is about 11 km (7 mi) west-southwest of the site (RG&E 2002a). The largest metropolitan area within an 80-km (50-mi) radius is Rochester, which is approximately 32 km (20 mi) west of the site and has a population of about 220,000. Figures 2-1 and 2-2 show the location of Ginna in relationship to the counties and important cities and towns within an 80-km (50-mi) and 10-km (6-mi) radius, respectively.

The Rochester Gas and Electric Corporation (RG&E) owns the Ginna site. The site has increased from 137 ha (338 ac) in 1972 to the present size of 197 ha (488 ac), and correspondingly, the shoreline extent has increased from about 1.6 km (1 mi) to 2.4 km (1.5 mi).

There are three occupied farmhouses on the site that are owned by RG&E, and the occupants have leases that are renewable annually at the option of RG&E. There are a number of unoccupied buildings on the site. With the exception of some physical security improvements, there are no plans for additional building onsite. The physical security improvements are not related to license renewal.

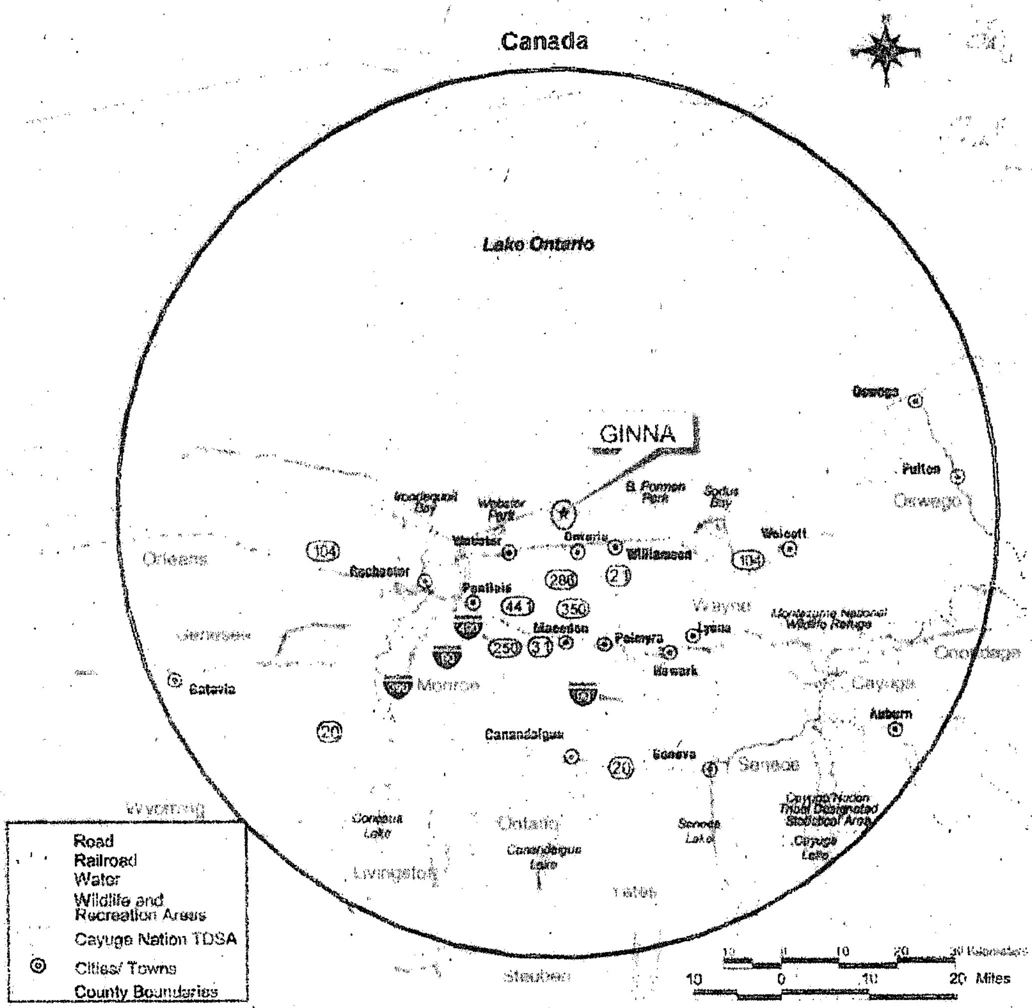


Figure 2-1. Location of R.E. Ginna Nuclear Power Plant, 80-km (50-mi) Region

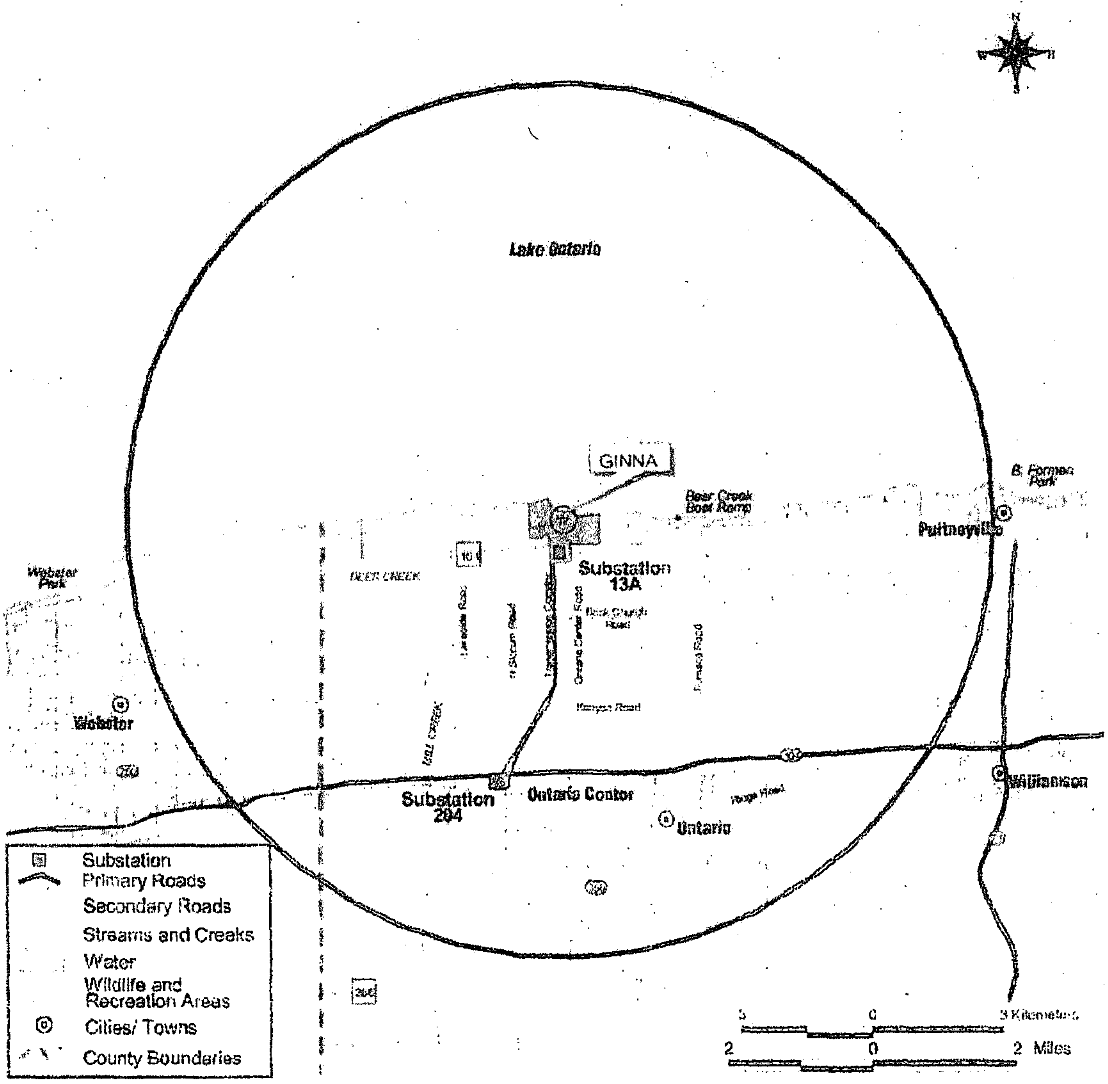


Figure 2-2. Location of R.E. Ginna Nuclear Power Plant, 10-km (6-mi) Region

The surface of the terrain at the Ginna site on the south shore of Lake Ontario and to the east and west is either flat or gently rolling. The elevation of the site increases to the south from about 78 m (255 ft) above mean sea level (msl) near the edge of Lake Ontario; to 134 m (440 ft) at New York State (NYS) Route 104, which is 5.5 km (3.5 mi) south of the lake; and then to about 488 m (1600 ft) at the northern edge of the Appalachian Plateau, which is 48 to 64 km (30 to 40 mi) to the south. Southward from NYS Route 104, the topography gradually changes to a series of small abrupt hills commencing about 16 km (10 mi) south of the site. Surface-water features on the site are limited to Mill Creek and Deer Creek, which enter the site from the south and west, respectively. These two creeks join southwest of the plant and empty into Lake Ontario just east of the plant. The general plant area is relatively well drained, with no topographic basins or swampy areas on the site. All drainage, both surface and subsurface, ultimately flows toward the lake.

2.1.1 External Appearance and Setting

The plant is visible from Lake Road (County Route 101), which borders the site in an east-west direction approximately 518 m (1700 ft) south of the plant. A distinctive design feature of the plant is a facade that conceals the dome of the reactor containment building, thus minimizing the aesthetic impact of the plant on the surrounding community. The area around the site is rural and the agricultural production and undisturbed land onsite enhances this appearance.

Major structures in addition to the reactor building are the auxiliary building, intermediate building, control building, turbine building, screen house, condensate demineralizer building, standby auxiliary feedwater pump building, and the service building containing offices, shops, and laboratories. Figure 2-3 identifies the major buildings on the site.

The Ginna site is located in the lake plain, a slender band of land bordering Lake Ontario that is about 8 to 48 km (5 to 30 mi) wide. The terrain is flat-to-rolling and contains numerous short streams that flow northward directly into Lake Ontario (AEC 1973). The surrounding region has agricultural land and rural communities.

2.1.2 Reactor Systems

The Ginna reactor is a pressurized light-water-moderated and -cooled system designed by Westinghouse Electric Corporation. The system has two identical heat-transfer closed loops, each of which includes a reactor coolant pump and a steam generator connected to the reactor vessel. Ginna began commercial operation in July 1970 at a licensed output of 1300 megawatts thermal power (MW[t]) and at 420 MW net electrical power (MW[e]). On March 1, 1972, on the basis of additional safety and environmental evaluations, the licensed output was increased to 1520 MW(t) and the net electrical output was increased to 490 MW(e).

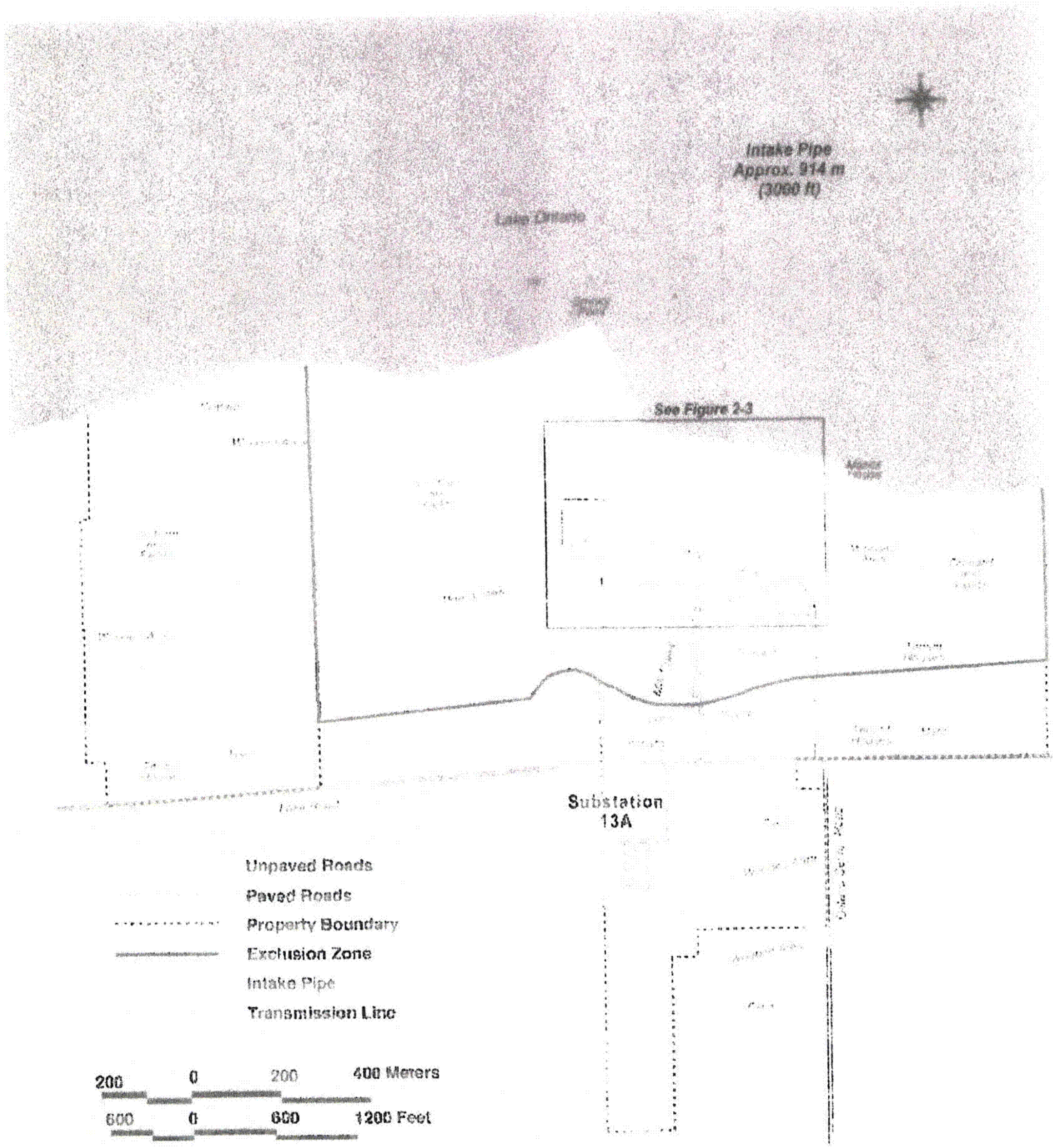


Figure 2-4. R.E. Ginna Nuclear Power Plant Transmission Lines

Table 2-1. R.E. Ginna Nuclear Power Plant Transmission Lines Right-of-Way

Substation	Number of Lines	kV	Approximate Distance		Corridor Direction	Corridor Width		Corridor Area	
			km	mi		m	ft	hectares	(acres)
204 (Fruitland)	4	115	5.6	3.5	South	152	500	85	212

Source: RG&E 2002a

2.2 Plant Interaction with the Environment

Sections 2.2.1 through 2.2.8 provide general descriptions of the environment near Ginna. Detailed descriptions also are provided, where needed, to support the analysis of potential environmental impacts of refurbishment and operation during the renewal term, as discussed in Chapters 3 and 4. Section 2.2.9 describes the historic and archaeological resources in the area, and Section 2.2.10 describes possible impacts of other Federal project activities.

2.2.1 Land Use

Ginna is in the town of Ontario, New York, in the northwest corner of Wayne County and on the south shore of Lake Ontario. Surface-water features onsite are limited to Mill Creek, which enters the site from the south, and Deer Creek, which enters the site from the west. These two creeks join southwest of the plant and empty into Lake Ontario just east of the plant.

Ginna is about 32 km (20 mi) east of the center of Rochester and 64 km (40 mi) west-southwest of Oswego. The immediate area around the site is rural. There are no substantial population centers, industrial complexes, airports, transportation arteries, or parks within a 4.8-km (3.0-mi) radius. The largest community within 16 km (10 mi) of the site is Webster, located in Monroe County approximately 11.2 km (7.0 mi) west-southwest, with a town population of about 38,000 (RG&E 2002a). The largest metropolitan area within 80 km (50 mi) is Rochester, with a population of about 220,000. Approximately, 48 percent of the workforce at Ginna live in Wayne County and 44 percent live in Monroe County. The remaining 8 percent live elsewhere.

The 197-ha (488-ac) Ginna site is owned by RG&E. The land at the site and along the transmission line right-of-way is zoned by the town of Ontario for limited industrial uses, while adjacent lands are zoned for large lot residential uses (exceeding 1858 m^2 [20,000 ft^2). The original site area was 134 ha (338 ac) at the time of preparation of the 1972 Environmental Report for Ginna (RG&E 1972). During July 1976, approximately 49 ha (122 ac) of additional land was acquired from an adjoining farm, and another 6.7 ha (16.0 ac) was purchased during 1988 on the western side of the site. Correspondingly, the shoreline extent has increased from about 1.6 to 2.4 km (1.0 to 1.5 mi). Approximately half of the site is leased and currently is used for agricultural production, primarily apple orchards and, to a lesser degree, corn and hay fields. Another quarter of the site has been left relatively undisturbed, having a combination of open fields, shrub brush, and trees. The remaining quarter of the site has been developed for the power station and ancillary facilities, with about 10 ha (25 ac) enclosed within the security fences.

There are three occupied farm houses on the Ginna site, one of which has an occupied out-building. These houses are owned by RG&E, and the occupants have leases that are renewable annually at the option of the RG&E. Two of the houses are located 1250 m (4100 ft) and 884 m (2900 ft), respectively, southwest of the plant, while the third house and its associated out-building are about 701 m (2300 ft) and 579 m (1900 ft) southeast of the plant, respectively. All are located beyond the exclusion area boundary.

Unoccupied buildings owned by RG&E include the Brookwood Estate Manor House (used as an employee meeting facility) and garage, located about 274 m (900 ft) east of the plant and fronting the lake; horse barns (used for storage), located about 457 m (1500 ft) south of the plant; and a house (used as a fitness-for-duty center), located about 488 m (1600 ft) south of the plant. While there are currently no plans for further development on the site, additional security features have been added, primarily along the perimeter of the plant area. The addition of these security features are unrelated to and independent of license renewal.

Webster Park, a 223-ha (550-ac) Monroe County park on the south shore of Lake Ontario, is approximately 9.6 km (6.0 mi) west of the site. Facilities include a fishing pier, campground, day-use shelters, lodges and cabins, picnic areas, tennis courts, baseball and soccer fields, hiking, and cross-country ski trails. Approximately 56 km (35 mi) from Ginna, in southeastern Wayne County along the border with Cayuga and Seneca counties, is the Montezuma Wetlands Complex. The 14,569-ha (36,000-ac) complex includes the Federally owned Montezuma Wildlife Preserve, state-owned Northern Montezuma Wildlife Management Area, lands owned by conservation groups, and private property. The area contains marshes and impoundments, forested wetlands, old fields, meadows, farm fields, and woodlands (RG&E 2002a).

2.2.2 Water Use

Lake Ontario is the source of water for cooling and most auxiliary water systems. Ginna uses a once-through condenser cooling system with a submerged offshore intake and a surface in July (NOAA 2002). Normal minimum temperatures range from -8.5°C (17.0°F) in January to 15.6°C (60.0°F) in July.

The regional prevailing winds are from the west-southwest. Based on monitoring data for the period 1992 to 1994 at Ginna, local winds are predominantly from south to west-northwest with the peak direction from the south-southwest. The average annual precipitation measured at ROC is 86.31 cm (33.98 in.). Based on statistics for the 30 years from 1954 through 1983, the probability of a tornado striking the site is expected to be about 2×10^{-6} per year (Ramsdell and Andrews 1986).

Locally, weather systems coming from Canada tend to pick up moisture as they cross Lake Ontario and deposit it within 24 to 32 km (15 to 20 mi) of the shoreline. Regional snowfall, as recorded at ROC, averages approximately 236 cm (93 in.) per year. Locations closer to the lake, such as the Ginna site, tend to experience many "lake-effect" snow showers and may have more snowfall than recorded at ROC.

Wind energy potential along the shore of Lake Ontario in the vicinity of Ginna is rated as 3 to 4 on a scale of 1 to 7, with a rating of 5 estimated to exist offshore (Elliott et al. 1986). These ratings indicate that wind is a viable energy resource in the area.

The air quality in the region is designated as better than national standards, in attainment, or unclassified for all criteria pollutants in 40 CFR 81.316 and 40 CFR 81.328. The nearest area of nonattainment is Niagara County, New York, which is classified as marginal for ozone (EPA 2003a). There are no mandatory Class I Federal areas in which visibility is an important value designated in 40 CFR Part 81 within 160 km (100 mi) of Ginna. According to the 1991 to 2000 data from the EPA, the number of days when the air quality index was greater than 100 for ozone in the Rochester Metropolitan Statistical Area (i.e., "Poor Air Quality") ranged from a low of 0 in 1993 and 1996 to a high of 16 in 1991 (EPA 2003b). The EPA reports 1 day in 2001 when the air quality index for ozone was higher than 100 for this area.

Emissions from diesel generators, boilers, and other activities and facilities associated with Ginna operations are regulated under New York State and Federal regulations. Emissions from these Ginna sources are lower than the thresholds specified in the applicable New York State and Federal air quality regulations. Therefore, RG&E is not required to have air quality permits for Ginna.

2.2.5 Aquatic Resources

Aquatic resources in the vicinity of Ginna are associated with Lake Ontario, which is the smallest of the Great Lakes and the eleventh largest lake in the world in terms of volume. The lake is approximately 306 km (190 mi) long by 80 km (50 mi) wide, with a surface area of about 19,000 km^2 (7340 mi^2). The maximum depth is 244 m (802 ft) and the mean depth is 86 m (283 ft), which is greater than the other Great Lakes, except Lake Superior. Depths of 12 to 30 m (40 to 100 ft) are within 0.6 to 1.2 km (1.0 to 2.0 mi) off the southern shore in the area of Ginna. The major source of water for the lake is from Lake Erie via the Niagara River. Water flows from Lake Ontario via the St. Lawrence River to the Atlantic Ocean. The predominant surface currents in front of the station are west to east, and the flows tend to swing towards the southern shoreline (RG&E 2002a).

There are also two creeks that cross the property of the station and the southern shore of Lake Ontario. Mill Creek crosses the site from the south and flows into Deer Creek. Deer Creek enters the site from the west, joins with Mill Creek, and then flows into Lake Ontario. Deer Creek is a wet-weather stream that dries up in the summer months so there is no direct flow into Lake Ontario during that time of the year (RG&E 2002a). Mill Creek, while flowing year-round, does not have sufficient flow to cross over a rise in the land around the mouth of the creek during the summer months. Flow from Mill Creek is possible through the subsurface; however, aquatic organisms could not easily swim in and out of Mill Creek to Lake Ontario during the summer. These creeks do not receive water from Ginna on a routine basis except for occasional storm water runoff. There is an onsite surface impoundment for emergency use that could discharge into Deer Creek.

The aquatic resources associated with Ginna, especially those in Lake Ontario, are an important resource for fishing, recreation, navigation, tourism, and conservation. Currently, the principal fish in Lake Ontario's offshore pelagic fish community are alewife (*Alosa pseudoharengus*) and Atlantic rainbow smelt (*Osmerus m. mordax*), and their salmonid predators, including Chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*) and Atlantic salmon (*Salmo salar*), lake trout (*Salvelinus namaycush*), rainbow trout (*O. mykiss*), and brown trout (*Salmo trutta*). Other less abundant pelagic species include threespine stickleback (*Gasterosteus aculeatus*), emerald shiner (*Notropis atherinoides*), and gizzard shad (*Dorosoma cepedianum*) (Schaner et al. 2002). The principal fish in the offshore benthic community include lake trout, lake whitefish (*Coregonus clupeaformis*), and slimy sculpin (*Cottus cognatus*). Additional species include burbot (*Lota lota*), round whitefish (*Prosopium cylindraceum*) and deepwater sculpin (*Triglopsis thompsonii*) (Hoyle and Schaner 2002). The salmon and trout populations are maintained chiefly by stocking programs conducted by the NYSDEC and the Ontario Ministry of Natural Resources. While these stocking programs were initially designed to control non-native fish overpopulation, the salmon and trout are now an important commercial and recreational resource resulting in annual expenditures of over $70 million (Kraft and Carothers 2002).

The Lake Ontario fish community that existed when Ginna began operations during the early 1970s reflected the changes to the fishery over the previous 150 years. The Lake Ontario fishery has been significantly altered over the past 150 years due to frequent introductions of non-native species. Non-native species such as the alewife, rainbow smelt, burbot, threespine stickleback, and several salmon species have profoundly altered the Lake Ontario fishery over the past 100 years. Between the mid-1800s and the early 1970s, populations of important species such as lake sturgeon (*Acipenser fulvescens*), Atlantic salmon, lake trout, lake herring (*Coregonus artedi*), burbot, and deepwater ciscoes (*C. johannae*) had all collapsed. This collapse has been attributed to such factors as overfishing, invasion of sea lamprey (*Petromyzon marinus*), habitat loss, and degraded water quality or eutrophication. The open lake fish community in 1970 was dominated by planktivores such as alewife and smelt due to the lack of large predatory species. Annual alewife die-offs were common at that time, which contributed to the impaired conditions of the lake and shoreline. During the mid-1970s, New York State and the Province of Ontario instituted a salmonid stocking program of up to 8 million fish per year aimed at using the extensive forage base of alewife and smelt. For the next 20 years, this program was very successful in both developing a world-class sport fishery on Lake Ontario as well as controlling the forage fish population (RG&E 2002a).

Water quality in Lake Ontario has changed since the initial plans for Ginna during 1972. There has been a substantial decrease in nutrient loading (particularly phosphorus) and a decline of persistent toxic chemicals. As the water quality has improved, the aquatic community has responded. Other factors in the change of the aquatic resources within the lake over time include control measures for alewife (including the salmonid stocking program), the introduction of non-native aquatic species, ongoing anthropogenic impacts, and natural climate variability (RG&E 2002a).

Evidence of the recent changes in aquatic resources can be seen in the dramatic drop of fish abundance, increases in *Cladophora* sp. (algae), and increases in non-native mollusks of the genus *Dreissena* (zebra and quagga mussels). Fish abundance decreased substantially around 1977 when controls for alewife started to take effect. While numbers of fish have decreased based on data collected by RG&E and by the NYSDEC, the diversity of aquatic species has not changed as much and even appears in the last 4 years to be increasing around Ginna. *Cladophora* sp. have been noted to be growing at greater depths in Lake Ontario as the water clarity has improved over the last decade. Mollusks have also been found to be increasing in numbers based on studies by RG&E and by the NYSDEC (RG&E 2002a).

Ichthyoplankton (fish eggs and larvae) studies conducted at the Ginna site during 1977 and 1978 characterize the site with respect to utilization of the Lake Ontario shoreline adjacent to the Ginna site for fish spawning and as a nursery area. More than 90 percent of the fish larvae found during both years were alewives. Also found both years, in the 1-5 percent range, were carp/goldfish (*Cyprinus carpio/Carassius auratus*), smelt, and Johnny darters (*Etheostoma nigrum*). All of these species are common components of the local fish community, and typical of the fish communities found along the near shore areas of Lake Ontario's southern shoreline. Conversely, there were no indications that the Ginna site area was unique to, or preferred by, any species as a spawning or nursery area.

Ginna is not adjacent to any significant bays or other habitat features that may provide unique or important spawning or nursery areas. Studies conducted within Lake Ontario near Chaumont, Sodus, and Irondequoit Bays during 1997 and 1998, show that alewife continues to dominate the ichthyoplankton population and that alewife-spawning locations are ubiquitous. Of particular interest, given the dramatic reduction in productivity within the lake, is the fact that alewife larval densities found during both the late 1970s and the late 1990s were within the same order of magnitude. This indicates the density of alewife larvae available for recruitment have remained fairly constant over time. Further, these recent studies found similar species to those collected at the Ginna intake during the 1970s, and generally support the previously stated conclusions concerning the spawning, nursery, and habitat conditions of the Ginna site (RG&E 2002a).

There are no aquatic species Federally listed as threatened or endangered under the Endangered Species Act (ESA) in the vicinity of Ginna. Through consultation with U.S. Fish and Wildlife Service (FWS), no aquatic species (fish, mollusks, or plants) were identified in Wayne County or any counties near Wayne County (FWS 2002).

There are two State-listed aquatic species known to occur within Wayne County (Table 2-2). Through discussions with NYSDEC, one endangered fish was determined to be near Wayne County (NYSDEC 2003a). The pugnose shiner (*Notropis anogenus*) was reported from Sodus Bay of Lake Ontario, approximately 32 km (20 mi) west of Ginna. However, the pugnose shiner has not been reported near Ginna, nor has it ever been captured during studies conducted by RG&E (RG&E 2002a). The lake sturgeon is a threatened species within New York state and might be found near Ginna (NYSDEC 2003a). One sturgeon was netted several years ago by NYSDEC at Pultneyville, a village approximately 9.6 km (6 mi) east of Ginna. No sturgeon has ever been reported from the vicinity of Ginna (RG&E 2002a).

Table 2-2. Aquatic Species Listed by the New York State Department of Environmental Conservation as Endangered, Threatened, or of Special Concern Known to Occur Within Wayne County, New York

Scientific Name	Common Name	State Status
Fish		
Notropis anogenus	pugnose shiner	Endangered
Acipenser fulvescens	lake sturgeon	Threatened

Source: (NYSDEC 2003a).

2.2.6 Terrestrial Resources

The Ginna site lies within the eastern great lakes/Hudson lowlands ecoregion (Omernik 1987). Prior to European settlement, the area was dominated by beech-maple forest that was typical of the region. Throughout the region, much of this forest type has been converted to other vegetation types, primarily various forms of farmland such as orchards, pastures, or crop land (AEC 1973).

The site and its associated transmission line right-of-way are surrounded by a variety of very typical habitat types found in central and western New York state: mature woodlands, meadows, and early- and late-stage old fields. In addition, significant acreage is farmed for grains or is in use for apple production. Portions of the property and the transmission line right-of-way are currently farmed under a lease arrangement with local residents. The other "natural" areas within the boundaries of the site are left to go through the natural succession process and are not actively managed by the applicant (RG&E 2002a). There are no State or Federally regulated wetlands found either at the Ginna site or on the transmission line right-of-way.

The wildlife species that occur at the Ginna site and transmission line right-of-way are also very typical of those found in similar habitats throughout central and western New York state. Whitetail deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), gray squirrel (*Sciurus carolinensis*), cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), grey (*Urocyon cinereoargenteus*) and red fox (*Vulpes vulpes*), Eastern chipmunk (*Tamias striatus*), and meadow vole (*Microtus pennsylvanicus*) are commonly found mammals. Numerous bird species, including the ring-necked pheasant (*Phasianus colchicus*), American kestrel (*Falco sparverius*), screech owl (*Otus asio*), blue jay (*Cyanocitta cristata*), bluebird (*Sialia sialis*), American goldfinch (*Carduelis tristis*), and crow (*Corvus brachyrhynchos*), are common. Amphibians common to the site include American toad (*Bufo americanus*), leopard frog (*Rana pipiens*), green frog (*R. clamitans*), and wood frog (*R. sylvatica*). Reptiles include the eastern garter snake (*Thamnophis s. sirtalis*) and ribbon snake (*T. sauritus*) (Dames and Moore 1971).

No Federally listed threatened or endangered terrestrial species are known to occur in the vicinity of Ginna or its associated transmission line right-of-way. Table 2-3 lists species known to occur or potentially occur in Wayne County. Bald eagles (*Haliaeetus leucocephalus*) will occasionally be observed in the vicinity, but the nearest known nesting site is approximately 88 km (55 mi) southeast near Montezuma National Wildlife Refuge (NYSDEC 2003a).

RAI Number: 1001-18

ESRP 9.3 - 3

Provide a legible graphic with a legible legend depicting only the following attributes: the former Thiokol site boundary, proposed facility footprint, National wetlands inventory delineated wetlands, other delineated wetlands, and onsite streams (Rich Neck Creek, Tom Swamp Run), and the interconnected reaches of the watershed, including Burnt Mill Creek and McIntosh Run. It should also show the nearest public roadways, and the distance to and the approximate line of route of piping access to the Patuxent River.

UniStar Response:

In addition to the foregoing RAI question, extensive discussion took place during a teleconference with the USNRC staff on 18 February 2009. During these discussions the important elements associated with this item were determined to be:

- To provide legible Graphics that would identify the regional location of the former Thiokol site.
- To provide a localized view of the site
- To provide sufficient information on the site wetlands streams and ponds to enable an appropriate ecological analysis of the site.

Ultimately the requirements were summarized in the "Notes" of the 18 February teleconference to provide "Tables and text describing the layout and acreage of site, plant footprint and wetlands/streams should be provided.

Revised Figure 9.3-4, which is included in response to RAI 1001-34, clearly locates the former Thiokol site regionally.

A response to the foregoing questions is contained in the attachment, which consists of UniStar's response to USACE Information Request Dated 10/28/08, Question 2. This includes a Thiokol Site Figure and a Table of Wetlands and Stream Impacts as well as a discussion of land use, wetlands affected, the cooling water pipeline right of way and the 500 kV transmission corridor.

COLA Impact:

No changes to the COLA are required.

Application NAB-2007-08123-M05
Response to U.S. Army Corps of Engineers Information Request Dated 10/28/08
Calvert Cliffs 3 Project, LLC and UniStar Nuclear Operating Services, LLC
Revision 1 - February 27, 2009

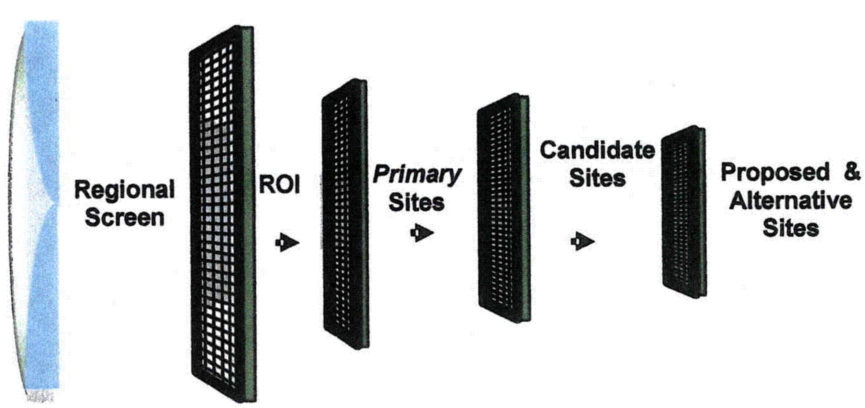
Question 2

A detailed analysis of alternative locations for the proposed project or any of the alternate energy sources that would have less impact to wetlands and waterways. Data collected using resource mapping is acceptable and should be noted as appropriate in all evaluations.

RESPONSE

Alternate energy sources (Wind, Geothermal, Hydropower, Solar Power, Wood Waste, Municipal Solid Waste, Energy Crops, Petroleum liquids (Oil), Fuel Cells, Coal, Natural Gas, Integrated Gasification Combined Cycle (IGCC)) were evaluated and determined to be non-viable energy sources for various reasons as described in Section 9.2 of the Calvert Cliffs (CCNPP) Unit 3 Environmental Report (ER) and in response to Question 1 of USACE letter dated 10/28/08. As such, a detailed analysis of how these alternate energy sources would have less impact to wetlands and waterways is unnecessary since these alternate energy sources are not considered to be viable energy options.

The alternatives analysis implements a multi-phase process in which initial Regions of Interest (ROIs) are identified and screened for "Potential" sites based on a high level set of criteria, further screening identifies "Candidate" sites based on a finer, more detailed, set of criteria and, finally, "Final" sites are selected and analyzed in detail.



The initial ROI is selected based on regulatory and strategic objectives. These include but are not limited to the following:

- Proximity to major population centers (that is, not located in an area with greater than or equal to 300 persons per square mile [ppsm]).
- Proximity of adequate transmission lines (that is, within approximately 30 miles (mi) [48.3 kilometer {km}) of 345- or 500-kV transmission lines). Per the EPR standard grid connection design, 345- or 500-kV transmission lines are needed.
- Lack of a suitable source for cooling water (that is, within 15 mi [24.10 km] of an adequate source for cooling water).
- Dedicated land (that is, not located within areas such as national and state parks, historic sites, and tribal lands).

Further screening is based on NRC site suitability and technical requirements as well as NEPA requirements for the consideration of alternative sites (e.g., reasonable range of alternatives and explicit consideration of environmental issues) and leads to the determination of potential sites. This screening includes but is not limited to the following:

- Consumptive use of water should not cause significant adverse effects on other users.
- The proposed action should not jeopardize Federal, State, and affected Native American tribal listed threatened, endangered, or candidates species or result in the destruction or adverse modification of critical habitat.
- There should not be any potential significant impacts to spawning grounds or nursery areas of populations of important aquatic species on Federal, State, and affected Native American tribal lists.
- Discharges of effluents into waterways should be in accordance with Federal, State, regional, local, and affected Native American tribal regulations and would not adversely affect efforts to meet water-quality objectives.
- There should be no preemption of or adverse impacts on land specially designated for environmental, recreational, or other special purposes.
- There would not be any potential significant impact on terrestrial and aquatic ecosystems, including wetlands, which are unique to the resource area.
- There are no other significant issues that preclude the use of the site.

Next, screening of the potential sites involves the scoring and ranking based on a discrete set of criteria of each site. This resulted in selection of the following four candidate sites:

- Calvert Cliffs Nuclear Power Plant Unit 3
- Nine Mile Point Nuclear Power Plant Unit 3
- R.E. Ginna Nuclear Power Plant Unit 2
- Former Thiokol Site (brownfield site in Maryland)

Section 9.3 of the CCNPP Unit 3 COLA, Revision 4a, which addresses the site alternatives analysis is currently being updated and will be provided once the update is complete.

SUPPLEMENTAL RESPONSE

The former Thiokol site which originally contained over 700 acres, now encompasses approximately 618 acres (ac) [250 hectares (ha)] of land in St. Mary's County, southern Maryland (Figure 1). The subject site is bordered by woodland, scattered agricultural parcels, Maryland Route 235 (northern boundary), and a forested wetland slough (portion of eastern boundary). Surface waters located on-site are Rich Neck Creek and Tom Swamp Run, including their interim tributaries, which flow through the heavily wooded property generally to the south and southwest toward the Potomac River. Surface waters near the former Thiokol site include the Patuxent River and Chesapeake Bay to the northeast and the Potomac River to the west.

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetlands Mapper (map resource database) was accessed to determine the total area of surface waters, including wetlands, present on the 618 acres (ac) [250 hectares (ha)] former Thiokol site. The area of the project including switch yard, power block and laydown would be approximately 257 acres (ac) 104 hectares (ha) exclusive of service roads and support facilities which would add to the total acreage required. In addition, 67 acres (ac) 27.114 (ha) of the site is identified as being a special reserve area that are to remain undisturbed. The NWI map data identifies that approximately 49.2 ac (19.9 ha) of non-tidal wetlands and approximately 14,411 linear feet (lf) (4,392 m) of stream channel occur within the site boundary. The majority of these stream channels are imbedded within the aforementioned forested wetland sloughs. The Federal Emergency Management Agency (FEMA) floodplain maps show no flood zones within the subject site (FEMA, 2009).

The Patuxent River would be the main source of cooling water at the former Thiokol site. In addition, the Patuxent River would also handle the discharge from the former Thiokol site such as ESW and CWS cooling tower blowdown, inlet water processing (membrane filtration) wastewater and other miscellaneous low volume wastewater. The river is located in St. Mary's County, approximately 3 mi (4.8 km) north of the subject site. As such, a pipe (intake/discharge) corridor consisting of a series of pipes would most likely be constructed between the northern edge of the subject site and the southern shore of the Patuxent River. The pipe (intake/discharge) corridor would be established along an existing roadway/right-of-way to minimize impacts to surface waters. This pipe corridor would need to cross Maryland Route 235, a primary arterial road, and would most likely have to be trenched. The total area of the pipe corridor and associated structures would be approximately 25.1 acres (10.2 ha). NWI map data identifies that the pipeline corridor would include approximately 0.4 ac (0.2 ha) of wetlands.

A 500 kV transmission line is also proposed for the project. As such, an electric power line right-of-way would be required. The right-of-way would be constructed between the southern portion of the subject site and an existing 500kV line located approximately 2 mi (3 km) to the southeast of the site. The total area of the power line right-of-way and associated structures would be approximately 85.07 acres (ac) or 34.43 hectares (ha). NWI map data identifies that the power line right-of-way includes approximately 15.8 ac (6.4 ha) of wetlands and 4,200.8 lf (1,280.4 m) of stream channel.

Based on a "Reconnaissance Level" effort of scope, an impact evaluation was conducted which arranged the footprints of the major project permanent and construction facilities (Construction Access Road, three Laydown Areas, Switch Yard, Power Block, Cooling Tower, and Water Intake) such that the proposed facilities would be designed to minimize encroachment into areas delineated as wetlands or other waters of the U.S. Based on the proposed site development plan (footprint), the total area of impacted wetlands on the former Thiokol site would be 13.9 ac (5.6 ha). An additional 0.4 ac (0.2 ha) and 15.8 ac (6.4 ha) of wetlands would be impacted by the construction of the pipeline corridor and the 500 kV transmission line, respectively. The total length of impacted stream channels on the former Thiokol site would be 2,315.7 lf (705.8 m). An additional 4,200.8 lf (1,280.4 m) of stream channel would be impacted by the construction of the transmission line. The total wetland impacts for the entire project build-out would be 30.1 ac (12.3 ha), while the total stream channel impacts would be 6,516.5 lf (1,986.2 m). No impacts to wetlands or stream channels would occur from the construction of the Cooling Tower, Switch Yard, and Water Intake. No impacts to stream channels would occur from the construction of the Power Block, Pipe Corridor, or Laydown Area 2. The proposed project would permanently impact wetlands and stream features.

Table 1 below presents the potential impacts to surface waters as a result of the "Reconnaissance Level" development of the former Thiokol site and the construction of the pipe (intake/discharge) corridor and the 500 kV transmission line. These impact values are based on the available NWI map data. All impacts are presumed to be permanent except for those associated with the transmission line which are assumed to be temporary.

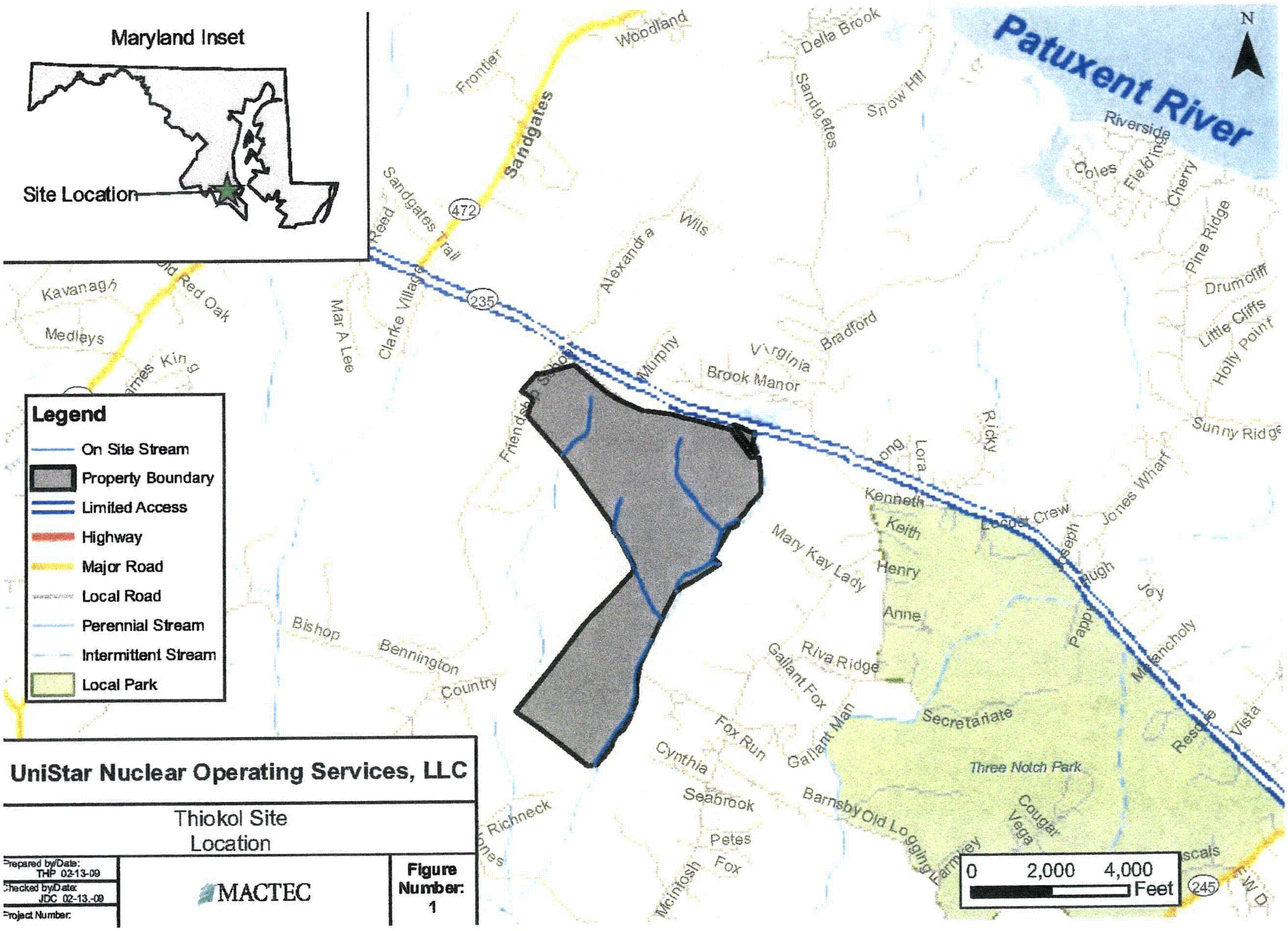
In summary, the Thiokol Site is inferior to that of the Calvert Cliffs site in that wetland impacts are fewer at Calvert Cliffs (11.72 ac). In addition, the Calvert Cliffs site is located on the Chesapeake Bay, a larger body of water than the Patuxent River, and provides direct access for the intake/discharge pipes. At the Calvert Cliffs site, the existing transmission line corridor is wide enough to accommodate the new line coming out of the proposed facility and will not result in additional impacts to wetlands or streams. Finally, two "Special Reserve Areas" exist on the former Thiokol site, which may include special restrictions requiring these areas to remain undisturbed. The boundaries of these areas were delineated by others with involvement from the federal government and the MDE. The "Special Reserve Areas" are to remain undisturbed; i.e., Maryland land records may include special restrictions on these areas. No "Special Reserve Areas" occur on the Calvert Cliffs site.

Per discussions with USACE, K. Anderson, no additional "Reconnaissance Level" information was required for the Nine Mile Point Nuclear Power Plant Unit 3 or R.E. Ginna Nuclear Power Plant Unit 2 alternative sites.

Table 1
Potential Impacts to Surface Waters (Wetlands and Streams) from Development of the Former Thiokol Site, Pipe (Intake/Discharge) Corridor, and 500 kV Transmission Line, St. Mary's County, Maryland

Facility Element	Wetland Impacts Acre (hectare)	Stream Impacts Linear Feet (meter)
Thiokol Site	13.9 ac (5.6 ha)	2,315.7 lf (705.8 m)
Construction Access Road	0.6 (0.2)	30.6 (9.3)
CSW Cooling Tower	None	None
Laydown Area 1	6.1 (2.5)	1,276.7 (389.1)
Laydown Area 2	0.2 (0.1)	None
Laydown Area 3	4.4 (1.8)	1,008.4 (307.4)
Power Block	2.6 (1.1)	None
Switch Yard	None	None
Water Intake	None	None
Pipe (intake/discharge) Corridor	0.4 (0.2)	None
Transmission Line (temporary wetland conversion)	15.8 (6.4)	4,200.8 (1,280.4)
Total Impacts	**30.1 (12.3)**	**6,516.5 (1,986.2)**

ALTERNATE SITE LOCATION
FORMER THIOKOL SITE



RAI Number: 1001-19

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 2.2-2.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

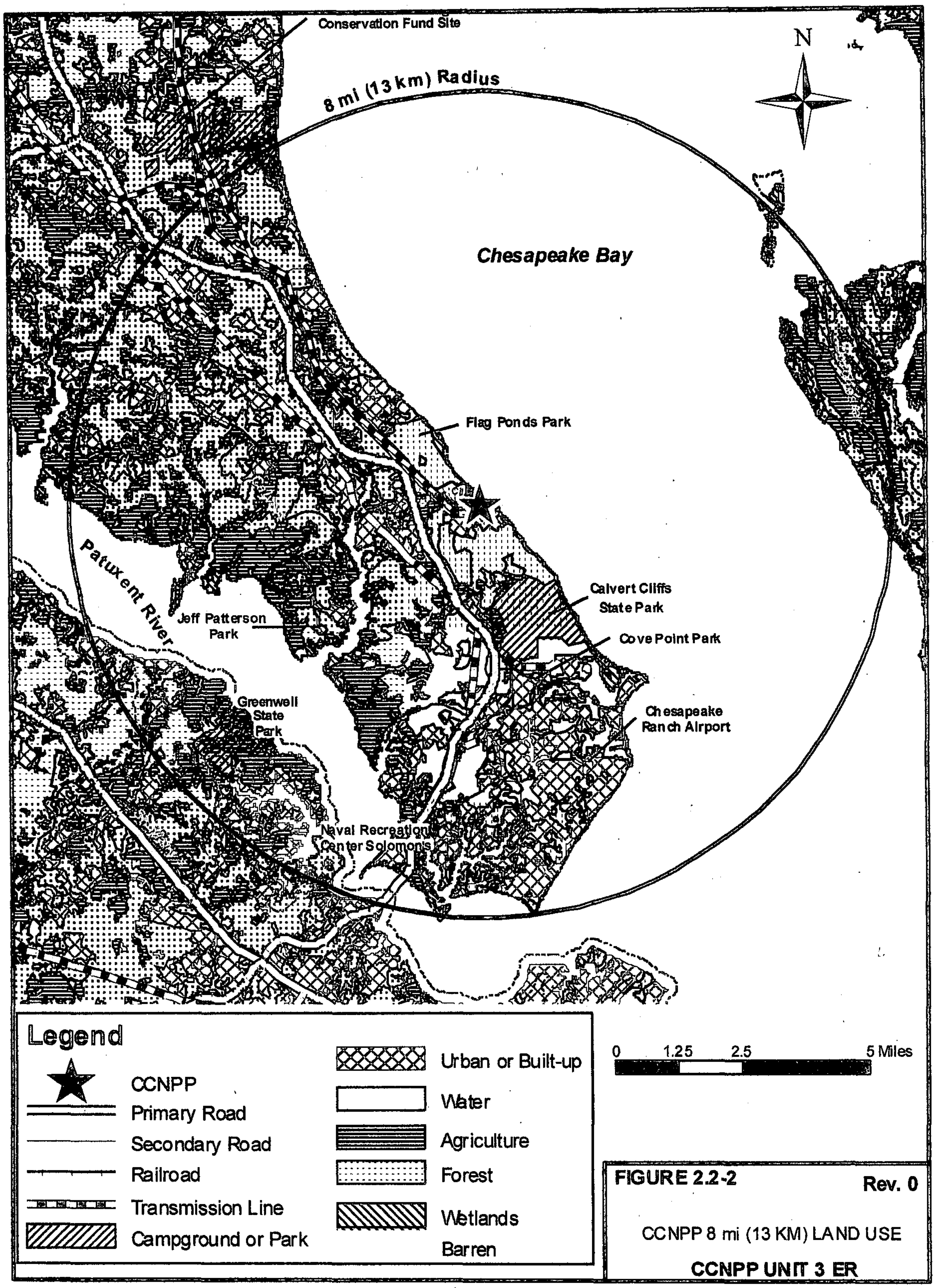


FIGURE 2.2-2 Rev. 0

CCNPP 8 mi (13 KM) LAND USE

CCNPP UNIT 3 ER

RAI Number: 1001-20

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 2.2-9.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

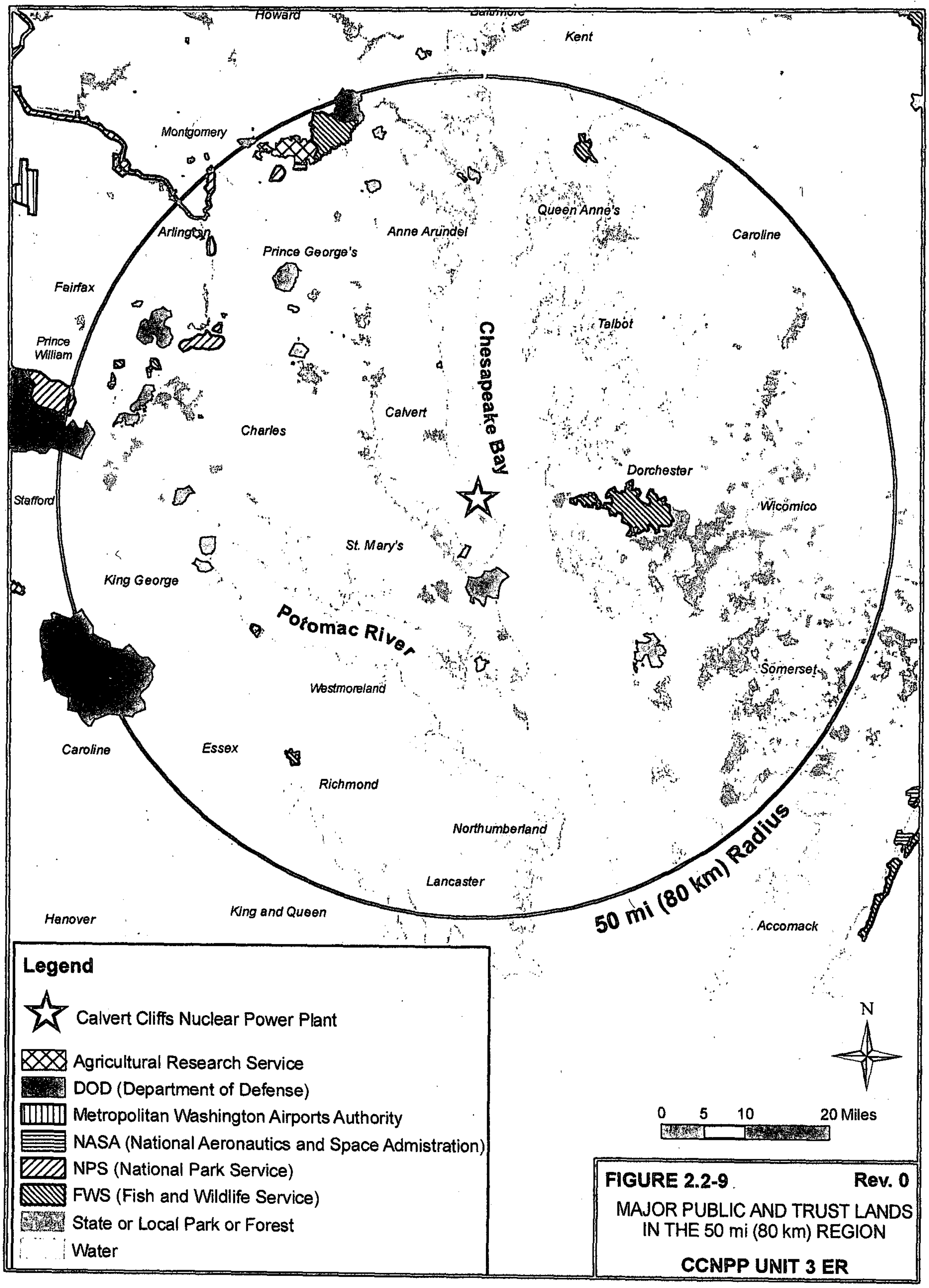


FIGURE 2.2-9 **Rev. 0**

MAJOR PUBLIC AND TRUST LANDS IN THE 50 mi (80 km) REGION

CCNPP UNIT 3 ER

RAI Number: 1001-21

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 2.3-1.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

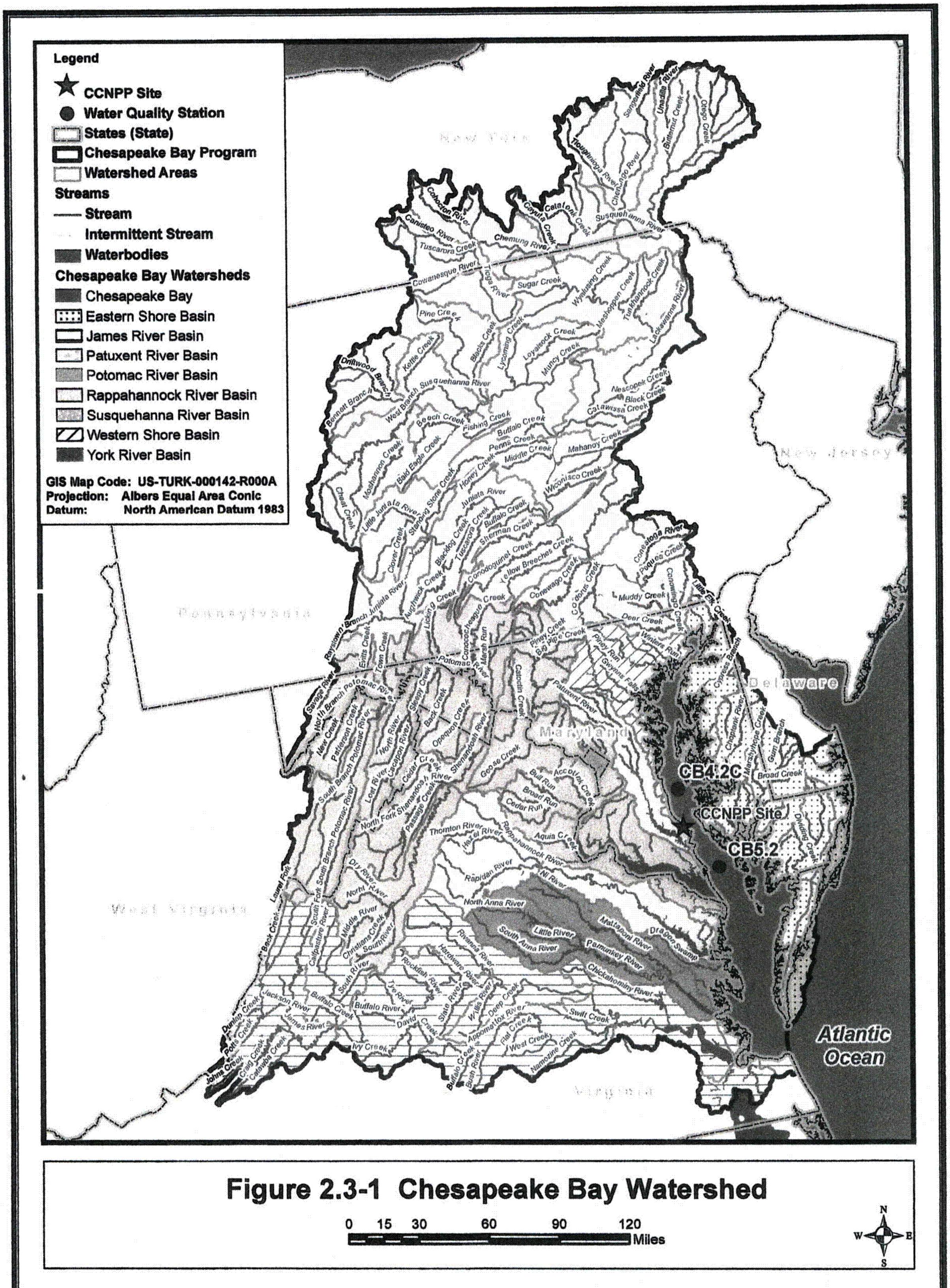


Figure 2.3-1 Chesapeake Bay Watershed

RAI Number: 1001-22

ESRP Various – Graphics to be in color but reproducible in black and white:

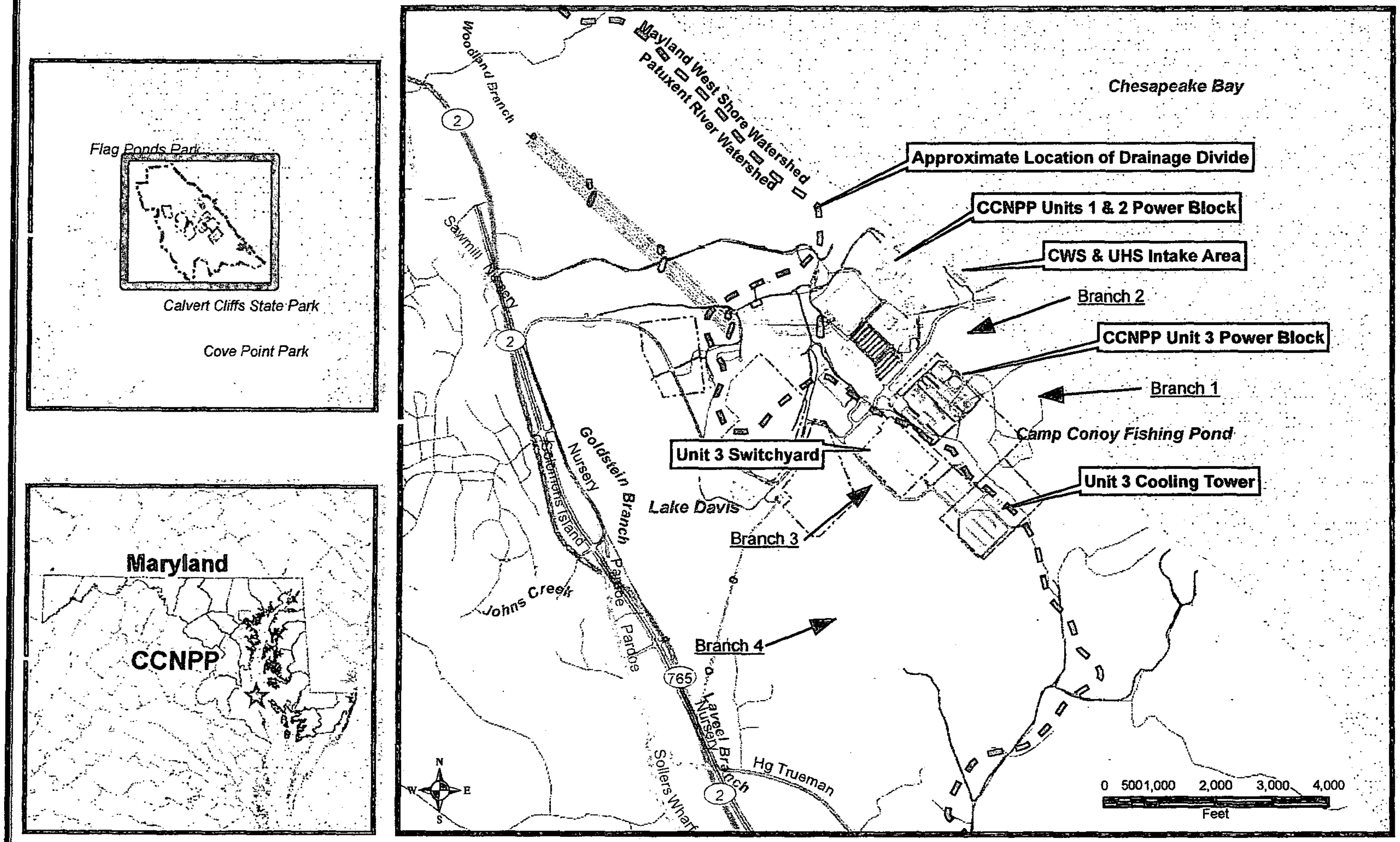
Provide legible graphics or GIS data for ER Figure 2.3-2.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



GIS Map Code: US-CALV-000105-R000B
Projection: Maryland State Plane
Datum: North American Datum 1927
Display: Calvert Cliffs Plant Grid

Figure 2.3-2 - CCNPP Site Area Topography

Watershed Boundary; Transmission Lines; Planned Structures; Future Land Use; Calvert Cliffs Site Boundary; Unit 3 Discharge Pipeline; Roads; Existing Structures; Waterbodies

RAI Number: 1001-23

ESRP Various – Graphics to be in color but reproducible in black and white:

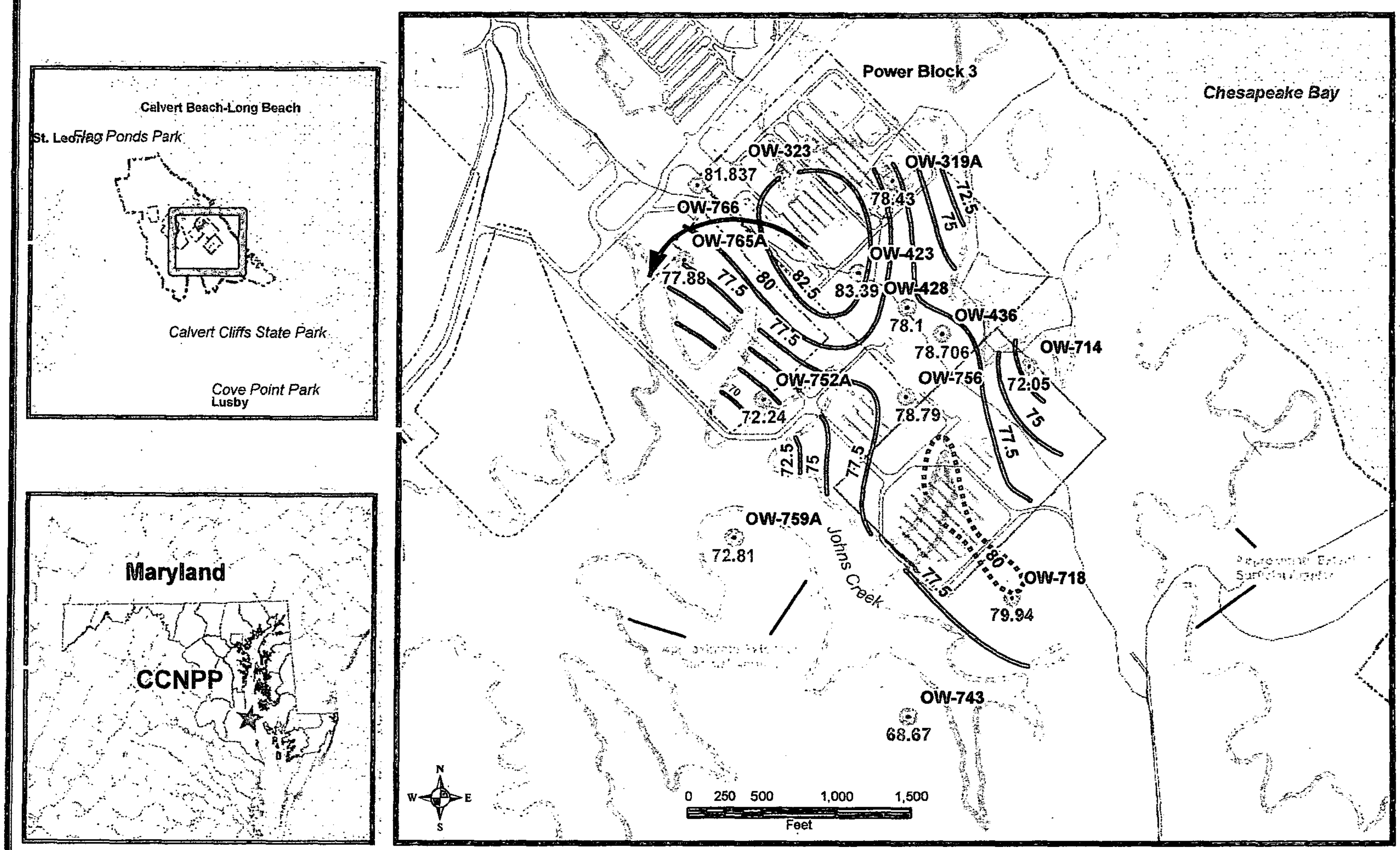
Provide legible graphics or GIS data for ER Figure 2.3-42.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



GIS Map Code: US-CALV-000118-R000D
Projection: Maryland State Plane
Datum: North American Datum 1927
Display: Calvert Cliffs Plant Grid

Figure 2.3-42 - Water Table Elevation Map and Groundwater Flow Direction for the Surficial Aquifer, July 2006

Surficial Aquifer Elevation (ft)
Interpolated Aquifer Elevation (ft)
Surficial Aquifer Wells
Elevation (10 ft interval)
Elvation (50 ft interval)
Suficial Aquifer Extent
Roads
Planned Structures
Existing Structures
Future Land Use
Waterbodies
Calvert Cliffs Site Boundary

RAI Number: 1001-24

ESRP Various – Graphics to be in color but reproducible in black and white:

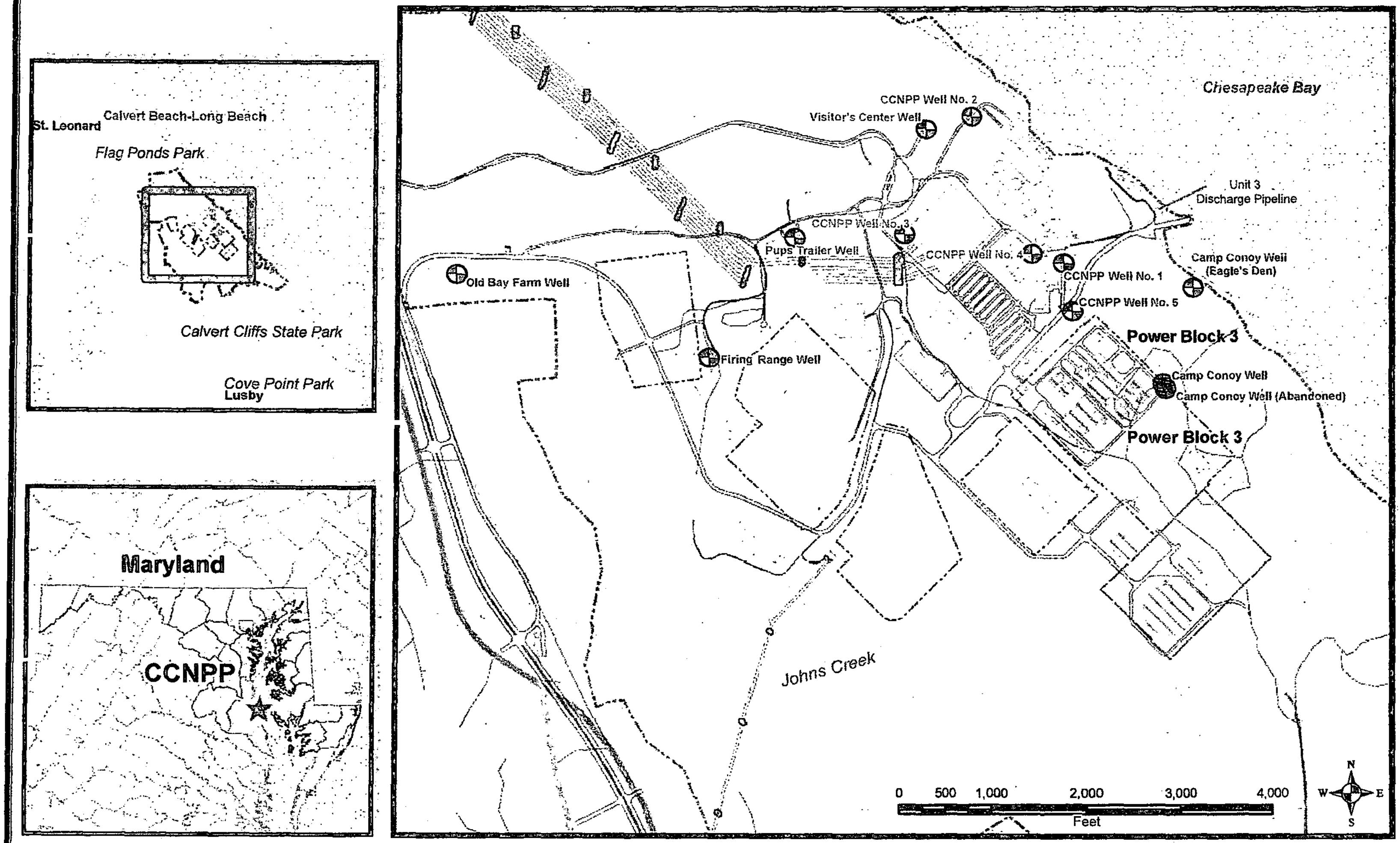
Provide legible graphics or GIS data for ER Figure 2.3-68.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



GIS Map Code: US-CALV-000102-R000C
Projection: Maryland State Plane
Datum: North American Datum 1927
Display: Calvert Cliffs Plant Grid

Figure 2.3-68 - CCNPP Water Production Wells

CCNPP Production Wells · Transmission Lines · Planned Structures · Future Land Use · Calvert Cliffs Site Boundary · Unit 3 Discharge Pipeline · Roads · Existing Structures · Waterbodies

RAI Number: 1001-25

ESRP Various – Graphics to be in color but reproducible in black and white:

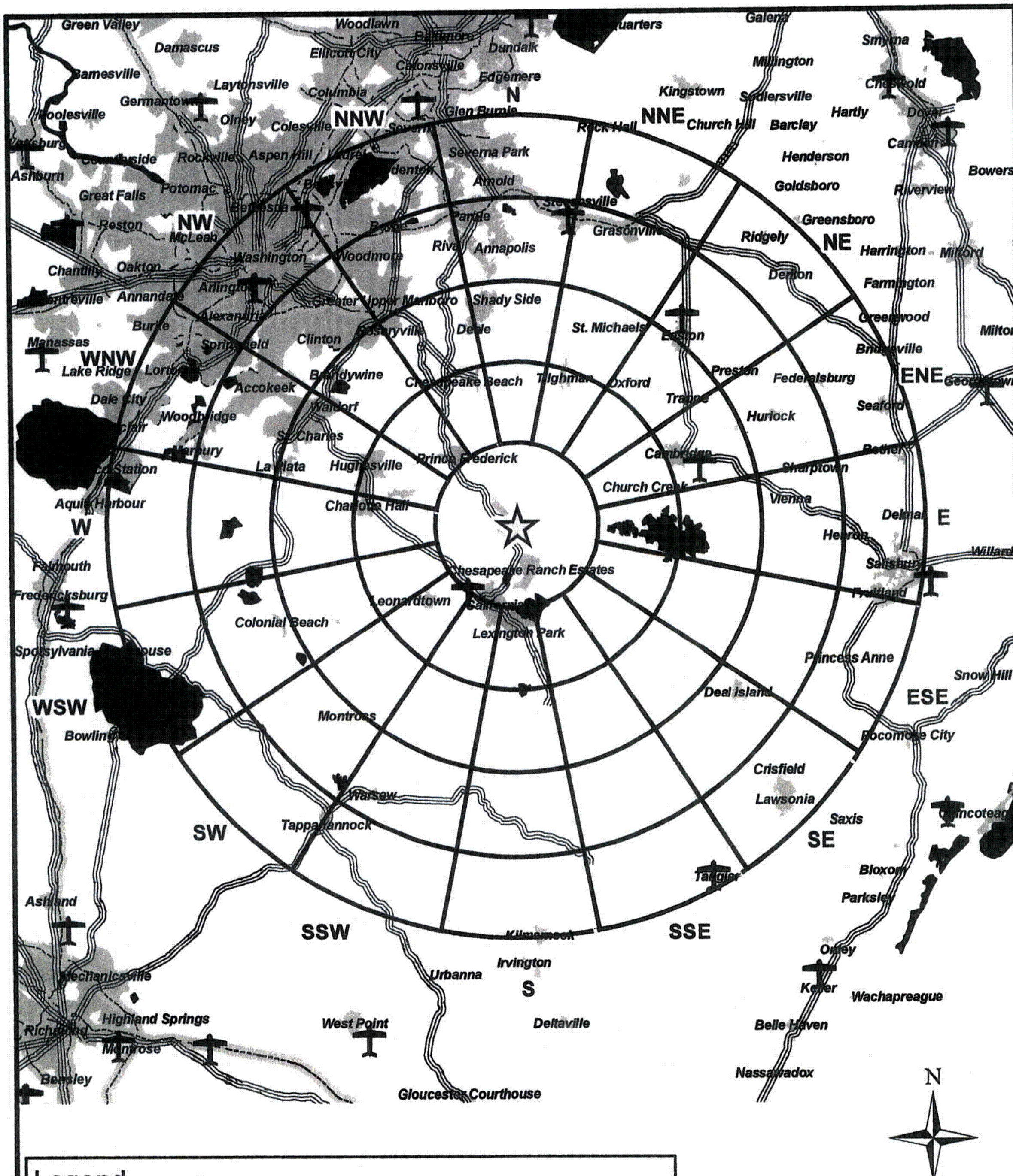
Provide legible graphics or GIS data for ER Figure 2.5-1.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



Legend

- Calvert Cliffs Nuclear Power Plant
- Airport
- Primary Highway with Limited Access
- Primary Highway
- Populated Places
- Federal Land

Miles
0 5 10 20 30

FIGURE 2.5-1 **Rev. 0**

CCNPP SITE 50 mi (80 km) VICINITY

CCNPP UNIT 3 ER

RAI Number: 1001-26

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 2.5-3.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See response to RAI 1001-4.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached markups in response to RAI 1001-4.

RAI Number: 1001-27

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 2.5-7.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

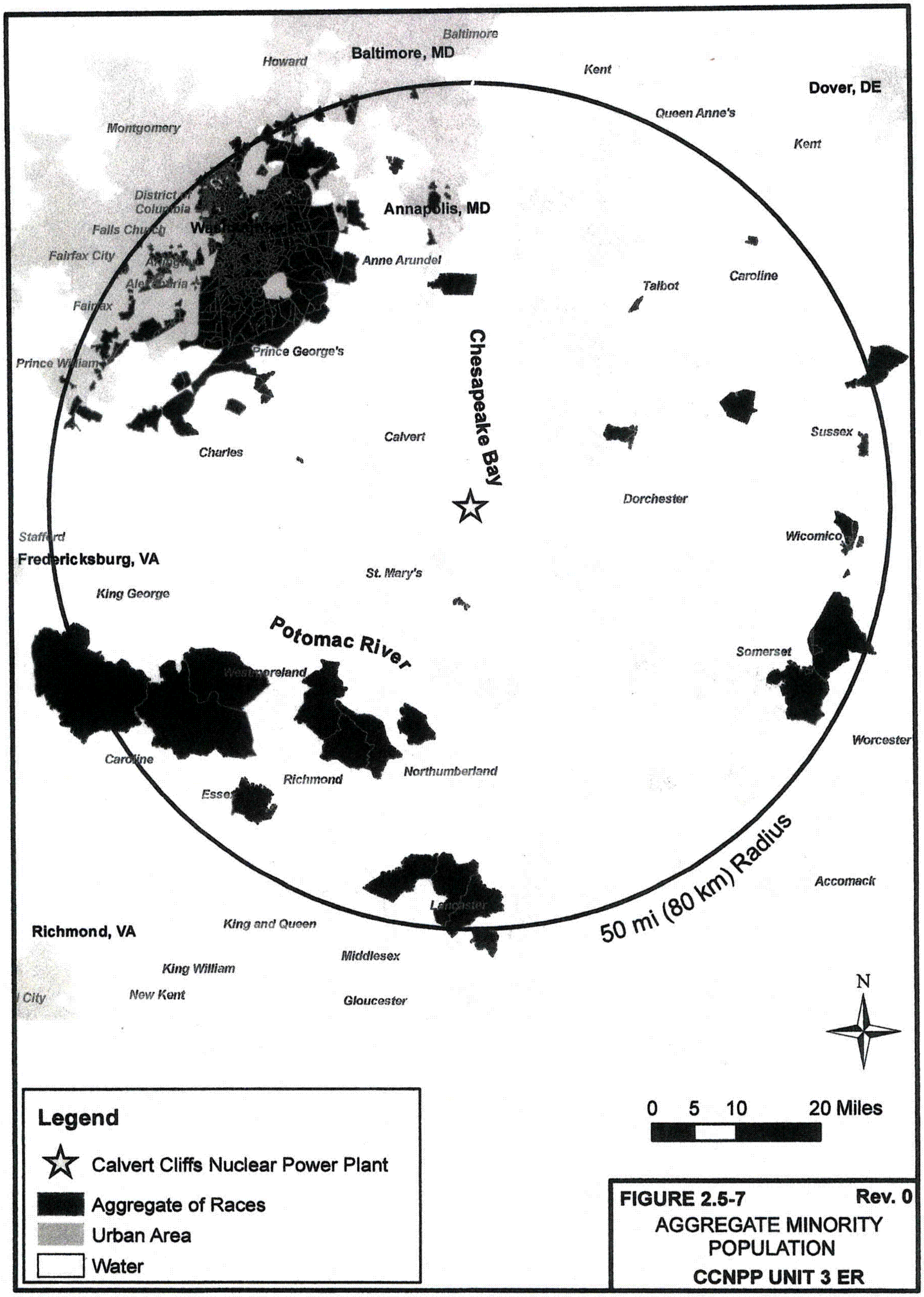


FIGURE 2.5-7 Rev. 0
AGGREGATE MINORITY POPULATION
CCNPP UNIT 3 ER

RAI Number: 1001-28

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 2.5-8.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

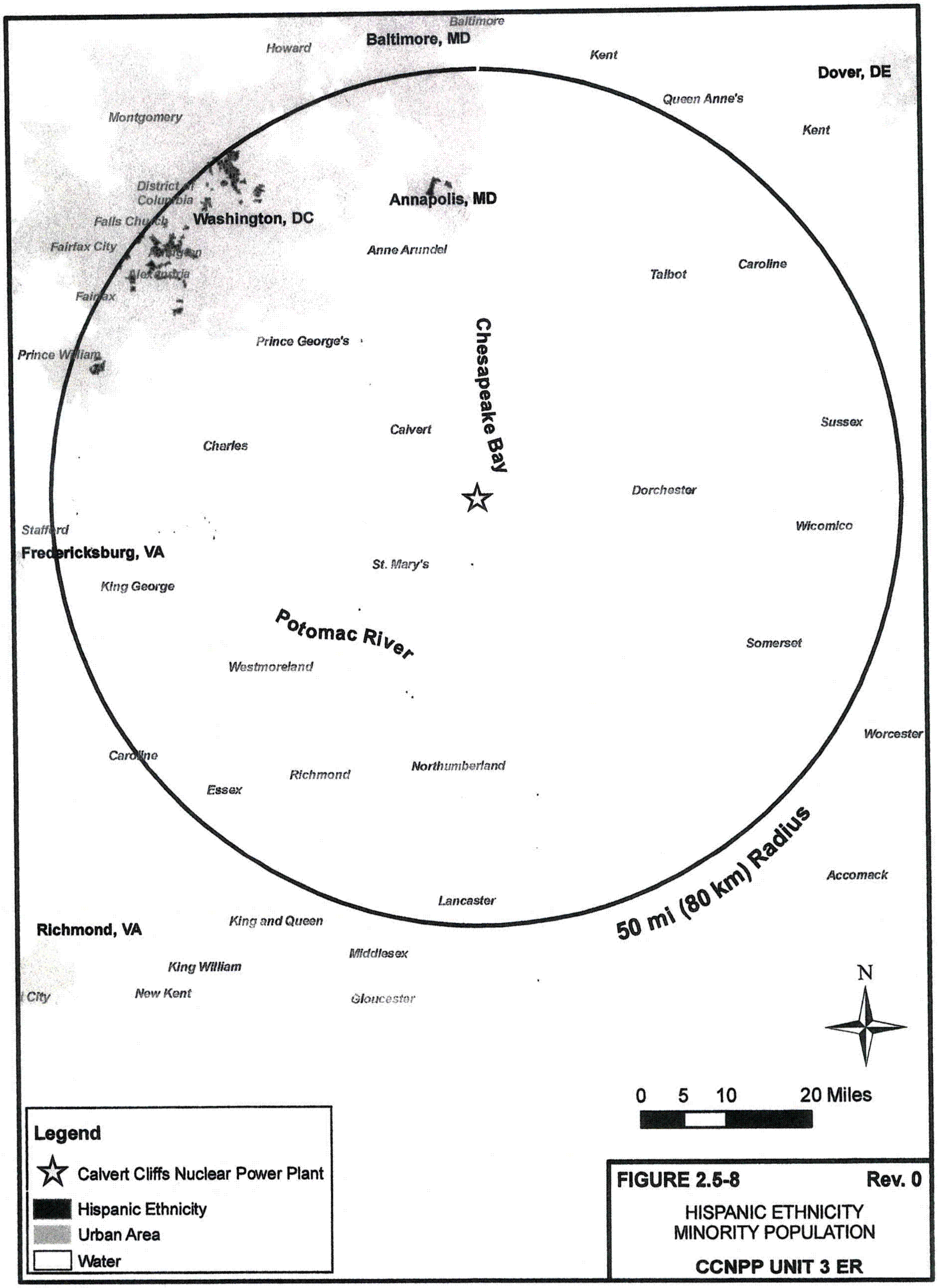


FIGURE 2.5-8 **Rev. 0**

HISPANIC ETHNICITY
MINORITY POPULATION

CCNPP UNIT 3 ER

RAI Number: 1001-29

ESRP Various – Graphics to be in color but reproducible in black and white:

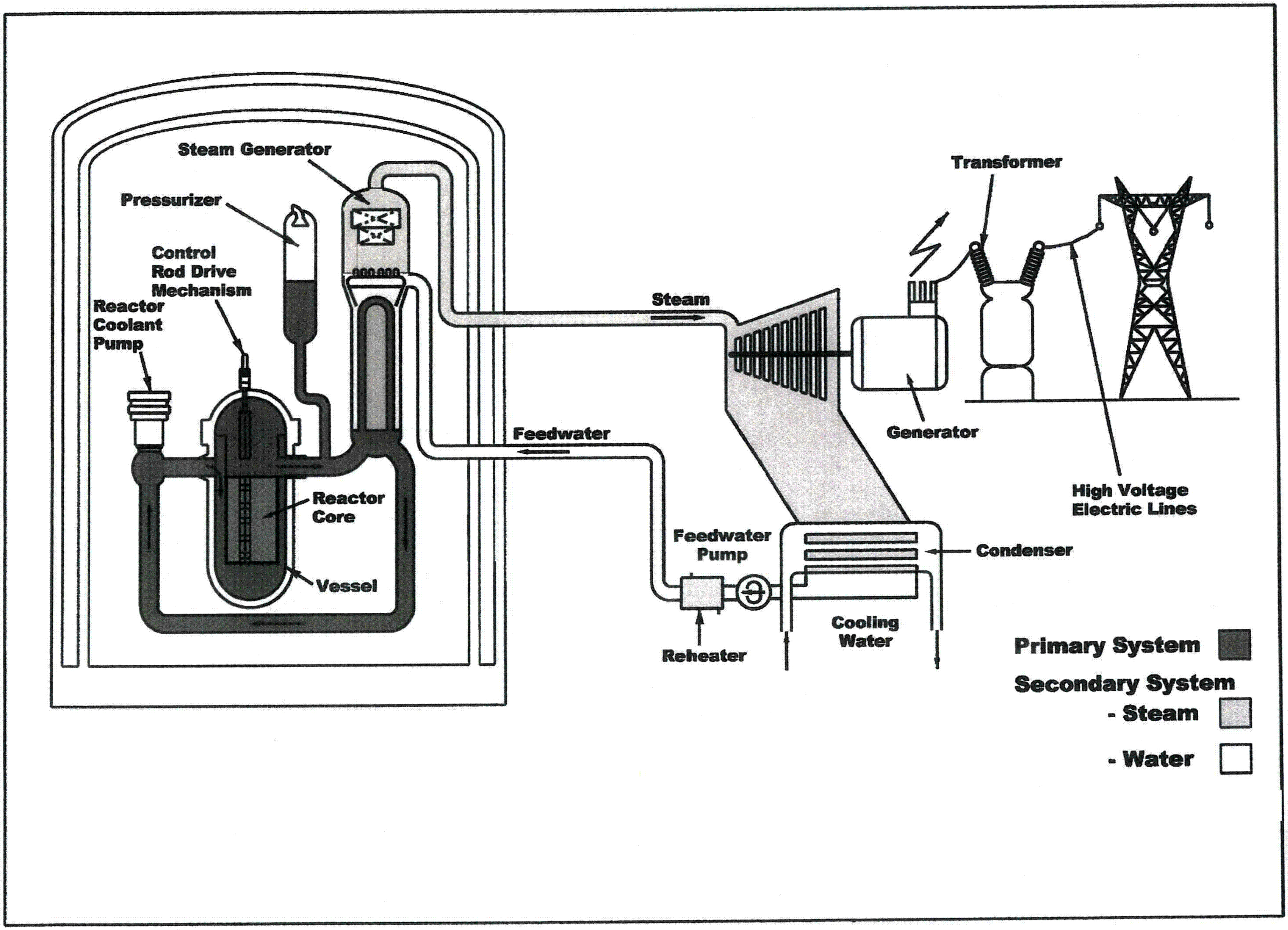
Provide legible graphics or GIS data for ER Figure 3.2-1.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.


Steam Generator
Pressurizer
Control Rod Drive Mechanism
Reactor Coolant Pump
Reactor Core
Vessel
Steam
Feedwater
Transformer
Generator
High Voltage Electric Lines
Feedwater Pump
Condenser
Reheater
Cooling Water
Primary System
Secondary System
- Steam
- Water

RAI Number: 1001-30

ESRP Various – Graphics to be in color but reproducible in black and white:

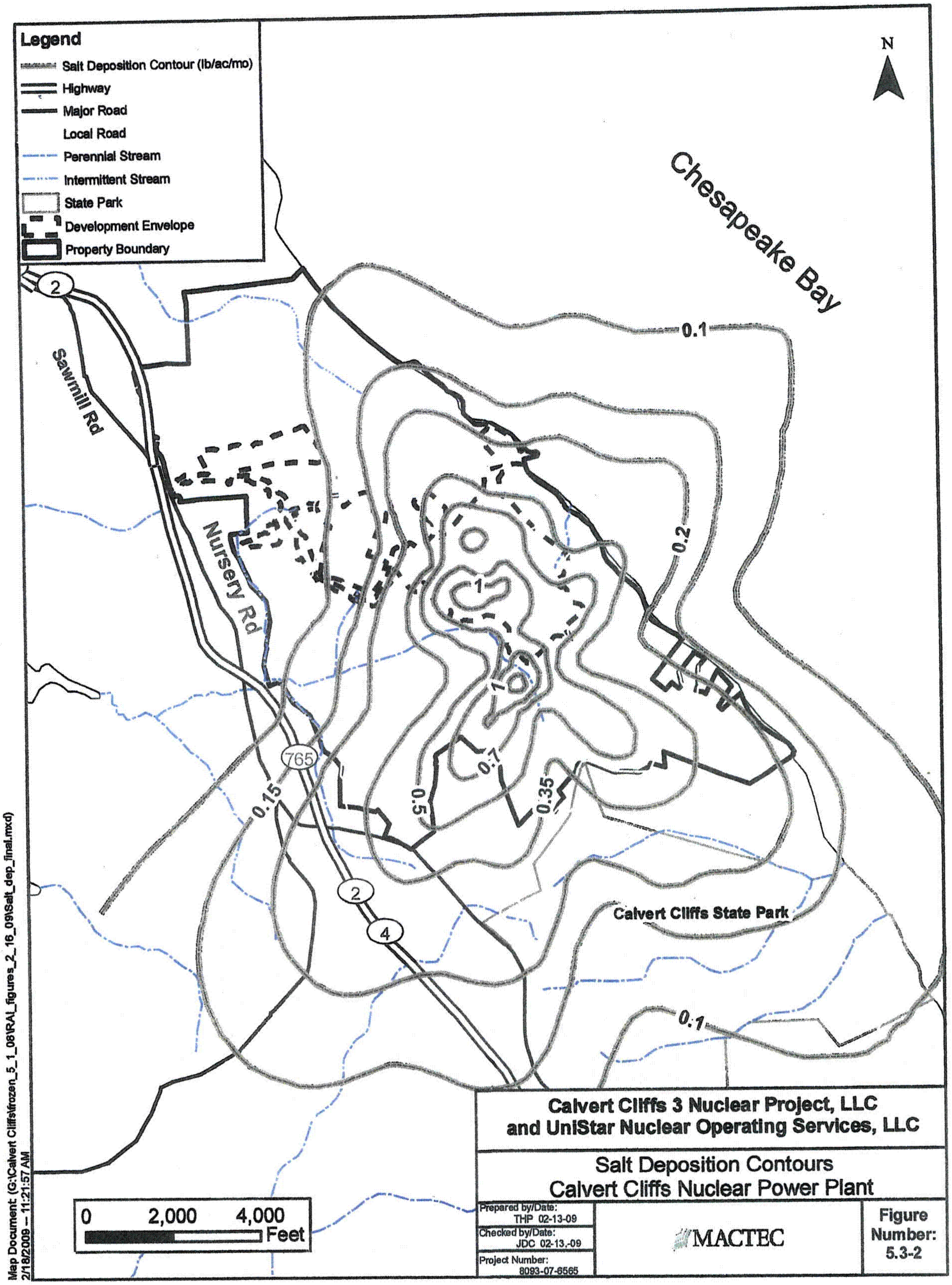
Provide legible graphics or GIS data for ER Figure 5.3-2.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



Map Document: (G:\Calvert Cliffs\frozen_5_1_08\RAI_figures_2_16_09\Salt_dep_final.mxd)
2/18/2009 -- 11:21:57 AM

RAI Number: 1001-31

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for ER Figure 5.3-3.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

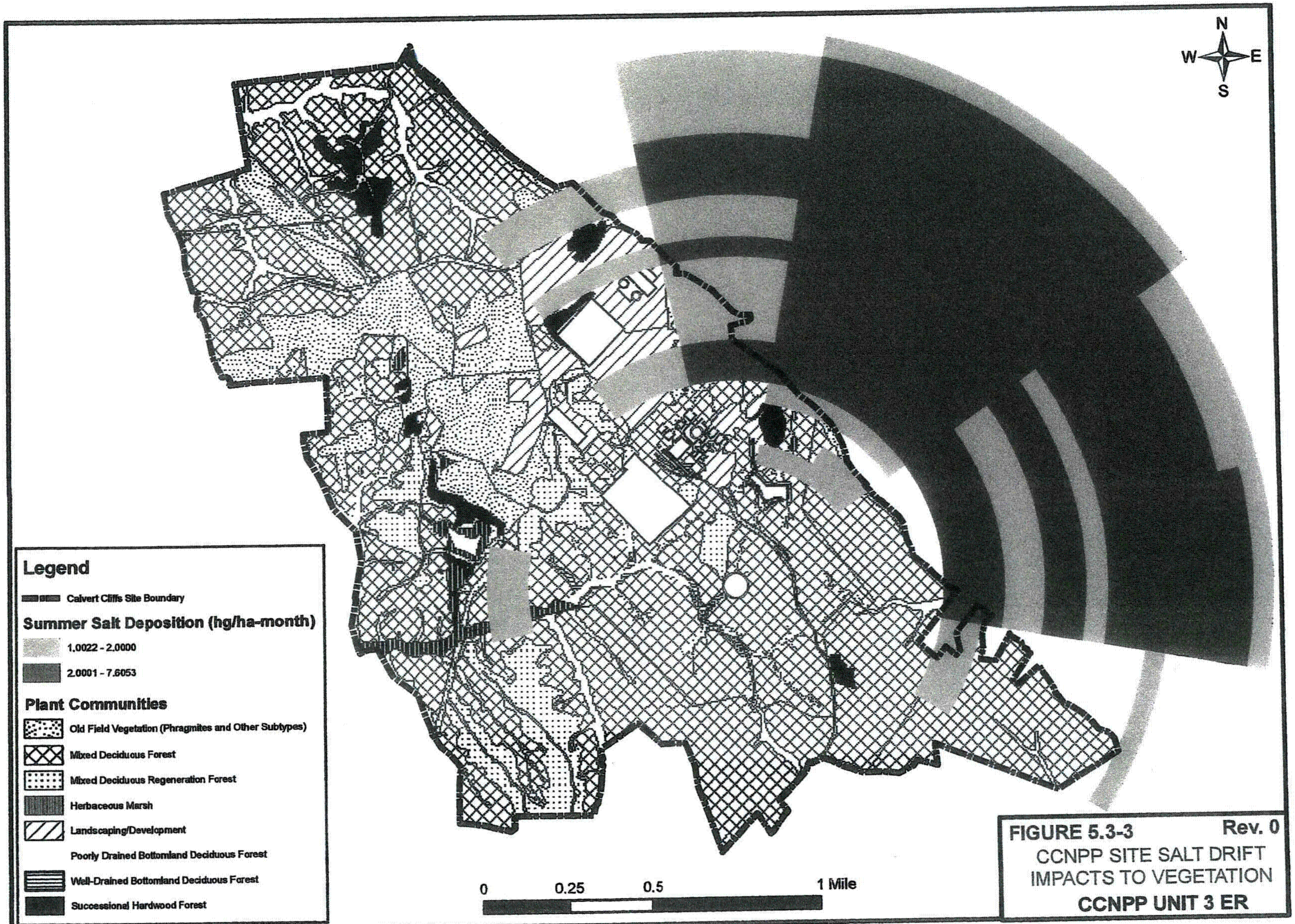


FIGURE 5.3-3 Rev. 0

CCNPP SITE SALT DRIFT IMPACTS TO VEGETATION

CCNPP UNIT 3 ER

RAI Number: 1001-32

ESRP Various – Graphics to be in color but reproducible in black and white:

Provide legible graphics or GIS data for FSAR Figure 2.5-1.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

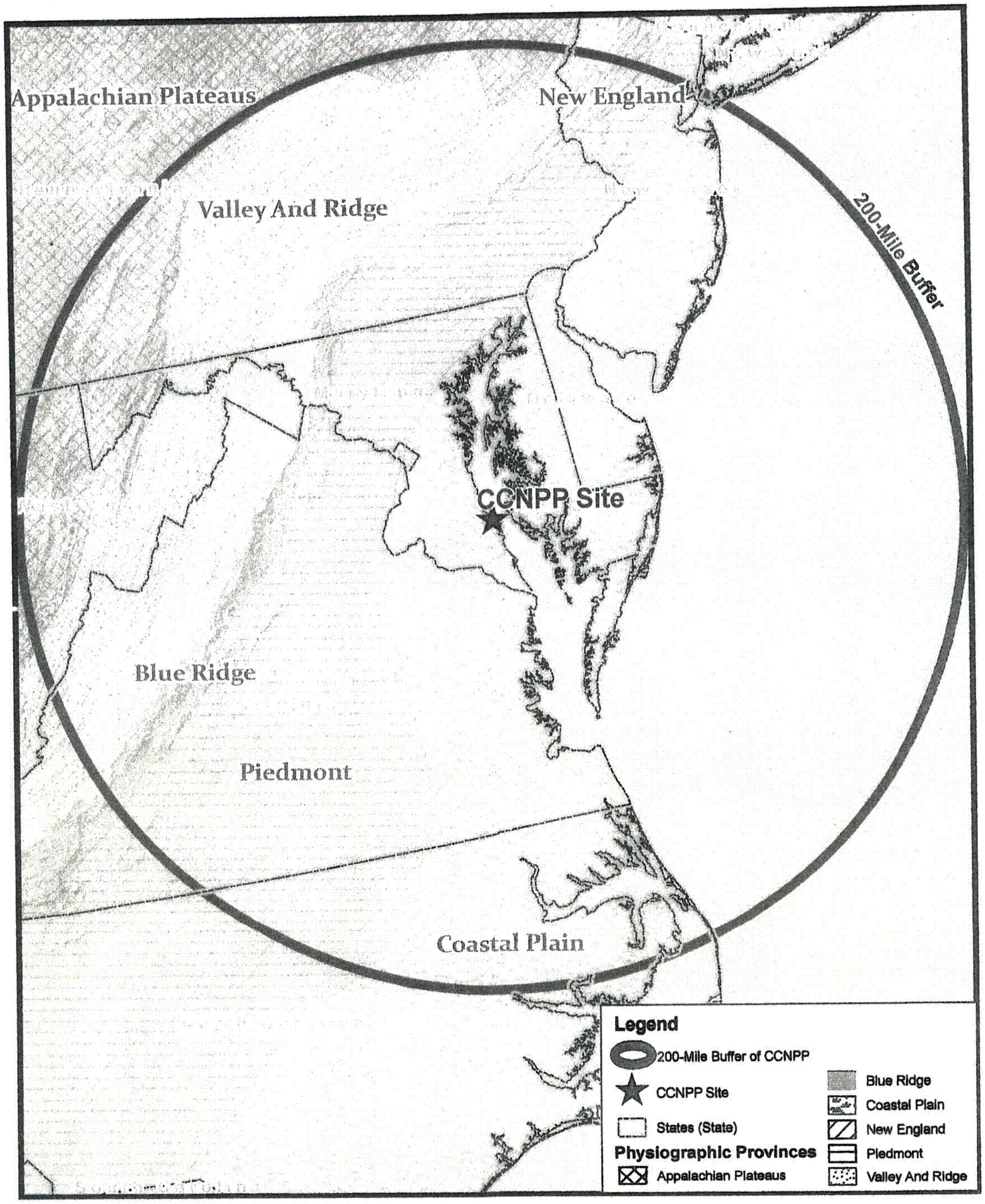


Figure 2.5-1 - Physiographic Provinces of Maryland

GIS Map Code: US-TURK-000143-R000A
Projection: Albers Equal Area Conic
Datum: North American Datum 1983

0 12.5 25 50 75 100 Miles

N S W E

RAI Number: 1001-33

ESRP Various – Graphics to be in color but reproducible in black and white:

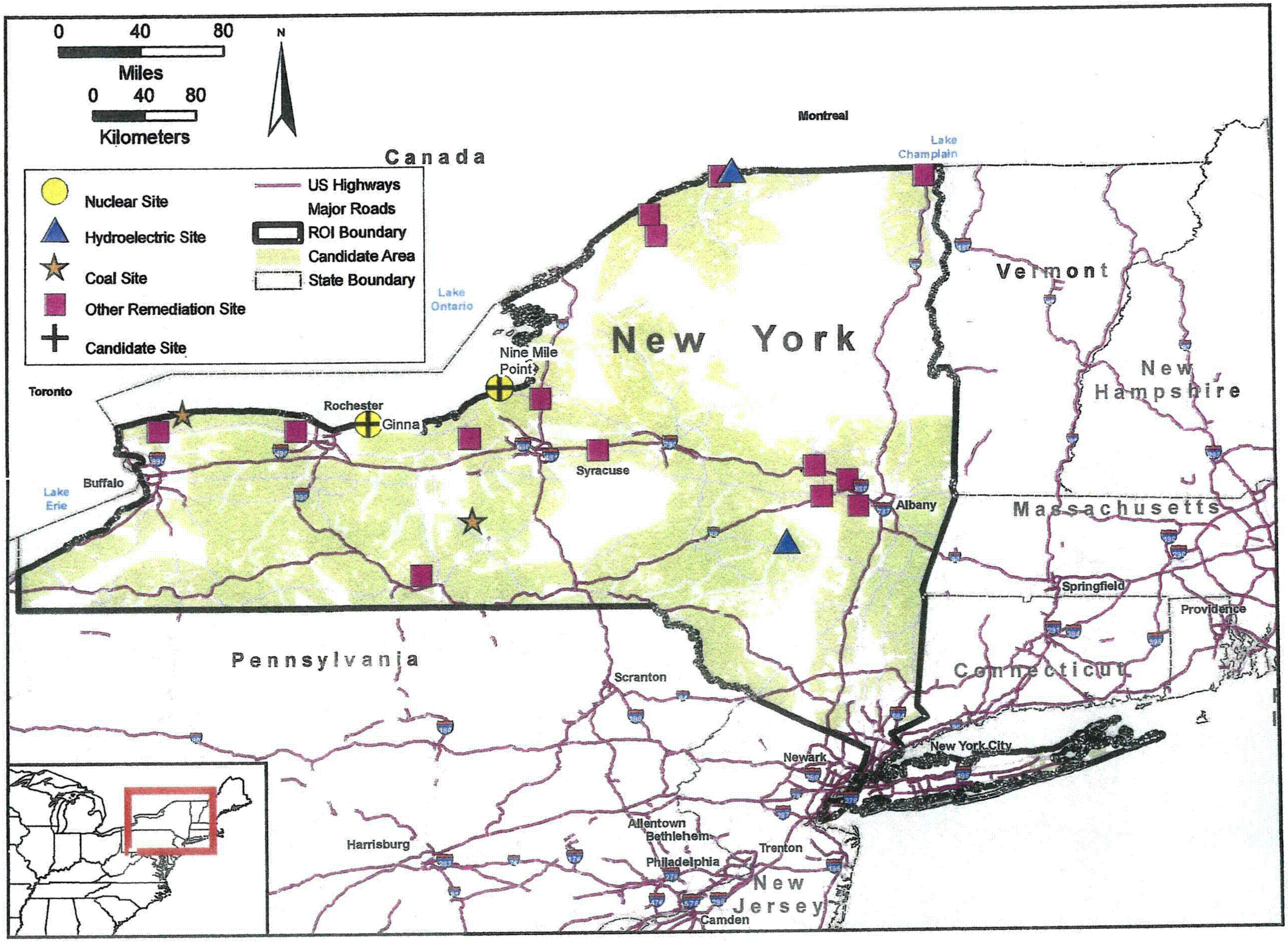
Provide legible graphics or GIS data for August 18, 2008 RAI 198 Figure 9.3-3.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.


0 40 80
Miles
0 40 80
Kilometers
N
Nuclear Site
Hydroelectric Site
Coal Site
Other Remediation Site
Candidate Site
US Highways
Major Roads
ROI Boundary
Candidate Area
State Boundary
Canada
Montreal
Lake Champlain
Lake Ontario
New York
Vermont
New Hampshire
Massachusetts
Connecticut
Pennsylvania
New Jersey
Toronto
Nine Mile Point
Rochester
Ginna
Buffalo
Lake Erie
Syracuse
Albany
Springfield
Providence
Scranton
Newark
New York City
Allentown
Bethlehem
Trenton
Harrisburg
Philadelphia
Camden

RAI Number: 1001-34

ESRP Various – Graphics to be in color but reproducible in black and white:

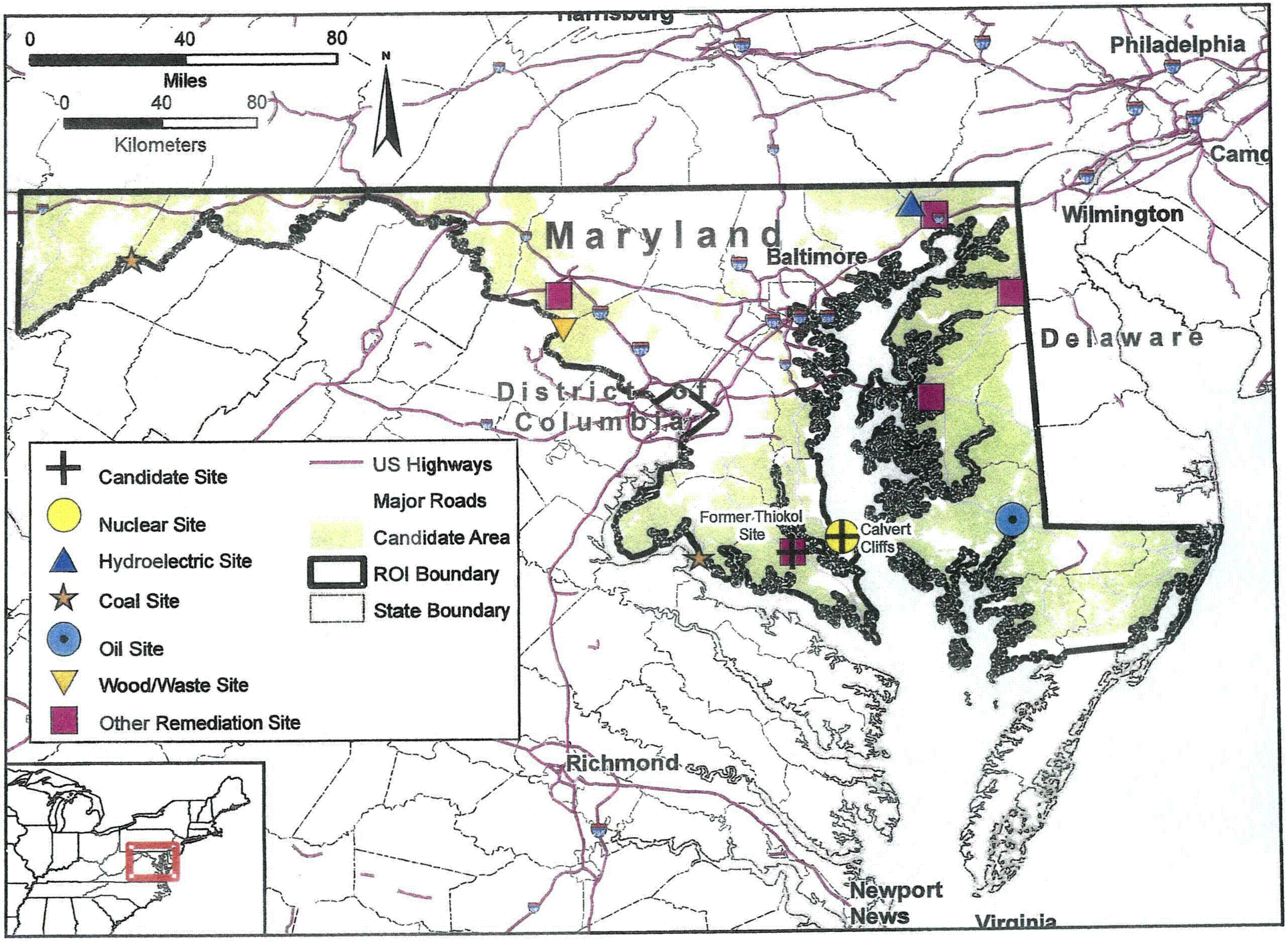
Provide legible graphics or GIS data for August 18, 2008 RAI 198 Figure 9.3-4.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.



Harrisburg
0 40 80
Miles
0 40 80
Kilometers
N
Philadelphia
Camd
Wilmington
Maryland
Baltimore
Delaware
District of Columbia
Former Thiokol Site
Calvert Cliffs
Richmond
Newport News
Virginia
Candidate Site
Nuclear Site
Hydroelectric Site
Coal Site
Oil Site
Wood/Waste Site
Other Remediation Site
US Highways
Major Roads
Candidate Area
ROI Boundary
State Boundary

RAI Number: 1001-35

ESRP Various – Graphics to be in color but reproducible in black and white:
Provide a legible graphic or GIS data for Figure 3 of the Final Wetland Delineation report for Proposed UniStar Nuclear Project Area Calvert Cliffs Nuclear Power Plant Site Calvert County, MA. 2007. Tetra Tech.

UniStar Response:

UniStar has prepared a figure for use in the printed version of the EIS. See attached figure.

COLA Impact:

No changes to the COLA are required.

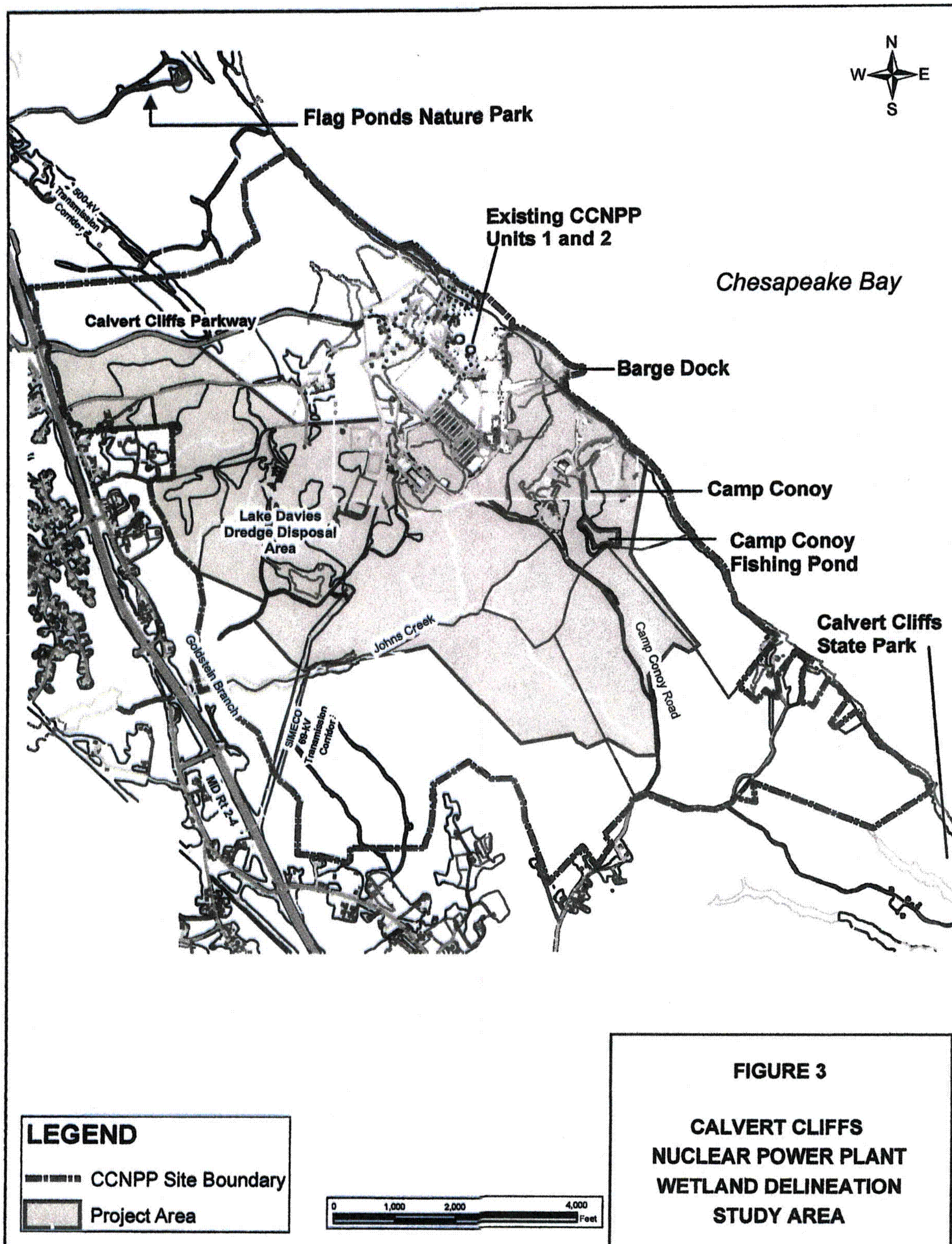


FIGURE 3

CALVERT CLIFFS NUCLEAR POWER PLANT WETLAND DELINEATION STUDY AREA

RAI Number: 1002-1

Hydrology

<u>ESRP 2.3-1</u>
<u>4.2-1</u>
<u>5.2-1</u>

Provide measurements or estimates of pre-construction seasonal flow conditions and associated water quality of CCNPP branches feeding into Johns Creek so that impact to onsite surface water and associated wetlands can be evaluated. Quantify seasonal changes to water flow and quality in Johns Creek during construction and during operations. (Related to May 13, 2008 RAI #49)

UniStar Response:

The western part of the CCNPP Unit 3 site, west of Camp Conoy Road, drains into intermittent headwaters of John's Creek, which flows west under Maryland Route 2/4 and ultimately to the Patuxent River. Most lands in the northwestern part of the site flow into the headwaters to the Goldstein Branch. The Goldstein Branch flows south, close to the western site perimeter, entering John's Creek just east of Maryland Route 2/4. The dredge spoil disposal area drains to the man-made Lake Davies, which discharges into a tributary to the Goldstein Branch.

Two locations in John's Creek were sampled: one upstream and one downstream of a dewatered reach that had filled in with an invasive reed (*Phragmites*). One location in the Goldstein Branch, downstream from its confluence with John's Creek, was sampled.

<u>Stream Water Quality</u>

Two habitat assessments were completed at each of the stream stations during two seasonal studies to determine overall habitat quality. First, the *Environmental Protection Agency (EPA) Rapid Bioassessment Protocols for Use In Wadable Streams and Rivers (EPA 1999)* habitat assessment for low-gradient streams was used to evaluate each site's aquatic habitat. The second habitat assessment used the *Maryland Biological Stream Survey y Sampling Manual (Kazyak 2001,)* consistent with Maryland Biological Stream Survey (MBSS) protocols, to capture several additional habitat characteristics. Assessments were conducted during the Fall 2006 and Spring 2007 to note any changes in habitat that may have occurred between field surveys.

Habitat parameters using the Rapid Bioassessment Protocols (RBP) method that were evaluated included: substrate and available cover characterization, pool substrate characterization, pool variability, sediment deposition, channel flow status, channel alteration, channel sinuosity, bank stability, and riparian zone characteristics. MBSS habitat assessment captured additional parameters such as extent of eroded stream bank, bar formation, exotic plants, number of woody debris within the sampling location, substrate composition, and presence of aquatic vegetation. All three of the stream locations were evaluated using both the RBP (EPA 1999) and MBSS (Kazyak 2001) methods.

Physicochemical parameters were measured *in situ* at each sampling location concurrent with the biological collections. Water temperature, dissolved oxygen, pH, and conductivity and turbidity during the spring sampling were measured with a calibrated YSI 556 MPS water quality analyzer. The following parameters were measured during the Fall 2006 and Spring 2007 surveys:

- Alkalinity as calcium carbonate
- Biochemical Oxygen Demand
- Ammonia as N
- Nitrate plus Nitrite as N
- Dissolved Phosphorus
- Total Phosphorus
- Total Dissolved Solids
- Total Kjeldahl Nitrogen
- Total Organic Carbon
- Total Suspended Solids

Additional water quality parameters were measured during the Spring 2007 survey. A wet weather sampling event was also added in 2007 at two stream stations (one on John's Creek and one on Goldstein Branch) to better characterize water chemistry at the site during wet weather events. The following additional parameters were measured during the Spring 2007 survey:

- Total Mercury
- Total Metals
- Total ICP/MS Metals
- Phosphate
- Total Carbon
- Total Organic Carbon
- Total Petroleum Hydrocarbons (TPH)
- Polynuclear Aromatic Hydrocarbons (PAH)
- Hardness
- Color
- Chemical Oxygen Demand
- Chlorides
- Sulfate
- Sodium
- Potassium
- Calcium
- Magnesium
- Phytoplankton (Chlorophyll A)
- Total Fecal Coliform
- Total Fecal Streptococci

Analytical results are included in the EA Final Report, Aquatic Field Studies for UniStar Calvert Cliffs Expansion Project, May 2007:

- 2-1 Fall 2006 Water Quality in Streams and Ponds, Calvert Cliffs Nuclear Power Plant.
- 2-2 Fall 2006 Surface, Mid-Depth and Bottom In Situ Water Quality Data For Lake Canoy and Lake Davies, Calvert Cliffs Nuclear Power Plant.

- 3-1 Spring 2007 Water Quality in Streams and Ponds, Calvert Cliffs Nuclear Power Plant.
- 3-2 Spring 2007 Surface, Mid-Depth and Bottom In Situ Water Quality Data For Lake Canoy and Lake Davies, Calvert Cliffs Nuclear Power Plant.
- 3-3 Spring 2007 Metals in Streams and Ponds, Calvert Cliffs Nuclear Power Plant.
- 3-4 Spring 2007 Polynuclear Aromatic Hydrocarbons (PAH) in Streams, Calvert Cliffs Nuclear Power Plant.

Biological Quality

The fish community in the sampled streams did not change noticeably between the Fall 2006 and the Spring 2007 surveys. The fish communities were representative of fish assemblages in coastal plain stream habitats. Fish survey results are provided in the tables included in the EA Final Report, Aquatic Field Studies for UniStar Calvert Cliffs Expansion Project, May 2007 (EA 2007):

- Common and Scientific Names of Fishes Collected During Fall 2006 and Spring 2007 Surveys at Calvert Cliffs Nuclear Power Plant.
- Fall 2006 Abundance and Distribution of Fishes Collected From Stream/Pond Stations, Calvert Cliffs Nuclear Power Plant.
- Spring 2007 Abundance and Distribution of Fishes Collected From Stream/Pond Stations, Calvert Cliffs Nuclear Power Plant.

The two reaches of John's Creek differed in components of the benthic community. The upstream location was numerically dominated by oligochaetes and chironomids; the downstream location by amphipods. However, both locations supported at least two of the three groups of aquatic insects that are considered indicators of nondegraded streams (Ephemeroptera, Plecoptera, and Trichoptera). Although both locations scored in the "optimal" category on the habitat assessment, an evaluation of the subscores reveals that the upstream site has poor pool variability, marginal epifaunal substrate and cover, and suboptimal pool substrate, sediment deposition, and channel sinuosity. The difference in the overall scores of the two reaches is attributable to substrate, cover, and pool variability.

In the Goldstein Branch, benthic invertebrate diversity and abundance were lower than in John's Creek, but within acceptable limits. The reach supported all three groups of aquatic insects that are considered indicators of nondegraded streams (Ephemeroptera, Plecoptera, and Trichoptera). The overall habitat assessment produced an optimal score; individual subscores were similar to the upstream location at John's Creek.

Benthic invertebrate survey results are included in tables in the Final EA Report, Aquatic Field Studies for UniStar Calvert Cliffs Expansion Project, May 2007 (EA 2007):

- 7-1 Abundance and Distribution of Macroinvertebrates Collected (Dip Net) From Stream/Pond Stations, Calvert Cliffs Nuclear Power Plant September 2006.
- 7-2 Metrics, Index of Biotic Integrity (IBI) Scores, Hilsenhoff Biotic Index (HBI) of Macroinvertebrates Collected (Dip Net) From Stream/Pond Stations, Calvert Cliffs Nuclear Power Plant September 2006.
- 8-1 Abundance and Distribution of Macroinvertebrates Collected (Dip Net) From Stream/Pond Stations, Calvert Cliffs Nuclear Power Plant March 2007.

- 8-2 Metrics, Index of Biotic Integrity (IBI) Scores, Hilsenhoff Biotic Index (HBI) of Macroinvertebrates Collected (Dip Net) From Stream/Pond Stations, Calvert Cliffs Nuclear Power Plant March 2007.

Habitat in each of the three stream locations is classified as Optimal for low gradient coastal plain streams (see EA [2007] Table 11: Summary of Habitat Quality Evaluated at Stream Locations, Calvert Cliffs Nuclear Power Plant September 2006). Habitat assessment was conducted during the Spring 2007 surveys to document any changes which may have occurred since the Fall 2006 survey. The habitat assessment shows a slight reduction of score at the downstream John's Creek station and the Goldstein Branch location. Because the RPB is somewhat subjective, some variability (margin of error) can be expected between assessments. The Goldstein Branch location showed a larger drop in score between the Fall and Spring surveys than would be expected from subjective variability. Adjacent construction activities off the CCNPP site seem to be adding sediment to the stream and thus reducing its overall habitat score. However, the fish community does not reflect any negative changes because Goldstein Branch and the downstream station on John's Creek have the most diverse and productive fish communities. The downstream station on John's Creek had the highest score (best habitat) during both the Fall and Spring surveys and showed little change between the two seasonal surveys.

<u>Maintaining Stream Flow</u>

The numerical model of the surficial aquifer has been revised to evaluate construction impacts to groundwater levels in the vicinity of the power block and stream flow off site into John's Creek. Both stream flow and groundwater levels after construction of Unit 3 will be dependent upon several factors, including the hydraulic conductivity of the engineered fill material used and the rate of groundwater recharge within the graded area of the site.

The hydraulic conductivity of the engineered fill must be estimated because it has not yet been placed and, therefore, cannot be measured. The rate of groundwater recharge within the graded area of the site is difficult to predict because construction of structures, paving with impermeable surfaces and installation of stormwater drains all have the effect of reducing recharge while leveling of the topography, placement of relatively permeable engineered fill, removal of vegetation and its associated evapotranspiration and construction of stormwater retention ditches and basins all have the effect of increasing recharge. All of these activities will be undertaken during construction of Unit 3.

A sensitivity analysis to improve estimates of the hydraulic conductivity of the engineered fill and groundwater recharge within the graded area of the site was completed using the numerical model. This analysis determined baseline values of 0.005 cm/sec and 5 in/yr, respectively, for these parameters.

Baseline values of hydraulic conductivity and groundwater recharge for the native soils were determined to be 0.001 cm/sec and 5 in/yr, respectively. Model simulations using these values produce groundwater levels that best satisfy the model calibration criteria. Assuming the baseline conditions, where the rate of groundwater recharge in areas to be graded does not differ significantly from that in undisturbed wooded areas of the site (i.e. 5 in/yr), model simulations show that the estimated average groundwater discharge into John's Creek after construction of Unit 3 will be approximately 20 percent lower than before construction.

The magnitude of this change is primarily dependent upon the rate of groundwater recharge that will occur over the graded area of the site. Assuming baseline conditions, cutting, filling and grading of the site could cause the position of the existing groundwater divide to shift to the east and a greater proportion of groundwater recharge from the site to flow toward the Chesapeake Bay rather than John's Creek. However, if the rate of groundwater recharge over the graded area is actually twice as high as in the undisturbed wooded areas, the discharge to John's Creek after construction of Unit 3 will increase by up to about 20 percent.

On the other hand, the results of modeling show that if the rate of recharge over the graded area is equal to only half the rate over the undisturbed wooded areas, the discharge to John's Creek will be reduced by about 50 percent. Because only the access road and nuclear island of the Unit 3 site will be paved, evapotranspiration will be substantially reduced by clearing approximately 274 acres of woodland. Several storm water retention basins will be installed to promote infiltration of site drainage, so it is likely that the rate of groundwater recharge over the graded area of the site will be greater than the rate over the undisturbed wooded areas. Therefore, groundwater discharge to John's Creek most likely will not decrease substantially and may slightly increase after construction of Unit 3.

Cutting, filling and grading will locally affect the location and flow of springs and seeps on the Unit 3 site. These springs and seeps occur where the base of the surficial aquifer is exposed within erosion channels and at the face of embankments. Downward flow of groundwater within the aquifer is restricted by the underlying aquitard and discharge occurs laterally at these locations, forming a spring or seep. Springs and seeps that currently exist in areas to be filled by site grading will be buried. However, they will be buried with fill whose hydraulic conductivity will likely be greater than that of the surficial aquifer from which the springs and seeps currently flow. New springs and seeps will likely issue from the toe of the fill, in locations further down-gradient from their former positions.

Currently, groundwater from the surficial aquifer discharges through seeps into the bounding tributaries and streams, including John's Creek. Replacement of vegetated areas with buildings and other impermeable surfaces will effectively eliminate direct recharge into that aquifer via precipitation. Instead, precipitation will be directed to sand-filter ditches, which will discharge into either an unlined stormwater basin located to the west, or into tributaries to Johns Creek. The outflow structure for the stormwater basin will be designed to release water at low enough rates so that the receiving stream will not be subject to either erosion or sedimentation, beyond what is naturally occurring now. This modulated release of surface water is meant to mimic the somewhat moderated discharge of groundwater through seeps and springs that occurs naturally. The bottom of the drainage ditches will consist of a permeable layer of sand or gravel which will permit infiltration down into the remaining (lower) portion of the surficial aquifer. The ditches will be designed to accommodate as much as a two-year 24-hour rain event.

Experience at other sites suggests that the constructions of CCNPP Unit 3 may lower the water table somewhat, and reduce the rate of groundwater discharge into the bounding tributaries. However, the net discharge into John's Creek is not expected to change, because the surface runoff collected in the sand-filter ditches will be diverted to Johns Creek. Thus, no significant change in the long term or short term flow to the streams and wetlands from the power block area is expected.

Maintaining Water Quality During Construction

Best management practices will be selected and implemented to ensure that the water quality downgradient of the power block area and the adjoining construction laydown area will not be degraded. Acceptable water quality will be maintained by implementation of the erosion and sediment control measures detailed in the Calvert Cliffs Unit 3 Storm Water Management Plan dated April 2008 (Revision 00A). Initial, intermediate, and final erosion and sedimentation controls, which will be planned, conducted and maintained according to the Calvert County Soil Conservation District standards and specifications, are described below.

Initial controls (prior to construction) will include perimeter protection fencing and controls and strictly-controlled construction exits. *Intermediate controls* (during construction) will include silt fencing, sediment ponds, diversion dikes and stone check dams, if necessary, to control erosion and stormwater runoff. During the grading and construction phase, additional intermediate erosion controls will be put in place as land disturbance occurs. Erosion control devices will be implemented or modified as the drainage patterns for stormwater are constructed. All disturbed land left exposed for 7 days (steep slopes) to 14 days (gentle slopes) will be mulched or planted with temporary grass cover.

Final erosion and sediment controls (post-construction) will be integrated with the permanent stormwater management system. These controls will include, among other things, construction of filtration ditches, stream enhancements, stabilization of construction roads, application of rolled erosion control product on steep slopes during final grading, and permanent stabilization by grassing of final grades and open pervious areas.

Implementation of a sequenced, systematic erosion and sedimentation control plan, as summarized above and to be approved by Calvert County Soil Conservation District, will limit the water-quality impacts of the planned construction activities on Johns Creek.

Prior to construction, a detailed storm-water management study will be conducted to evaluate adequate sizes of the components of the storm-water system to maintain water quality and quantity in the downstream area. This will include analyzing the pre-development and post-development site hydrology for the 1-, 2-, 5-, 10- and 100-year 24-hour rainfall events. The planned storm-water management system will be sized such that the downstream flow rates, sediment loads and water quality will be similar to the existing conditions and such that the post-development peak discharges will not exceed the pre-development rates.

Summary

The Before-After/Control-Impact (BACI) approach is a classic method for measuring the potential impact of a discharge, disturbance, or event on the fish and invertebrates of a stream. The 2006-2007 survey data, the groundwater studies, and the other site-specific analyses that have been conducted for CCNPP Unit 3 serve to document the current conditions, represent the "Before" component of the analysis. The impacts of construction cannot be quantitatively measured before construction has begun. In the absence of an actual constructed project to evaluate as the "After" component of the study, quantitative models must be used to predict impacts and inform *a priori* design changes to minimize anticipated impacts. In addition, the model results must be interpreted using professional judgment and experience with similar projects in similar habitats.

References

EA Engineering, Science, and Technology (EA). 2007, Aquatic Field Studies For Unistar Calvert Cliffs Expansion Project.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1002-2

Hydrology

ESRP 3.4.4-1
5.3-1
5.3-2

In Section 3.4.4.2 (page 3.0-33), there is a corrected flowrate value of 21,019 gpm (19,437 gpm lined out in tracked changes). In Section 5.3.2 (page 5.0-38), the first paragraph lists an average discharge flow rate of 19,400 gpm. Table 5.3-3 (page 5.059), gives a discharge flow rate of 17,633 gpm. On this same table there is a correction in the line above (labeled "Discharge Water Density") that contains the 21,019 gpm value, but the units do not match those lined out (density units). Identify the correct value or explain these differences.

UniStar Response:

The average discharge flow in Section 5.3.2.1 (page 5.0-38) will be changed to 21,019 gpm (79,566 lpm). Table 5.3-3 (page 5.0-59) includes a discharge flow rate of 17,633 gpm (1.1125 m^3/s). This will be change to 21,019 gpm (1.3261 m^3/s). The discharge water density value in Table 5.3-3 will also be corrected to the appropriate value (62.919 lbm /ft^3 (1007.87 kg/m^3)). In addition, the flow rate in lpm for the normal discharge flow is 79,172 lpm. This value will be changed to 79,566 lpm.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the following markup.

screen wash pumps (single shaft) that provide a pressurized spray to remove debris from the water screens. In both intake structures, there is no need for a fish return system since the flow velocities through the screens are less than 0.5 fps (0.15 mps) in the worst case scenario (minimum bay level with highest makeup demand flow).

The growth of slime, algae and other organic materials will be monitored in the intake structure and their components as well as the accumulation of debris on the trash racks. Cleaning will be performed, as necessary.

The combined pumping flow rate from Chesapeake Bay for CCNPP Unit 3 will be a maximum of approximately ~~43,480~~47,383 gpm (~~164,590~~179,365 lpm)}.

3.4.2.2 {Final} Plant Discharge

{The final discharge consists of cooling tower blowdown from the CWS cooling tower, the ESWS cooling towers and site wastewater streams, including the domestic water treatment and circulation water treatment systems. All biocides or chemical additives in the discharge will be among those approved by the U.S. Environmental Protection Agency and the State of Maryland as safe for humans and the environment, and the volume and concentration of each constituent discharged to the environment will meet requirements established in the National Pollutant Discharge Elimination System (NPDES) permit. The types and quantities of chemicals used are discussed in Section 3.3.

79,5

The discharge flow to the Chesapeake Bay through the seal well is mainly from the retention basin. Note that treated liquid radioactive waste and effluent from the sewage treatment plant will discharge directly to the seal well. Discharge from the retention basin occurs through an approximately 30 in (76 cm) diameter discharge pipe to the seal well. From the seal well, the discharge pipe is routed to the offshore diffuser outfall where there are three 16 in (41 cm) diameter nozzles to distribute the discharge flow into the bay. The normal discharge flow will be approximately ~~19,437~~ 21,019 gpm (~~73,577~~79,572 lpm) and the maximum discharge flow will be approximately ~~23,204~~24,121 gpm (~~87,837~~91,304 lpm). This includes the nominal and maximum discharge flow from the CWS cooling tower of approximately ~~17,366~~18,977 gpm (~~65,737~~71,836 lpm) and ~~20,201~~22,160 gpm (~~76,469~~83,885 lpm), respectively. Figure 3.4-2 and Figure 3.4-6 show the preliminary details for the retention basin and the seal well, respectively.

The discharge structure will be designed to meet all applicable navigation and maintenance criteria and to provide an acceptable mixing zone for the thermal plume per the State of Maryland regulations for thermal discharges. Figure 3.4-7 shows details of the discharge system. The discharge point is near the southwest bank of the Chesapeake Bay approximately 1,200 ft (366 m) south of the intake structure for CCNPP Unit 3 and extends about 550 ft (168 m) into the bay through a buried nominal 30 in (76 cm) discharge pipe with diffuser nozzles at the end of the line. The preliminary centerline elevation of the discharge nozzles of the diffuser is 3 ft (0.9 m) above the Chesapeake Bay bottom elevation. The three 16 in (40.6 cm) diameter nozzles are spaced center-to-center at 9.375 ft (2.86 m) located 3 ft (0.91 m) above the bottom. The angle of discharge is 22.5 degrees to horizontal. Riprap will be placed around the discharge point to resist potential erosion due to discharge jet from the diffuser nozzles. Fish screens are not required on the diffuser nozzles since there will always be flow through the discharge piping, even during outages, to maintain discharge of treated liquid radioactive waste within the concentration limits of the applicable local, state and federal requirements. The length of the diffuser flow after exiting the nozzle is approximately 26 ft (7.9 m)}.

E1-1016972-005

5.3.2 DISCHARGE SYSTEM

5.3.2.1 Thermal Description and Physical Impacts

{The thermal discharge from CCNPP Unit 3 will return blowdown from the cooling towers and site wastewater streams to the Chesapeake Bay. A description of the cooling water system including the discharge is provided in Section 3.4. The average discharge flow is approximately 19,400 gpm (73,500 lpm). The offshore discharge structure will consist of a subsurface multi-port diffuser located approximately 1,200 ft (366 m) south of the CCNPP Unit 3 intake structure, extending about 550 ft (168 m) into the Chesapeake Bay at a depth of -10 ft (-3 m) msl. The diffuser will consist of three nozzles located approximately 3 ft (0.9 m) off the bottom.

The differential temperature rise (delta-T) across the cooling water system from intake to discharge will vary with electrical generation and seasonal changes in intake water temperature. For purposes of thermal plume modeling, a delta-T of 12°F (6.7°C) was assumed, consistent with the current NPDES permit limit for CCNPP Units 1 and 2.

The CCNPP Unit 3 discharge multi-port diffuser system 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.}

5.3.2.1.1 {Chesapeake Bay Hydrology

Information describing the hydrology of Chesapeake Bay in the vicinity of the CCNPP site is found in Section 2.3.1. Average rise and fall of the semidiurnal tides is approximately 1 ft (0.3 m) as determined from the NOAA Cove Point gauging station just south of the CCNPP site (NOAA, 2007a). Velocities can vary based on tide stage and have been measured as high as 0.78 ft/sec (0.24 m/sec) in previous thermal plume studies (Lacy, 1979). Tidal excursion was estimated to range from 3.1 to 3.7 mi (5 to 6 km).

Water temperatures measured from 1984 through 2006 ranged between 36.5°F (2.5°C) and 80.6°F (27°C). Salinities measured during 2005 and 2006 varied from just above 5 to 20 ppt, averaging 15 ppt. Depth at the discharge structure will be approximately -10 ft (-3.05 m) msl with the substrate dropping off to a depth of approximately -40 ft (12.2m) msl at 4,800 ft (1,463m) east of the intake structures. In the region of the CCNPP site, the Chesapeake Bay is approximately 6 mi (9.6 km) wide. Sands predominate in waters less than 13.1 ft (4.0 m), mud predominates in waters greater than 26 ft (8.0 m), and a mixture of each appears in the intermediate depths.}

5.3.2.1.2 Discharge Thermal Plume Regulations

{The State of Maryland has established thermal discharge water quality regulations that limit the spatial extent of thermal plumes

- The 24 hour average of the maximum radial dimension measured from the point of discharge to the boundary of the full capacity 3.6°F (2°C) above ambient isotherm (measured during the critical periods) may not exceed one-half of the average ebb tidal excursion,
- The 24 hour average full capacity 3.6°F (2°C) above ambient thermal barrier (measured during the critical periods) may not exceed 50% of the accessible cross section of the receiving water body. Both cross sections shall be taken in the same plane,

Table 5.3-3—{Baseline Discharge Structure Input Data CORMIX Thermal Plume Prediction}
(Page 1 of 1)

Input Quantity/Data	Parameter Value
Location	1,200 ft (366 m) south of the CCNPP Unit 3 intake structure
Discharge Water Temperature T	12°F (6.67°C)
Discharge Water Density (69.5°F, 13.0 ppt) STET	62.919 lbm/ft³ (1007.87 kg/m³) 21,019 gpm (1.3261 m³/s)
Discharge Flow Rate	~~17,633 gpm (1.1125 m³/s)~~
Diffuser Type	Multi-port
Number of Discharge Ports	3
Distance of Shore	550 ft (167.6 m)
Orientation	Parallel to Shoreline
Height of Discharge Ports above Bottom	3 ft (0.91 m)
Angle of Inclination	22.5 degrees
Nozzle Diameters	16 in (0.406 m)
Active Diffuser Length	18.75 ft (5.715 m)

(62.919 lbm/ft³ (1007.87 kg/m³))

RAI Number: 1003-1

Aquatic ecology

ESRP 2.4.2 - 1

Items 14 and 15 in the May 13, 2008 RAI set requested complete survey data of aquatic habitats affected by the proposed new unit. UniStar responded (June 12, 2008 RAI responses with attachments) with a figure of sampling locations and a file that included raw data tables were provided in the attachment, but there was no information relating the data to the locations in the surveys. Please identify where sampling locations LCM1, WB-M1, UTJC-M5, UTJC-I03, LC-I01, JC-M4, and WB-M2 were located and explain whether or not they can be used to help characterize streams onsite.

UniStar Response:

As discussed in the Joint Permit Application (JPA) Phase I mitigation plan, chapter 2 (MACTEC, 2009). The sampling locations noted as LC-M1, WB-M1, UTJC-M5, UTJC-I03, LC-I01, JC-M4, and WB-M2 were representative locations where benthic macroinvertabrate data and habitat assessment data were collected. Samples were conducted on both proposed impact reaches and potential mitigation reaches using protocol from the Maryland Biological Stream Survey (Kazyak, 2001). Note the locations are named appropriately, either as I for Impact reach; or as M for Mitigation reach (e.g. LC-M1= mitigation reach). Benthic macroinvertebrates have been categorized into tolerant, moderately tolerant, and intolerant groups with regards to disturbance (pollution or otherwise) of the aquatic habitats in which they live. Under normal circumstances, the benthic macroinvertebrate community in a given stream reach with suitable habitat will be balanced, with a predominance of intolerant and moderately tolerant species. Under impaired conditions, benthic community structure will shift and will usually be dominated by tolerant species. Benthic macroinvertebrate data can be used to evaluate community composition, and the results of the evaluation can be used to evaluate whether a particular stream reach is or is not impaired.

Sampling locations for LC-M1, WB-M1, UTJC-M5, UTJC-I03, LC-I01, JC-M4, and WB-M2 are shown in the attached Figure 1003-1.

References:

MACTEC, 2009. Phase I Compensatory Mitigation Plan, MACTEC Engineering and Consulting, Inc., February 2009

Maryland Biological Stream Survey (Kazyak, 2001):
http://www.dnr.state.md.us/streams/mbss/

COLA Impact:

No changes to the COLA are required.

RAI Number: 1003-2

Aquatic ecology

ESRP 2.4.2 - 2

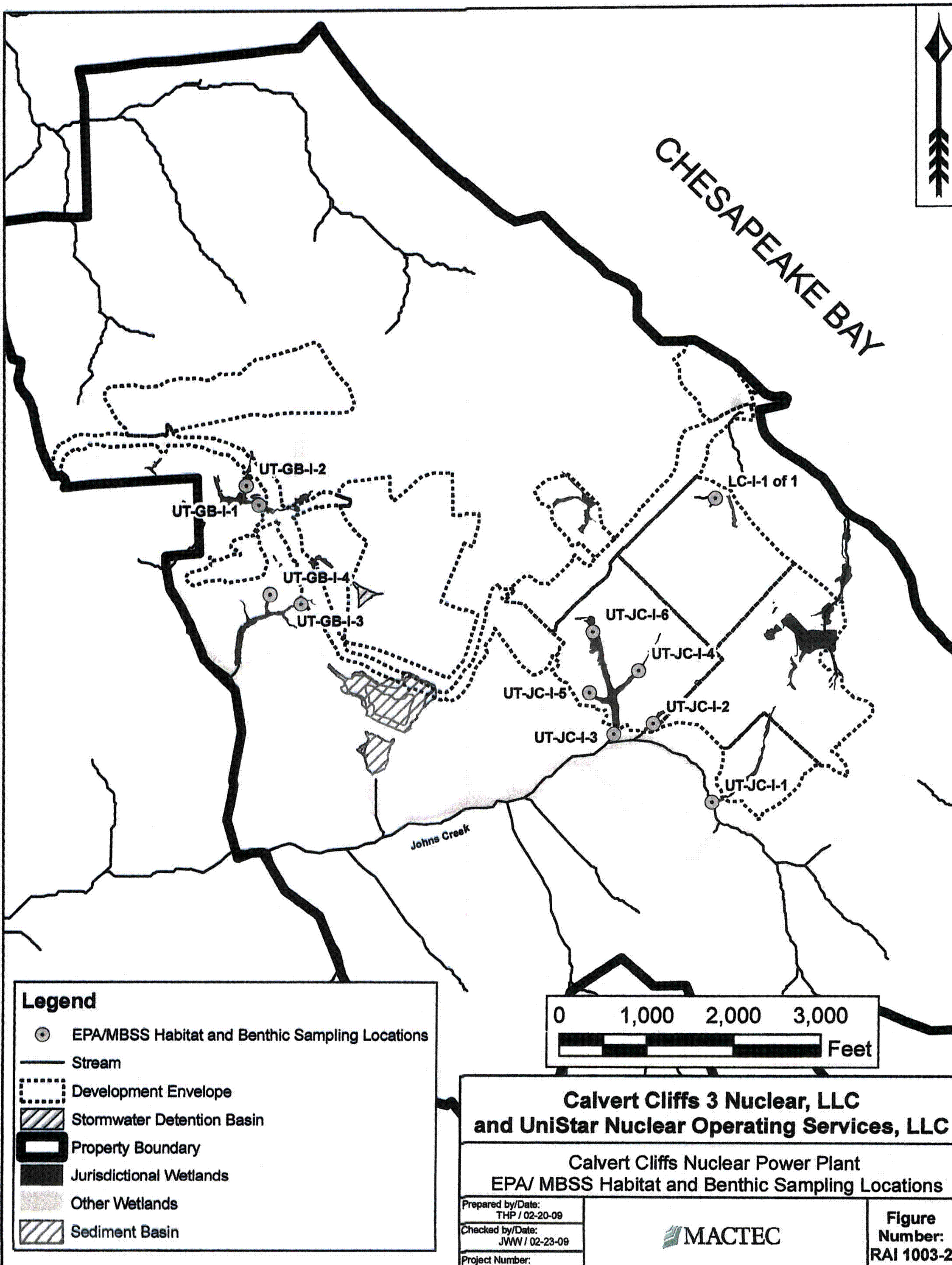
In the June 12 2008 response to Items 14 and 15 in the May 13, 2008 RAI set, UniStar included additional data collected in the Spring 2008. A figure of sampling locations and a file that included raw data tables were also provided. The figure identifies sampling locations for which data were not provided. These are UT-GB-I-2, UT-GB-I-4, UT-JC-I3, UT-JC-I-4, UT-JC-I-5, UT-JC-I-6, and LC-I-1of1. Please provide data for these sampling locations.

UniStar Response:

The sampling locations at the Calvert Cliffs site are shown on the attached figure. The Maryland Biological Stream Survey (MBSS) benthic macroinvertebrate data and EPA Rapid Bioassessment Protocol (RBP) scores for these sampling locations are provided on Table 1. Stream physical attributes for these sampling locations are provided in Table 2.

COLA Impact:

No changes to the COLA are required.



Calvert Cliffs 3 Nuclear, LLC and UniStar Nuclear Operating Services, LLC

Calvert Cliffs Nuclear Power Plant
EPA/ MBSS Habitat and Benthic Sampling Locations

Prepared by/Date: THP / 02-20-09	MACTEC	Figure Number: RAI 1003-2
Checked by/Date: JWW / 02-23-09		
Project Number: 8093-07-6565		

Map Document: (G:\Calvert Cliffs\frozen_5_1_08\RAI_figures_2_16_09\FIG_RAI_1003-2.mxd)
2/21/2009 -- 1:47:53 PM

Table 1

MBSS benthic macro-invertebrates community scoring metrics and associated total scores for each potential impact reach.

Community metric	UTJC-I1	UTJC-I2	UTJCI3	UTJC-I4	UTJCI5	UTJC-I6	UTGB-I1	UTGB-I2	UTGB-I3	UTGB-I4	LC-I01
Total Number of taxa	19	31	29	*	*	*	21	*	6	*	27
Number of EPT taxa	5	5	6	*	*	*	2	*	2	*	3
Number of Ephemeroptera taxa	1	2	1	*	*	*	0	*	0	*	1
Percent intolerant (tol val </=3) urban	91.02	55.00	56.31	*	*	*	22.30	*	1.42	*	0.61
Percent Ephemeroptera	1.24	2.19	0.31	*	*	*	0.00	*	0.00	*	0.31
Number of scrapers	0	0	0	*	*	*	1	*	0	*	2
Percent climbers	0.31	2.81	1.85	*	*	*	3.60	*	1.42	*	3.36
MBSS IBI score	3.00	3.86	3.29	*	*	*	2.43	*	1.57	*	3.00
Rating	Fair	Fair	Fair	*	*	*	Poor	*	Very poor	*	Fair
Hilsenhoff biotic index	1.54	3.60	3.96	*	*	*	2.36	*	2.59	*	6.63
EPA Rapid Bio-Assessment (RBP)	105	138	129	126	111	132	124	134	60	86	129

* Water did not meet MBSS Preliminary Sampleability Criteria

Table 2

Physical attributes associated for each potential impact reach.

Physical Attribute	UTJC-I1	UTJC-I2	UTJCI3	UTJC-I4	UTJCI5	UTJC-I6	UTGB-I1	UTGB-I2	UTGB-I3	UTGB-I4	LC-I01
Temp. (Degrees C)	13.4	15.8	14.6	16.9	14.7	16.9	14.0	13.1	14.3	14.4	11.7
D.O. (mg/liter)	10.30	10.60	11.40	10.98	12.80	11.20	11.70	12.50	12.90	12.70	10.50
Salinity (%)	0.00	0.00	0.02	0.00	0.08	0.02	0.07	0.00	0.07	0.01	0.05
pH	6.0	7.2	7.2	6.4	6.8	7.1	7.2	7.1	7.2	7.1	6.30
Conductivity (uS)	0.03	0.08	0.53	0.05	1.7	0.43	1.60	0.21	1.50	0.30	0.45
Turbidity (NTU)	<10.0	0.79	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0

RAI Number: 1003-3

Aquatic Ecology

ESRP 2.4.2-3

The liquid waste stream to be discharged to the Chesapeake consists of blowdown from the circulating water supply system and essential service water system cooling towers; desalination plant waste; and other site waste streams. These waste streams are discharged into a common retention basin before release.

What is the projected temperature of the liquid waste streams at the Unit 3 discharge point? Would there be any variation with the different flow or seasonal conditions? If so describe such differences.

As a result of the February 19, 2009 teleconference with USNRC staff, RAI # 1003 ESRP2.4.2-3; liquid waste discharge to Chesapeake Bay was altered to: UniStar will provide maximum summer and winter temperatures for the discharge to the retention basin.

UniStar Response

The temperature of the cooling water system discharge to Chesapeake Bay will vary with electrical generation and seasonal changes. Although the water temperature at the discharge point in the Bay is unavailable at this time, the projected temperature of the liquid waste stream at the Unit 3 waste water retention basin prior to Bay discharge ranges between 56 °F and 90 °F. The effluent water from various plant sources is discharged to the retention basin. Suspended solids are allowed to settle and further chemical treatment of waste water, if required, is carried out prior to the discharge to the Bay. The retention time for this basin is approximately 6 hours. As a result, the final discharge water temperature may be different than the temperature of the fluid in the wastewater retention basin. The degree of variability depends on many factors such as flow rates, ambient conditions, plant load etc., as well as the season. The average expected Unit 3 discharge flow to the Bay during normal operation amounts to less than one percent of the Units 1 and 2 discharge.

For purposes of thermal plume modeling to determine regulatory compliance and evaluate potential environmental impact, a differential temperature rise (delta-T) across the cooling system between the intake and discharge of 12°F was assumed. This delta-T is consistent with the current NPDES permit limit for Units 1 and 2 and was used for all seasons.

The spatial configuration of the Unit 3 thermal plume was simulated using the Cornell Mixing Zone Expert System (CORMIX), as described in ER Section 5.3.2.1.3. The modeled plume predictions are considered conservative since the CORMIX model constrains the depth of the plume to no more than 30 percent greater than the depth at discharge, or -13 ft in this case. Further, a sensitivity analysis comparing plume size at differential water temperatures below 12°F demonstrated that plume size decreases as delta-T is reduced.

ER Table 5.3-5 demonstrates that the Unit 3 thermal plume conforms to each of the criteria; the area occupied by the plume is compared to the State of Maryland water quality criteria. The radial dimension of the 3.6°F (2°C) isotherm, for example, is less than 4% of the ebb tide excursion, compared to one-half of the ebb tide excursion allowed by the State of Maryland regulation. Likewise, the bottom area potentially exposed to the entire 3.6°F (2°C) isotherm would be less than 0.4 acres, which also is well within the State of Maryland regulatory criteria for benthic area affected.

Additionally, the Unit 3 plume is predicted to be a small fraction of the Units 1 and 2 plume (see ER Section 5.3.2.2.1). Based on its location, the Unit 3 plume will have little or no interaction with the Units 1 and 2 plume. Its small cross sectional area is unlikely to provide a barrier to fish migration and its transient nature should limit attraction of fish such that they become acclimated and entrapped there particularly during winter when fish are susceptible to cold shock from plant shutdown.

COLA Impact

No changes to the COLA are required.

RAI Number: 1004-1

Environmental Justice

ESRP 2.5.4 - 1

Two ER maps of minority populations appear to be contradictory. Fig. 2.5-4 (Black or African American Minority Population) and 2.5-7 (Aggregate Minority Population) should look essentially identical with the exception of the much smaller other minoriy populations incorporated into the aggregate map. However, a close look at the two maps reveals that there are populations captured in Fig. 2.5-4 that are not included in Fig. 2.5-7 and that there are a few population areas shown in the aggregate map that are not present in the various minority maps. Please provide corrected maps and/or explain why this apparent discrepancy is correct

UniStar Response:

The aggregate minority is treated as a separate category by NRC, meaning that it has a threshold criterion that it must meet for each state, just like every other race and ethnicity. Just because a block group meets the criterion for a particular minority does not mean that it meets the criterion for the aggregate category. For instance, Maryland has an average Black or African American population of 27.9 percent. A block group consisting of 48 percent African Americans would meet the criterion for a significant Black population because it is more than 20 percent greater than the state percentage. However, Maryland's average aggregate of minorities (sum of American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander Black races, "Other" Races, and Multi-racial) is 36.0 percent. If no other minorities are present in this block group, the block group would not meet the criterion for having a significant aggregate of minorities population because the limiting criterion in this case would be 50 percent.

Similarly, a block group may have smaller percentages of several minorities (e.g., 15 percent each of Black races, Asian, "Other" races, and Multi-racial), adding up to 60 percent in the aggregate category and therefore being identified on Figure 2.5-7, but not meeting the criterion for any of the minorities individually.

In summary, Figures 2.5-4 and 2.5-7 are correct.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1005-1

Cooling System

ESRP 3.4.1 - 1

Provide an estimated date that the desalinization plant will be available for operation after construction is initiated. Identify the environmental impact on water use before and after the desalinization system is operating.

UniStar Response:

The response to this RAI was discussed during a telephone conference with the NRC staff on February 13. UniStar letter UN#09-001, dated January 9, 2009, provides the response to this RAI.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1005-2

Cooling System

ESRP 3.4.2 - 1

The applicant made recent changes to the intake structure and fish return since the COLA was submitted. Provide a description and schematic of the relocated cooling water intake structure, the new fish return design, and armoring of the bay bottom associated with both structures. Provide a figure showing the location of these structures with respect to the existing Unit 1 and 2 plant intake structures and shoreline.

UniStar Response:

UniStar staff and vendors discussed this RAI in telephone conferences with the NRC staff and vendors on February 13, 18, 19, and 24. Clarifications of the NRC's need for additional information resulted in the following response.

A description and some of the figures depicting the relocated cooling water intake structure, new fish return system and bay bottom armoring are provided in UniStar letter UN#08-037, dated September 29, 2008, and letter UN#09-005, dated January 14, 2009. Letter UN#08-037 provides responses to supplemental requests for additional information concerning aquatic ecology. Letter UN#09-005 provides revised ER text and figures that were updated to reflect the relocation of the cooling water intake structure.

In addition to the information provided in the letters described above, figures prepared and submitted by Calvert Cliffs Unit 3 Nuclear Project, LLC and Unistar Nuclear Operating Services, LLC to the Army Corps of Engineers pursuant to the plant expansion permit application provide detailed information on the cooling water intake structure, new fish return system, and bay bottom armoring. The relevant figures are as follows:

Key Plan
Figure 1 – Site Location
Figure 2 – USGS 7.5 Minute Topographic Quadrangle
Figure 3 – Site Plan @ Unit 3 Intake Structure – Sht 1
Figure 3A – Site Plan @ Unit 3 Intake Structure – Sht 2
Figure 3B – Proposed Armor Protection
Figure 4 – Site Plan @ Unit 3 Intake Structure – Sht 1
Figure 4A – Fish Return
Figure 5 – Seal Well & Discharge Piping
Figure 5A – Seal Well (In Uplands)
Figure 5B – Seal Well & Discharge Piping
Figure 5C – Discharge Outfall Details
Figure 5D – Discharge Outfall Details
Figure 6 – Proposed Restoration of Barge Slip (With Existing Contours)
Figure 6A – Modifications @ Existing Barge Unloading Facility
Figure 6B – Modifications @ Existing Barge Unloading Facility
Figure 6C – Section @ Proposed Barge Slip Modification
Figure 6D – Modifications for New Bulkhead & Apron
Figure 6E – Section Thru Concrete Apron
Figure 6F – Stone Outlet & Earth Berm Sections (In Uplands)

Figure 6G – Stream Outfall Details
Figure 6H – Barge Slip Restoration

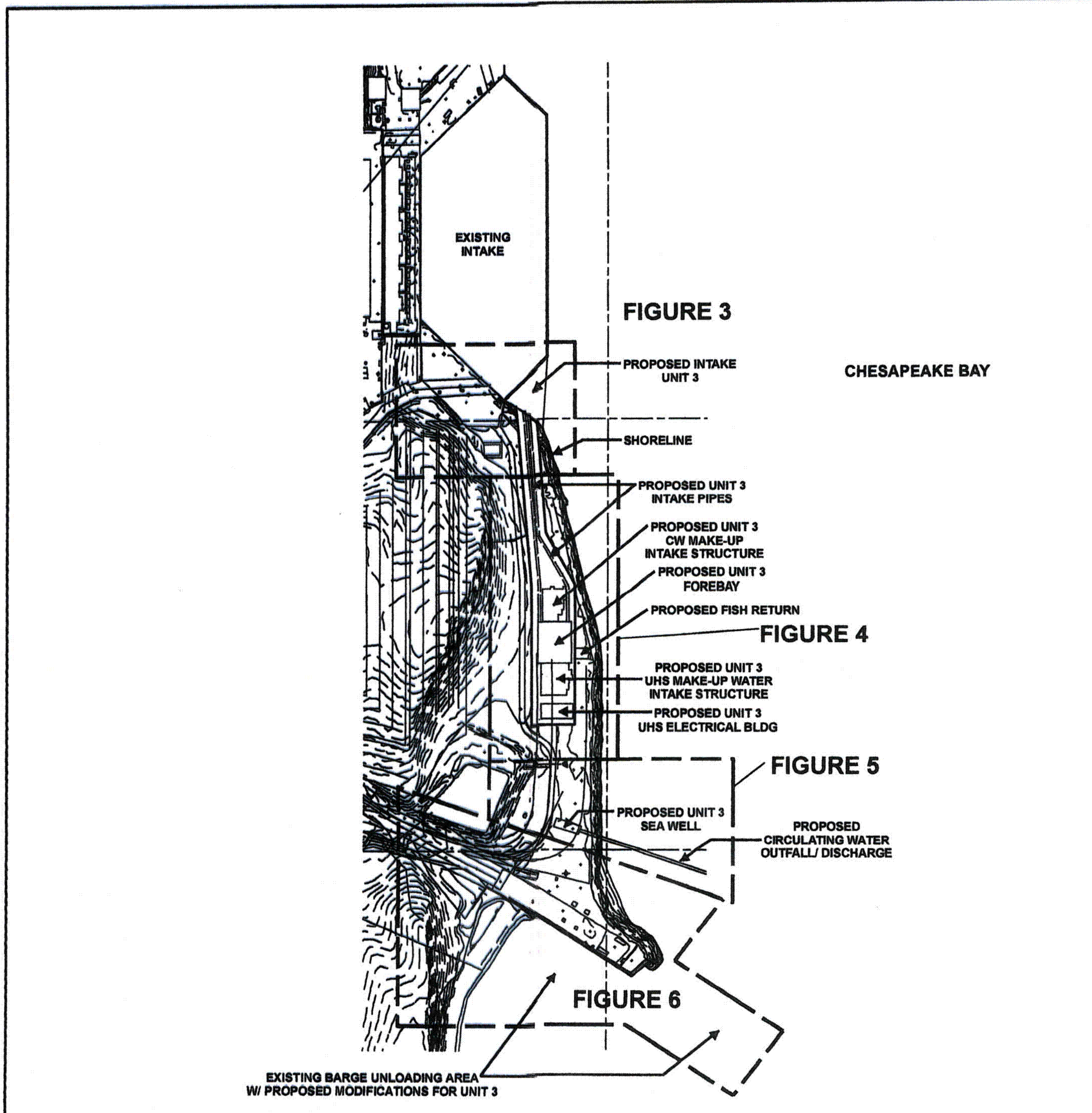
The above figures are included in this response. The Key Plan and Figures 3, 4, 5B, 5C, 5D, 6, and 6A were included in the information provided in UniStar letter UN 08-037. Figure 5A is a slightly simplified version of ER Revision 3, Figure 3.4-6. Figure 5C, on the other hand, is a modification of ER revision 3, Figure 3.4-7 containing additional riprap and fills details. Figures 1, 2, 3A, 3B, 4A, 5, and 6B through 6H contain supplemental information with no existing analogous ER figures.

Also see Figure 4.3.2-2 provided in response to ER RAI 1001-13, Question 4.3.2-2, to show the plant arrangement related to the locations of Unit 3 shoreline structures relative to existing Units 1 & 2 intake and discharge structures and fish returns.

COLA Impact:

No changes required to COLA text, tables or figures beyond what has already been transmitted to the NRC in UniStar letters UN 08-037 and UN 09-005

TIDAL



PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	KEY PLAN SCALE IN FEET 0 300 600 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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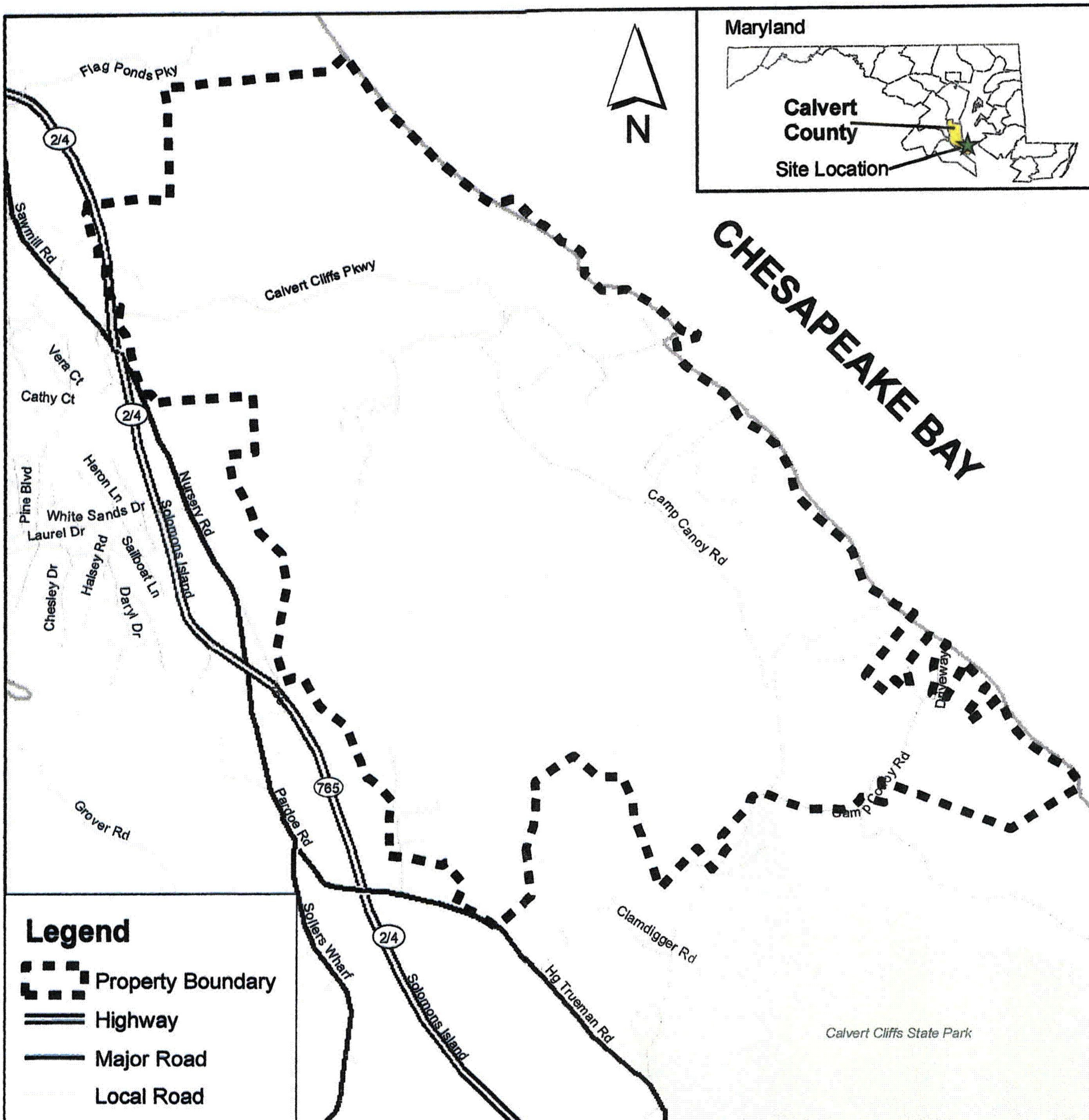

PURPOSE: PLANT EXPANSION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	**SITE LOCATION** **FIGURE 1** SCALE IN FEET 0 2,000 4,000 Feet	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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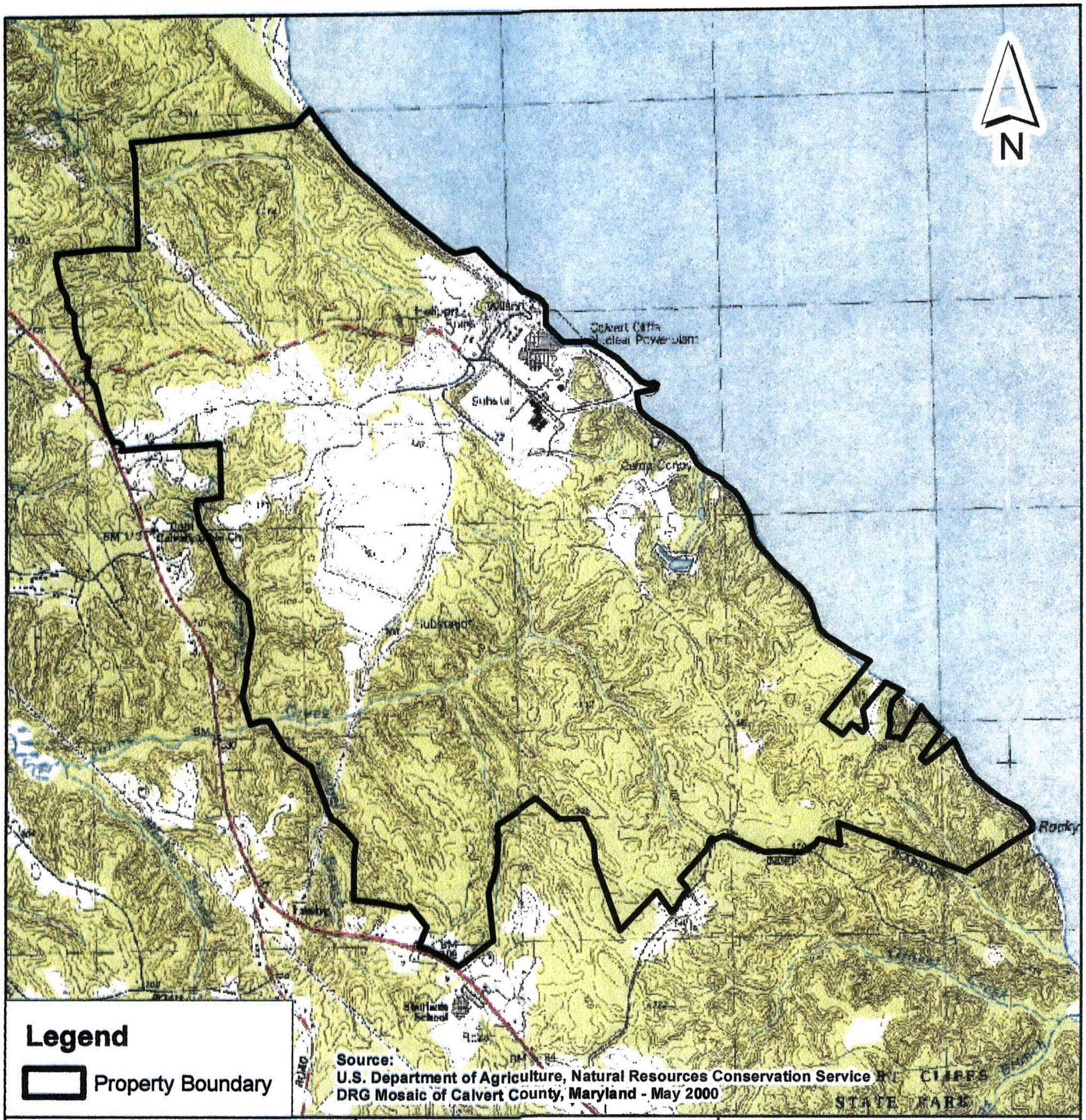

PURPOSE: PLANT EXPANSION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE FIGURE 2 SCALE IN FEET 0 2,000 4,000 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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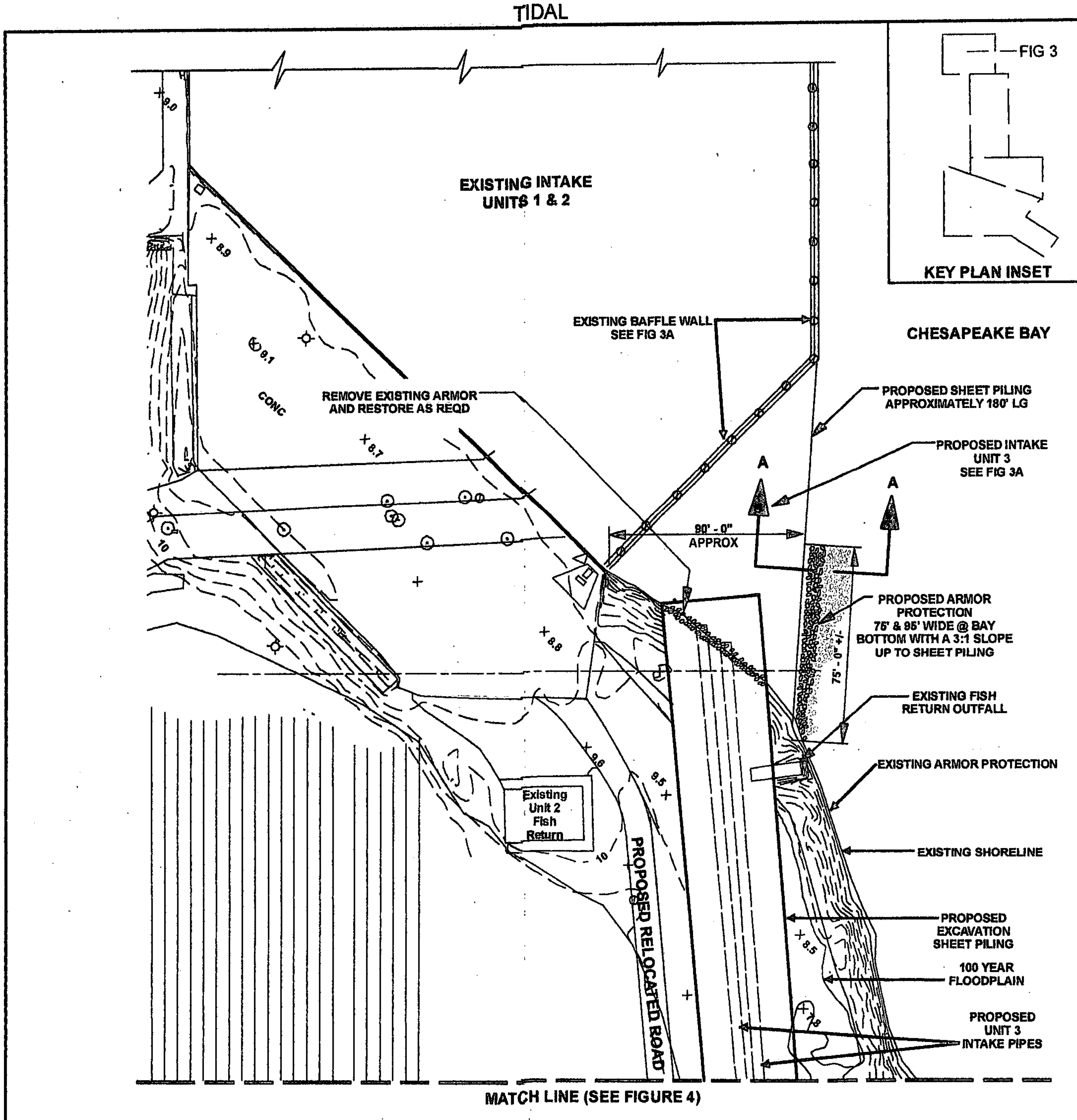

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PURPOSE: PLANT EXPANSION
DATA SOURCE:
BECHTEL CORPORATION
DATUM: (NGVD 29)
PROJECT LATITUDE/LONGITUDE:
38.424133
-76.441598

N

FIGURE 3
SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 1

SCALE IN FEET

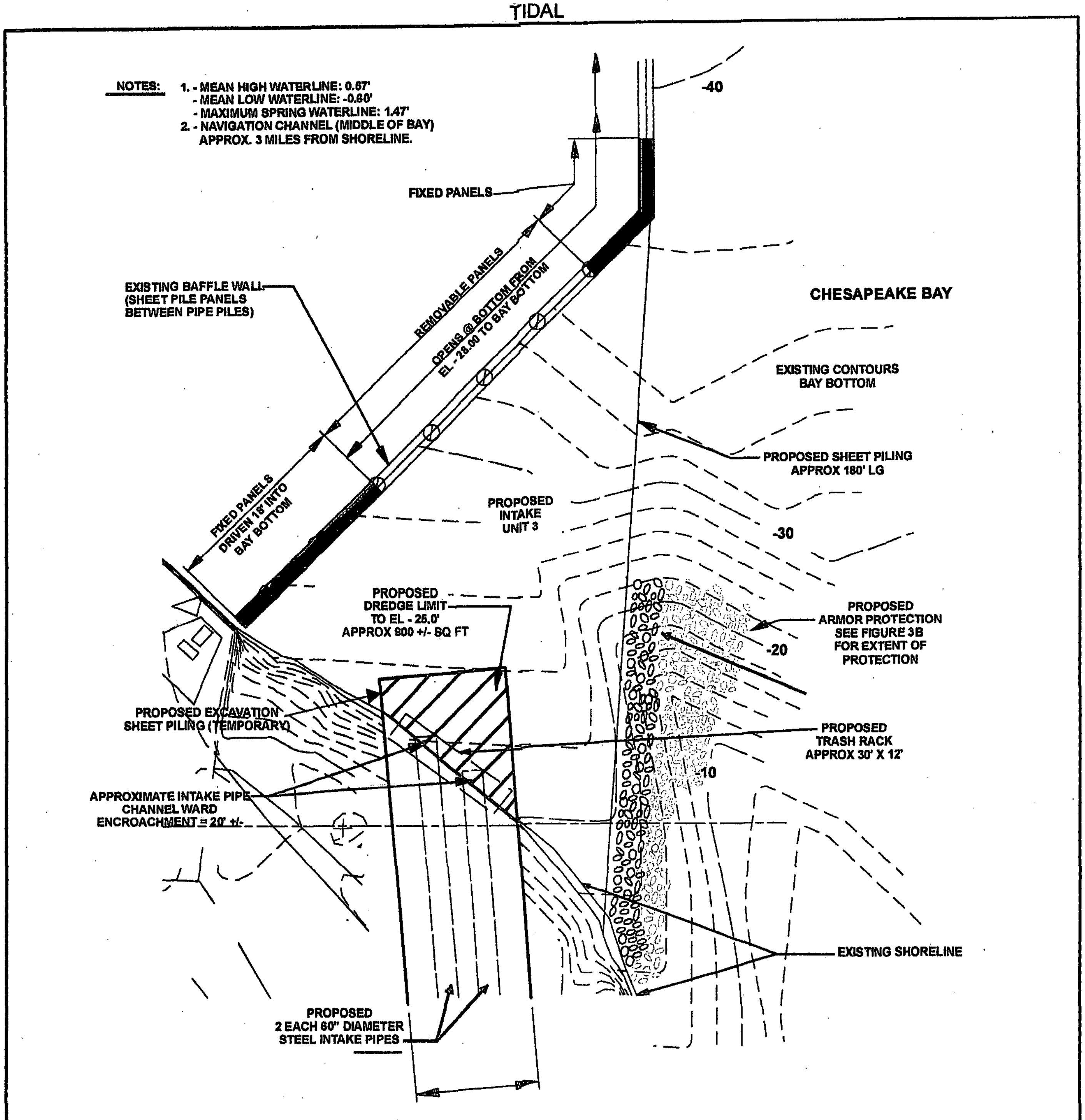
0 50 100 Feet

CALVERT CLIFFS NUCLEAR POWER PLANT

IN:
PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD
APPLICATION BY:
CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC
AND UNISTAR NUCLEAR OPERATING SERVICES,LLC

DATE: 5/09/08 REV3 3/3/09

TIDAL



PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	FIGURE 3A SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 2 SCALE IN FEET 0 25 50 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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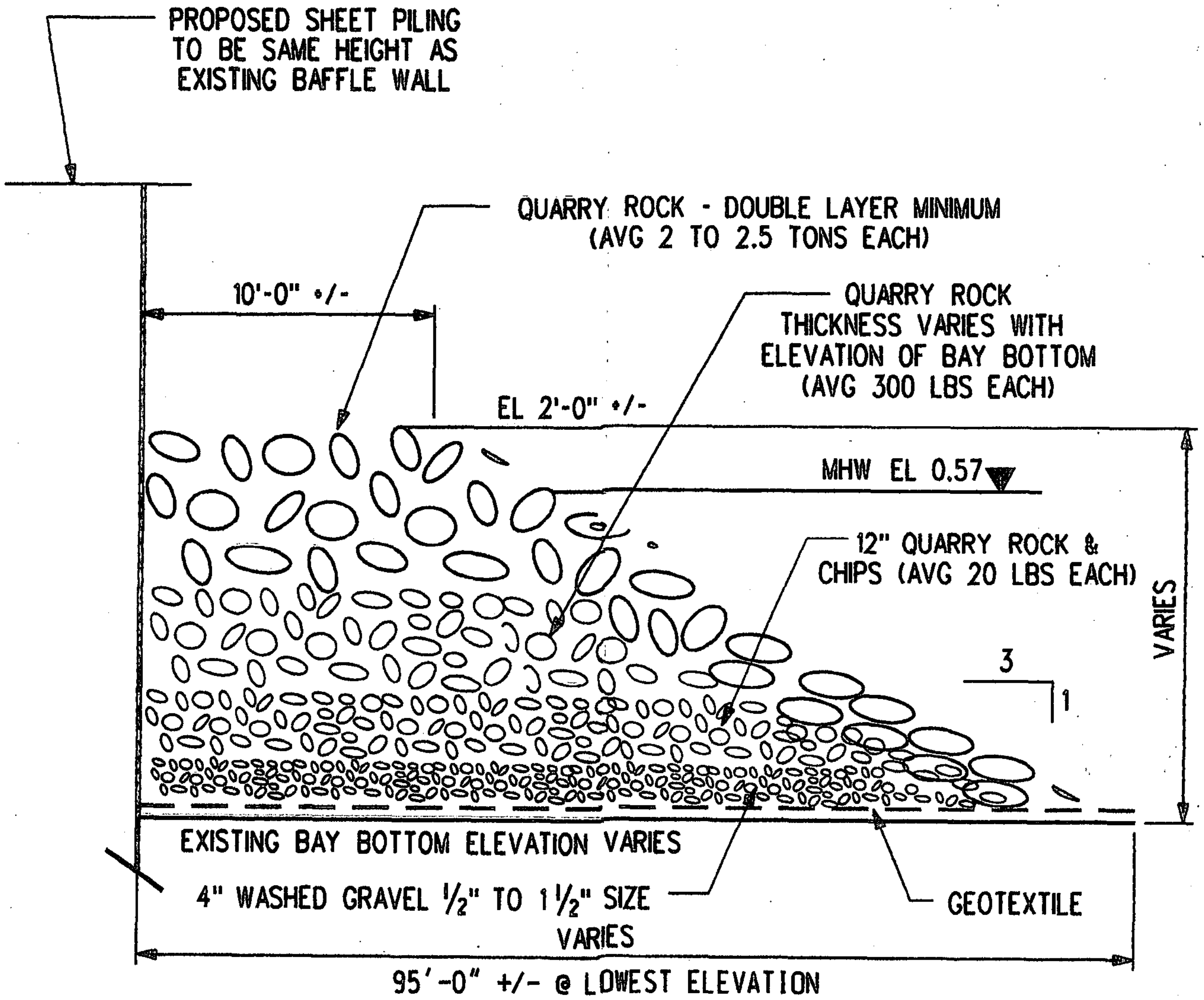
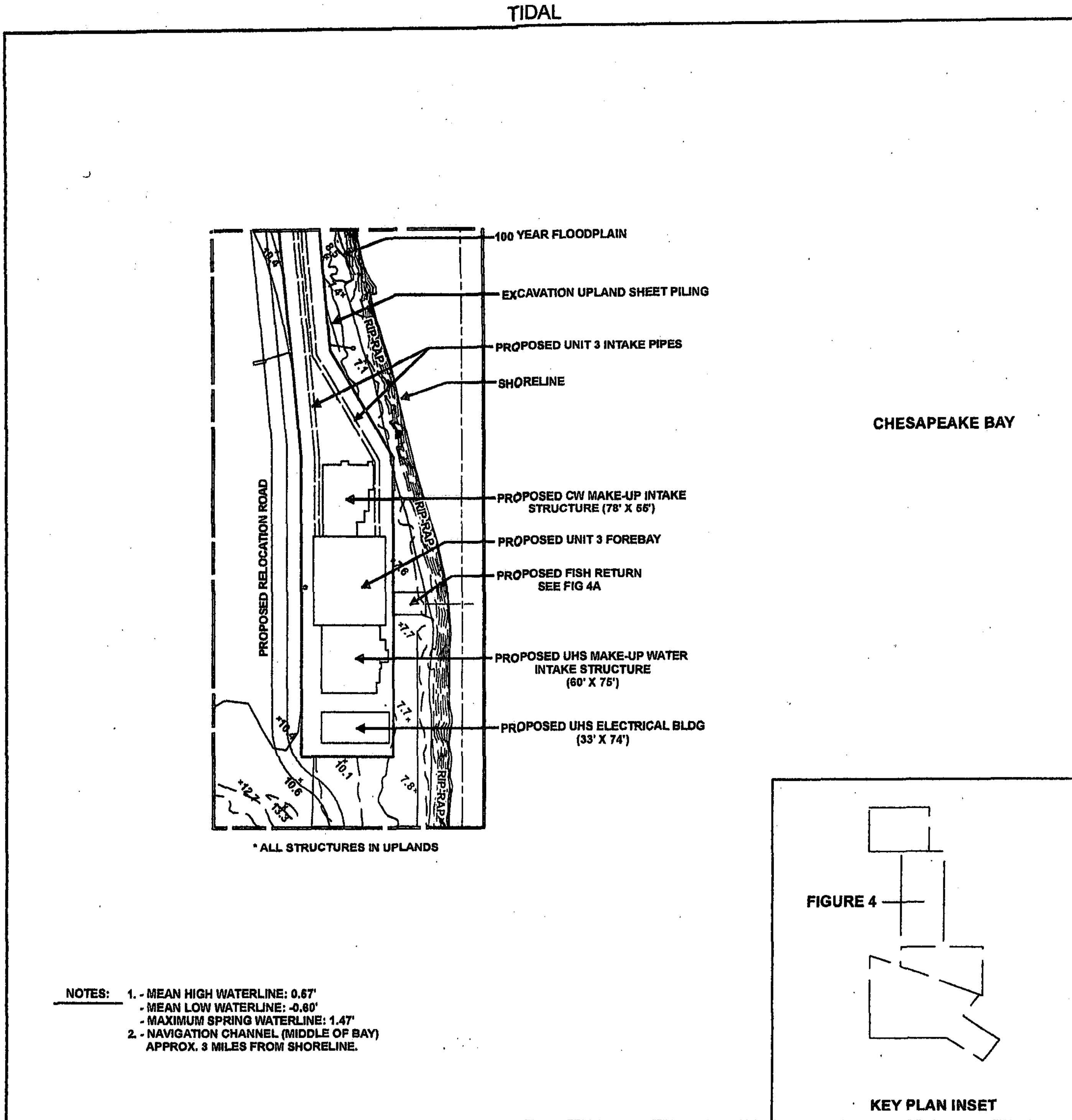


SEE FIGURE 3 FOR LENGTH OF PROPOSED ARMOR PROTECTION

SECTION A - A

PURPOSE: PLANT EXPANSION	FIGURE 3B	CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 3
DATUM: (NGVD 29)	PROPOSED ARMOR PROTECTION	IN: PATUXENT/ WEST CHESAPEAKE BAY
PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	SCALE NOT TO SCALE	COUNTY OF: CALVERT STATE: MD APPLICATION BY: UNISTAR NUCLEAR ENERGY SHEET OF DATE:



PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	FIGURE 4 SITE PLAN @ UNIT 3 INTAKE STRUCTURE - SHT 1 SCALE IN FEET 0 150 300 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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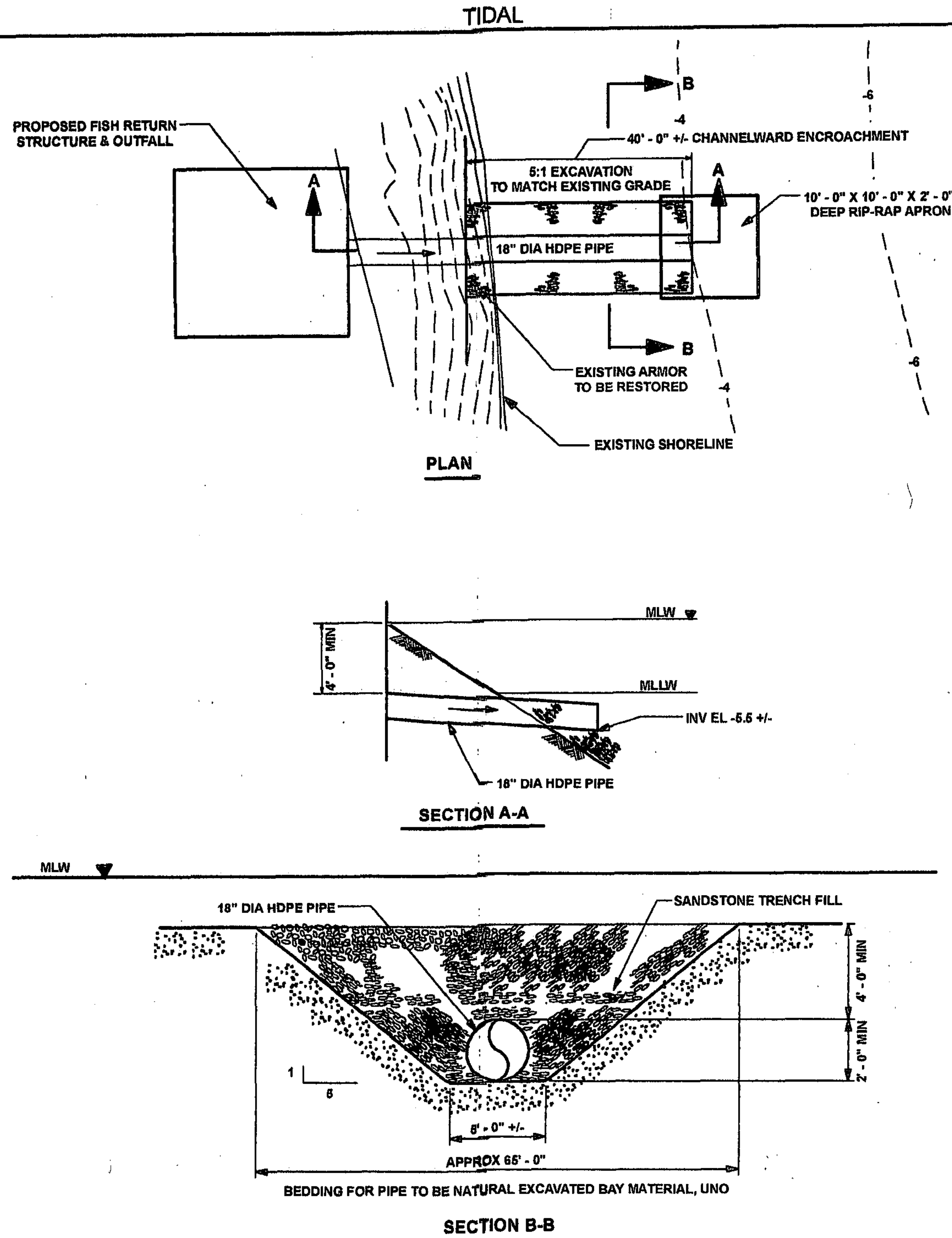

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	**FIGURE 4A** **FISH RETURN** SCALE IN FEET **NOT TO SCALE**	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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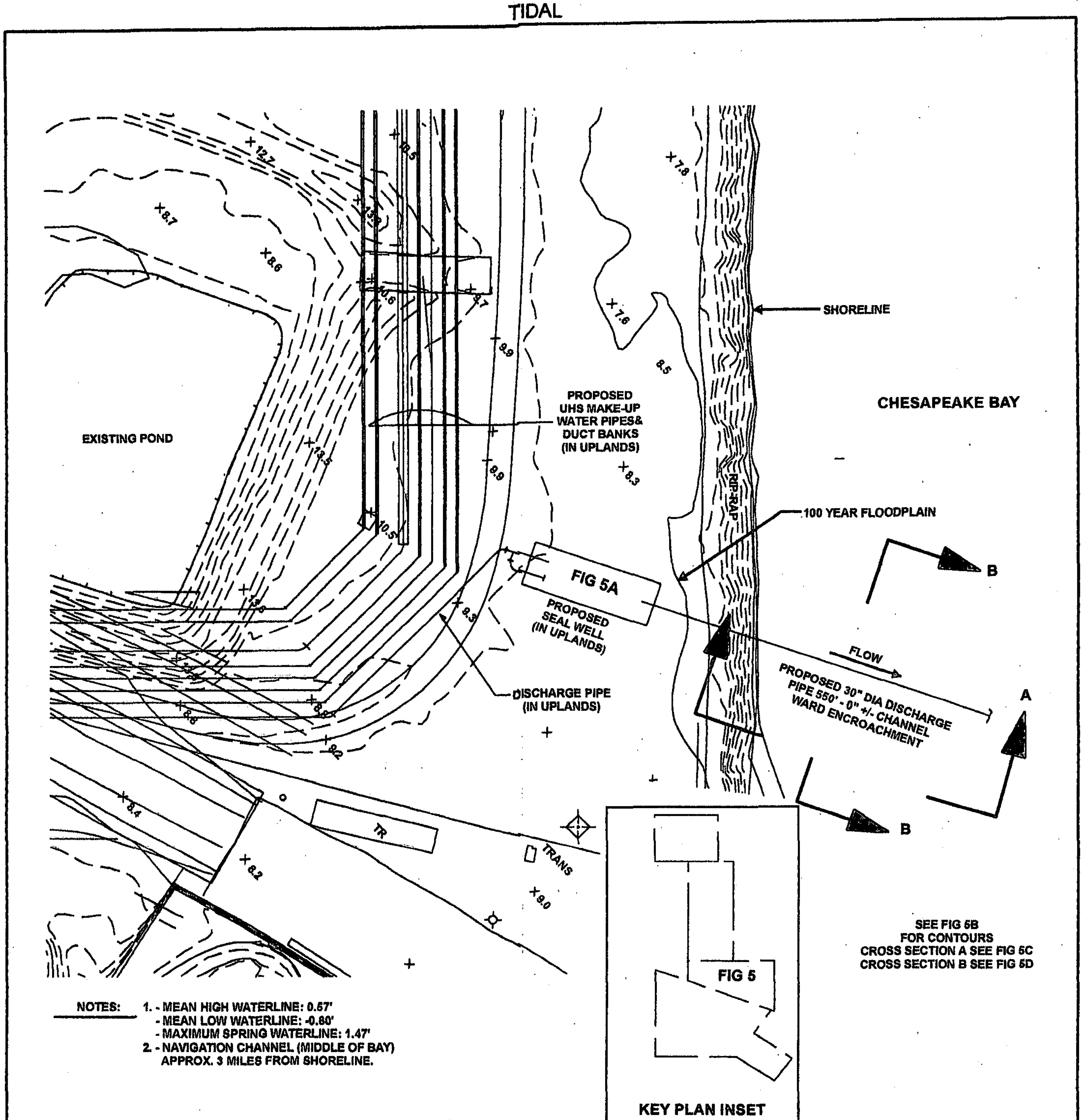

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	FIGURE 5 SEAL WELL & DISCHARGE PIPING SCALE IN FEET 0 60 120 Feet	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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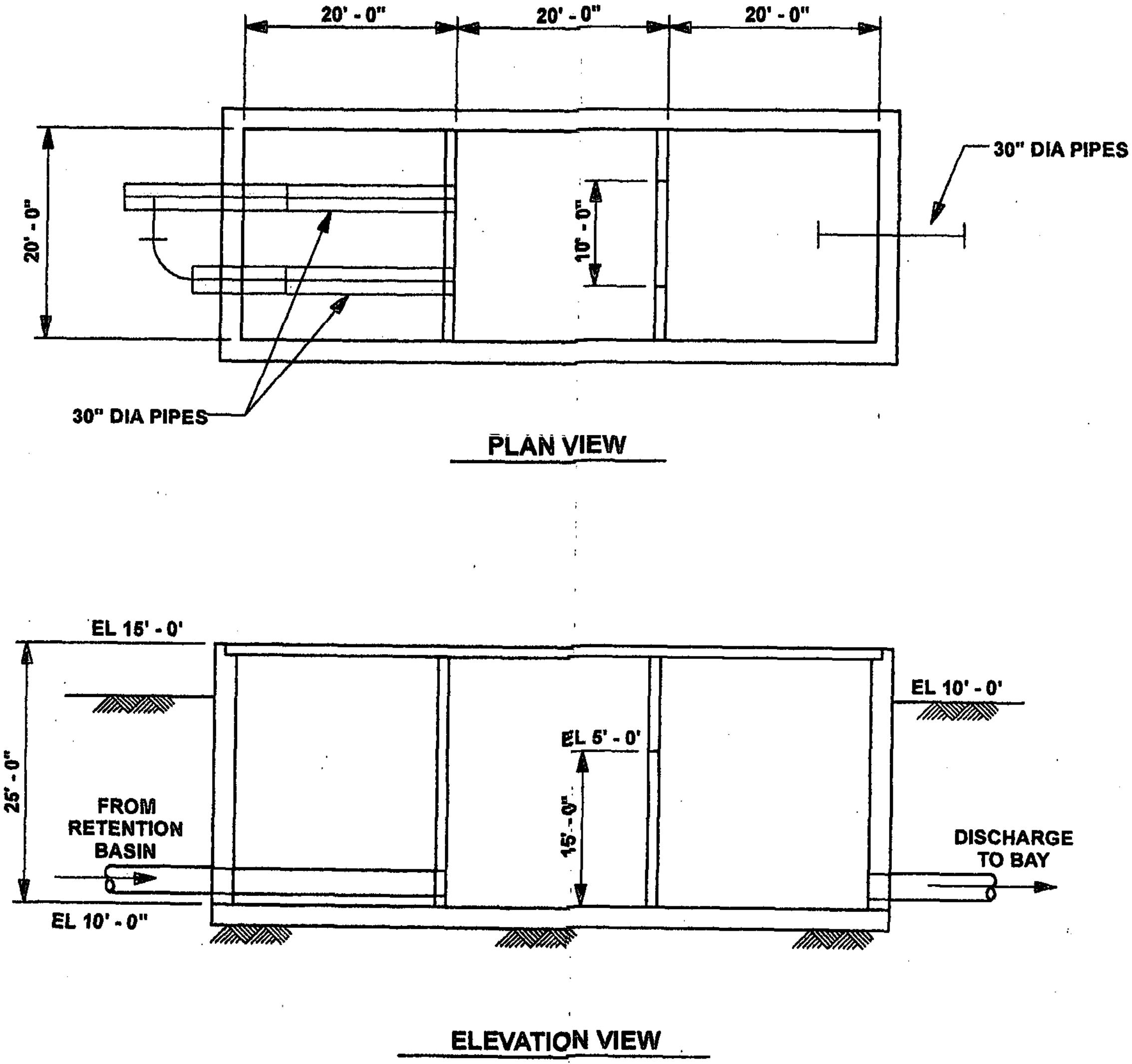

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	FIGURE 5A SEAL WELL (IN UPLANDS) SCALE IN FEET NOT TO SCALE	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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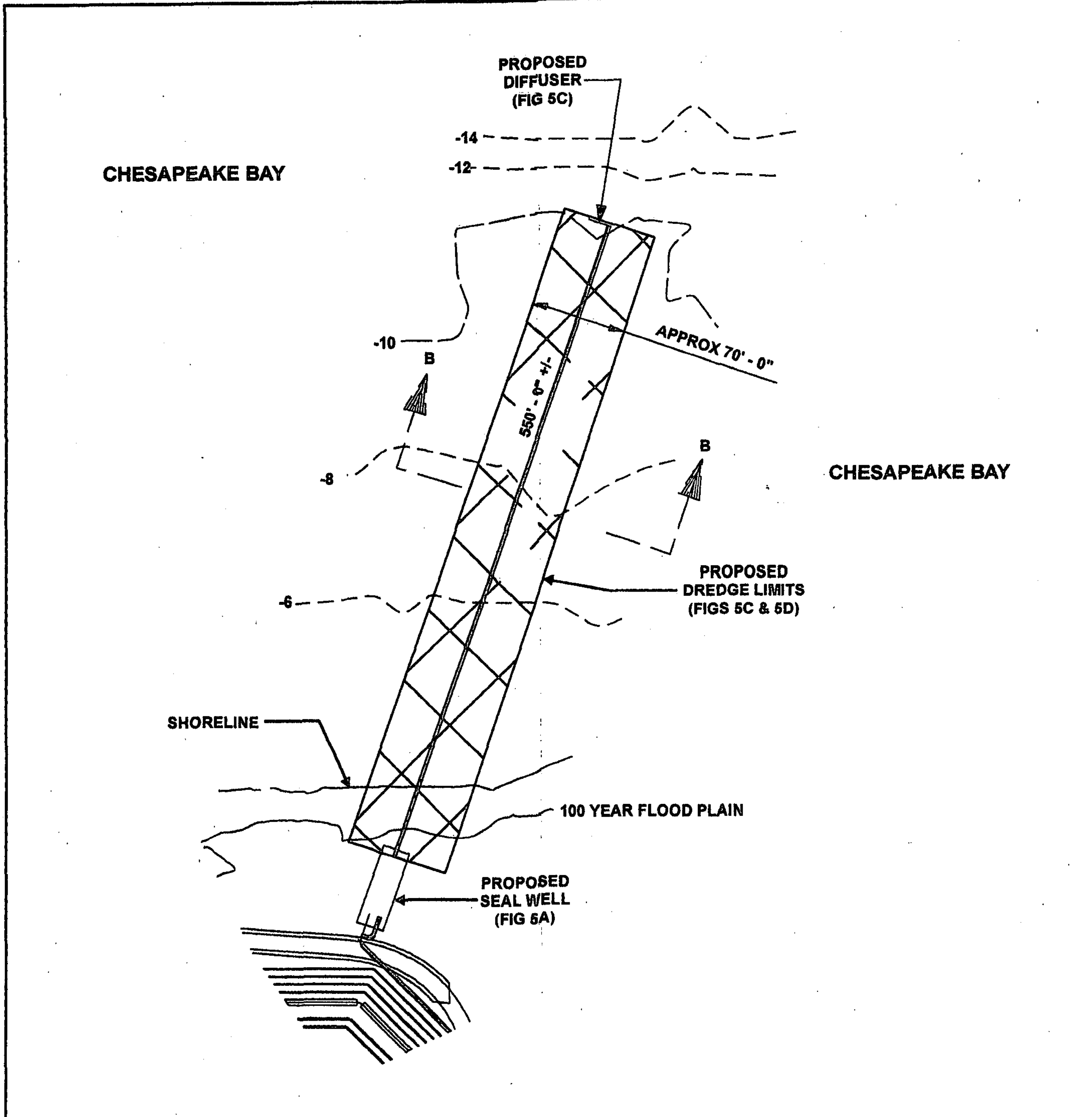

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	**FIGURE 5B** **SEAL WELL &** **DISCHARGE PIPING** SCALE IN FEET 0 100 200 Feet	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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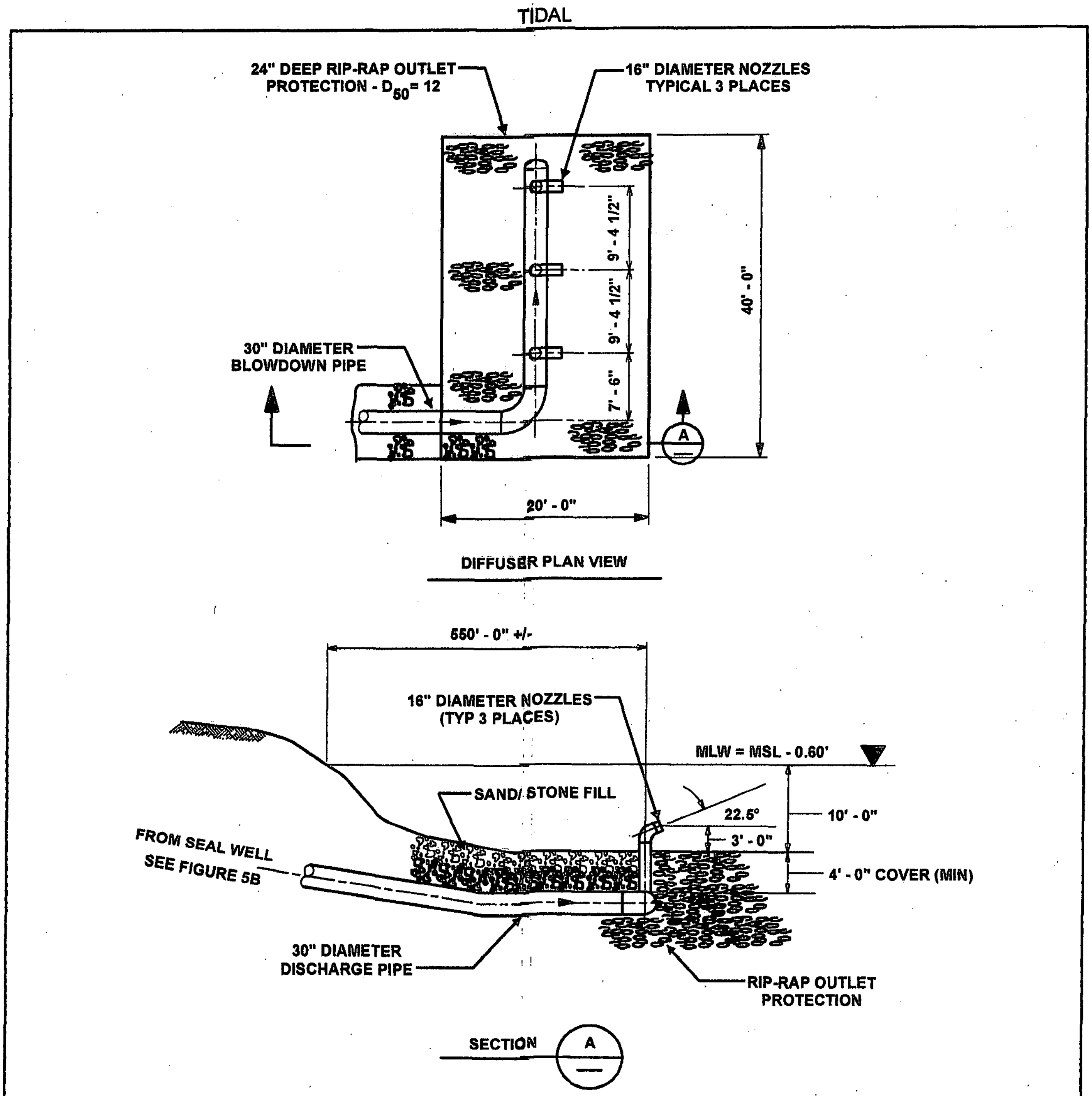

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	**FIGURE 5C DISCHARGE OUTFALL DETAILS** SCALE IN FEET **NOT TO SCALE**	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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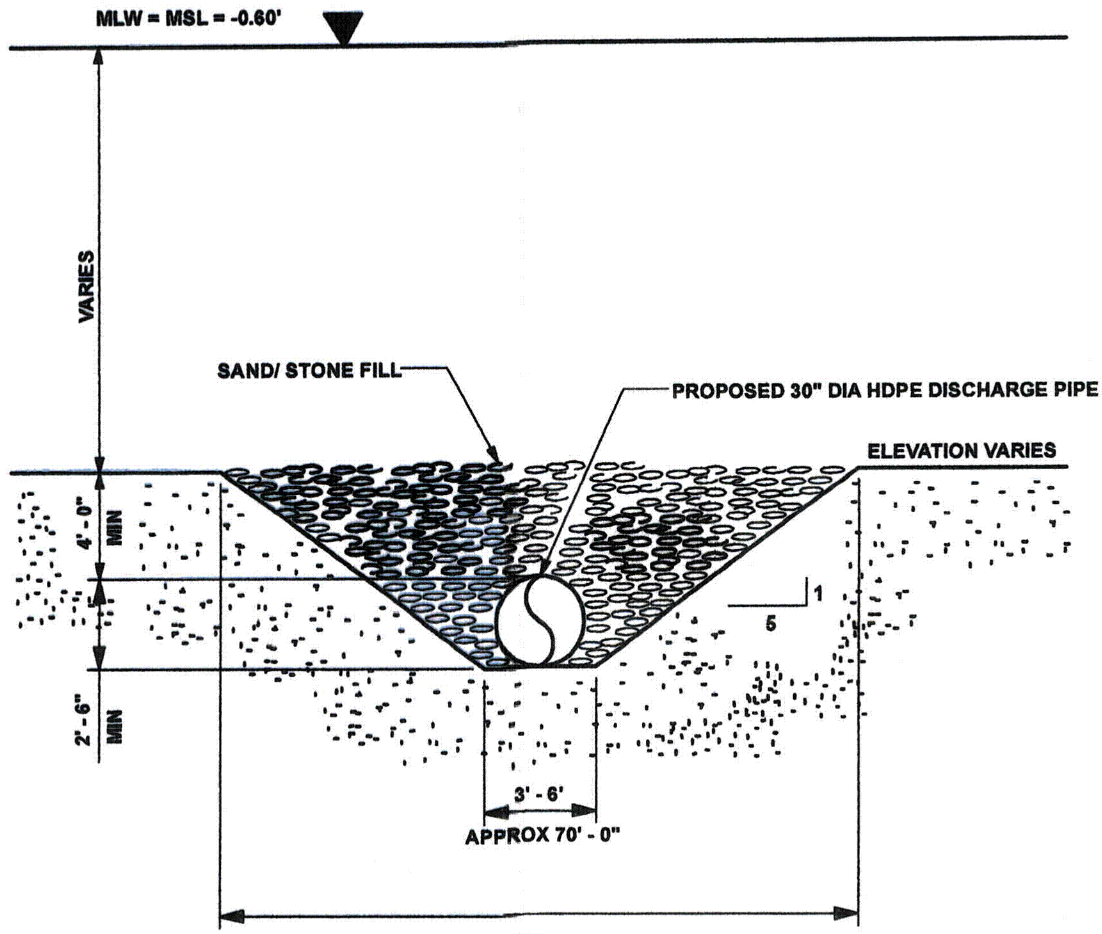

BEDDING FOR PIPE TO BE NATURAL EXCAVATED BAY MATERIAL, UNO
SEE FIG 5C FOR RIP-RAP PROTECTION @ DIFFUSER END

SECTION B

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	FIGURE 5D DISCHARGE OUTFALL DETAILS SCALE IN FEET NOT TO SCALE	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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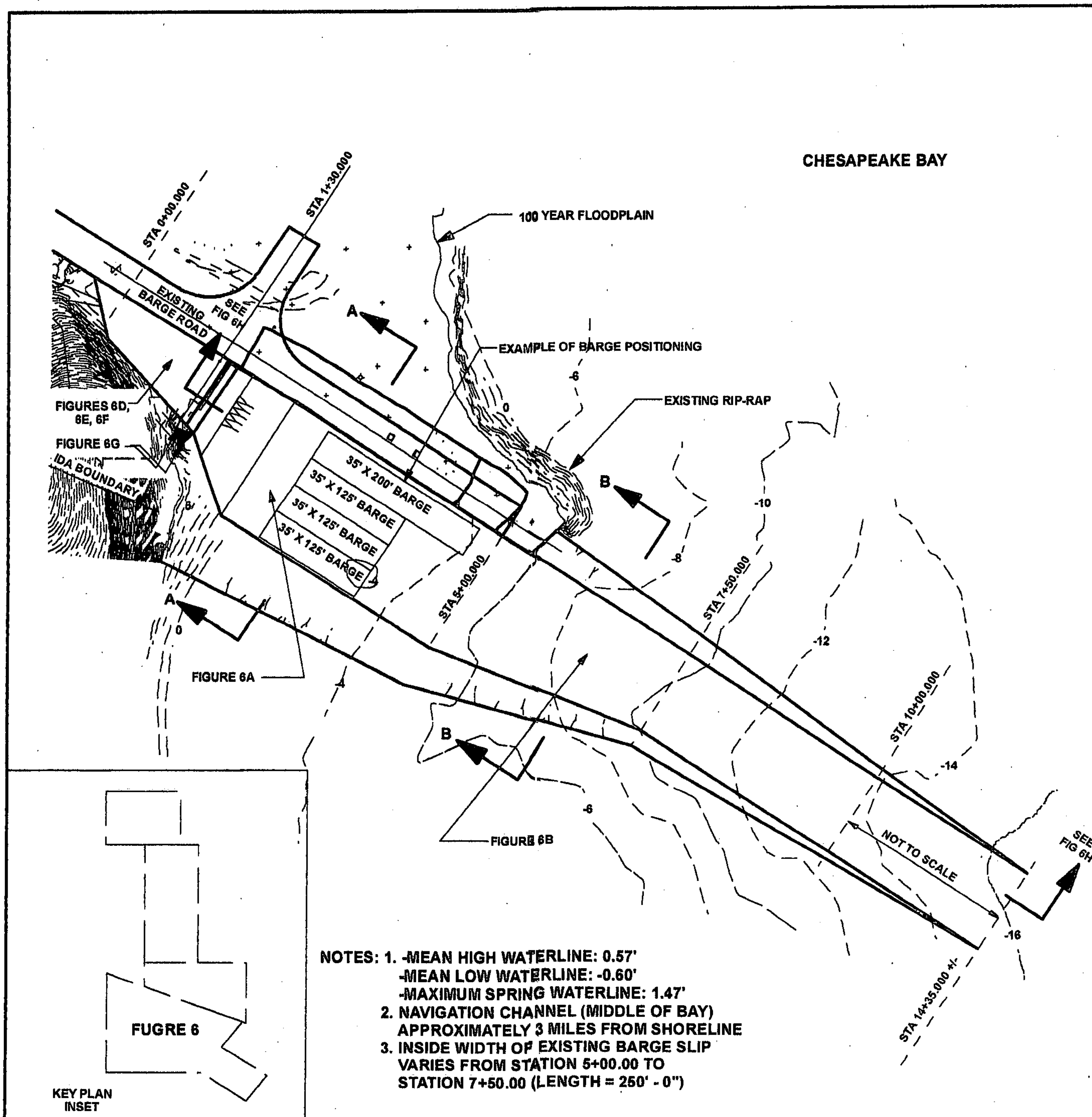

NOTES: 1. -MEAN HIGH WATERLINE: 0.57'
-MEAN LOW WATERLINE: -0.60'
-MAXIMUM SPRING WATERLINE: 1.47'
2. NAVIGATION CHANNEL (MIDDLE OF BAY) APPROXIMATELY 3 MILES FROM SHORELINE
3. INSIDE WIDTH OF EXISTING BARGE SLIP VARIES FROM STATION 5+00.00 TO STATION 7+50.00 (LENGTH = 250' - 0")

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598 N	**FIGURE 6** **PROPOSED RESTORATION OF BARGE SLIP** **(WITH EXISTING CONTOURS)** SCALE IN FEET 0 100 200 300 Feet	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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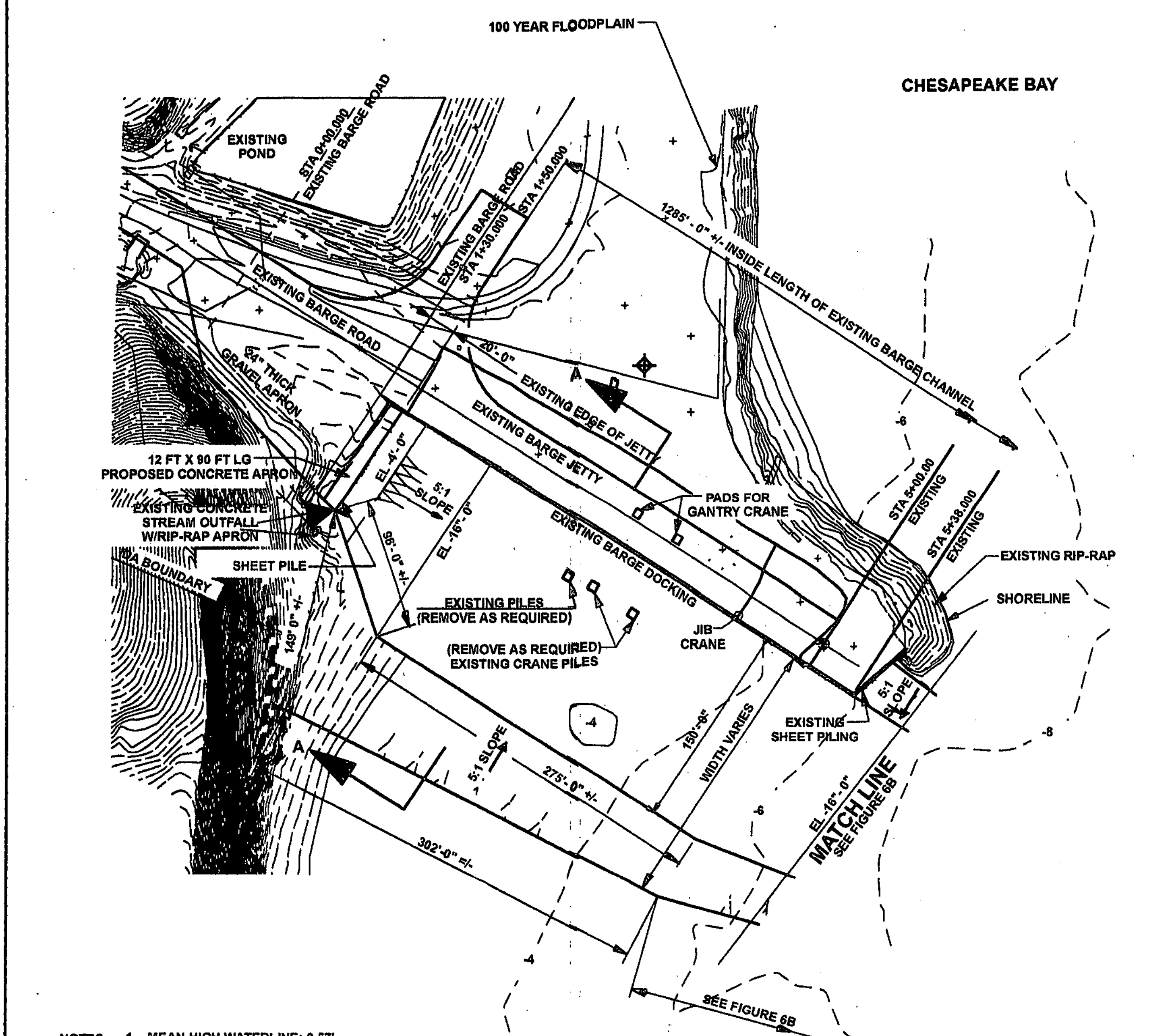

NOTES: 1. - MEAN HIGH WATERLINE: 0.57'
- MEAN LOW WATERLINE: -0.60'
- MAXIMUM SPRING WATERLINE: 1.47'
2. - NAVIGATION CHANNEL (MIDDLE OF BAY) APPROX. 3 MILES FROM SHORELINE.
3. - INSIDE WIDTH OF EXISTING BARGE SLIP VARIES FROM STATION 5+00.00 TO STATION 7+50.00 (LENGTH = 250' - 0")

PURPOSE: PLANT EXPANSION
DATA SOURCE: BECHTEL CORPORATION
DATUM: (NGVD 29)
PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598

FIGURE 6 A
MODIFICATIONS @ EXISTING BARGE UNLOADING FACILITY

SCALE IN FEET
0 50 100 150 Feet

CALVERT CLIFFS NUCLEAR POWER PLANT

IN: PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD
APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC
DATE: 5/09/08 REV1 7/14/08

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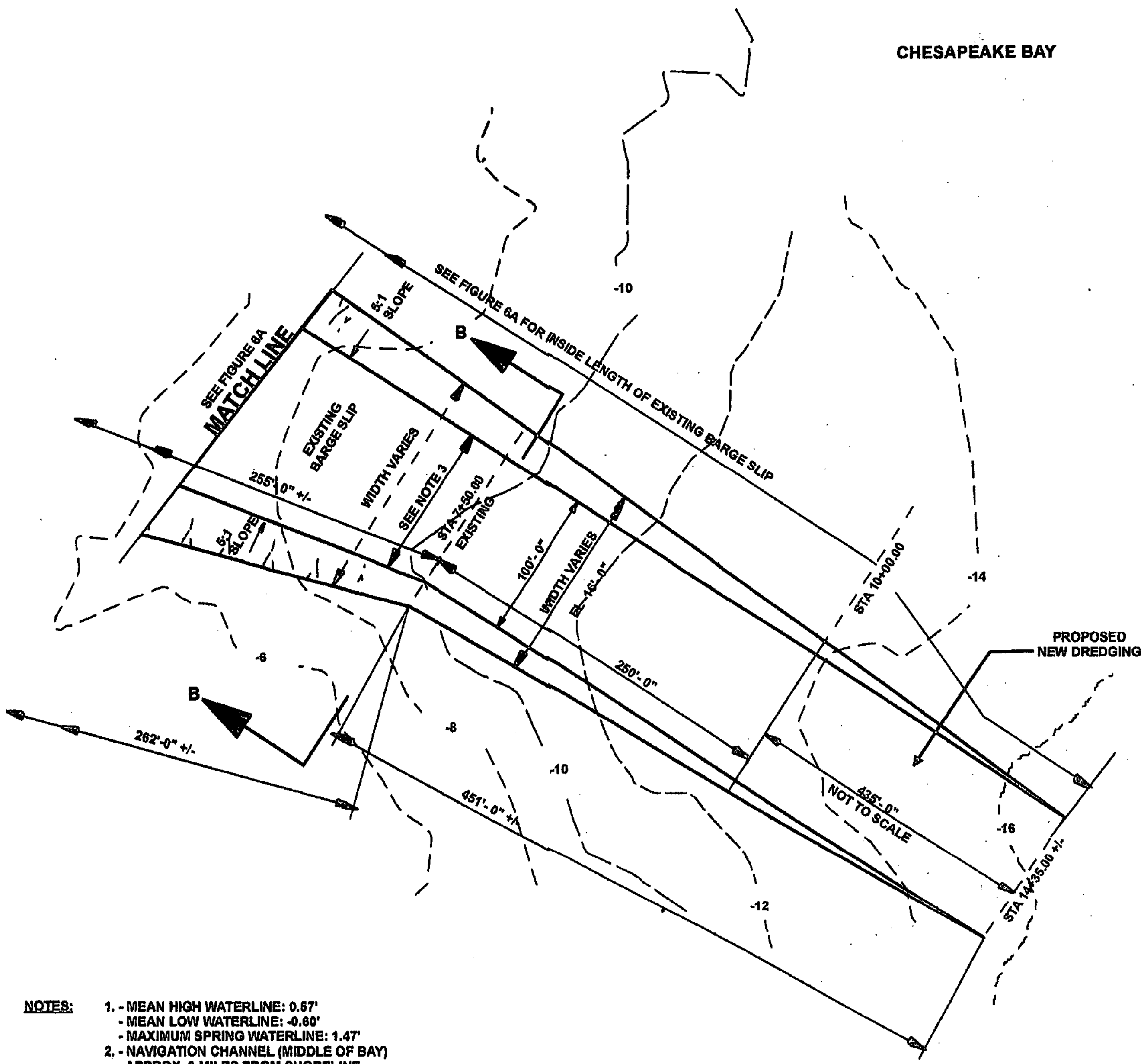

NOTES:
1. - MEAN HIGH WATERLINE: 0.57'
   - MEAN LOW WATERLINE: -0.60'
   - MAXIMUM SPRING WATERLINE: 1.47'
2. - NAVIGATION CHANNEL (MIDDLE OF BAY) APPROX. 3 MILES FROM SHORELINE.
3. - INSIDE WIDTH OF EXISTING BARGE SLIP VARIES FROM STATION 5+00.00 TO STATION 7+50.00 (LENGTH = 250' - 0")

PURPOSE: PLANT EXPANSION
DATA SOURCE:
BECHTEL CORPORATION
DATUM: (NGVD 29)
PROJECT LATITUDE/LONGITUDE:
38.424133
-76.441598
N

FIGURE 6 B
MODIFICATIONS @ EXISTING BARGE UNLOADING FACILITY

SCALE IN FEET
0 50 100 150
Feet

CALVERT CLIFFS NUCLEAR POWER PLANT

IN:
PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD
APPLICATION BY:
CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC
AND UNISTAR NUCLEAR OPERATING SERVICES,LLC

DATE: 5/09/08 REV1 7/14/08

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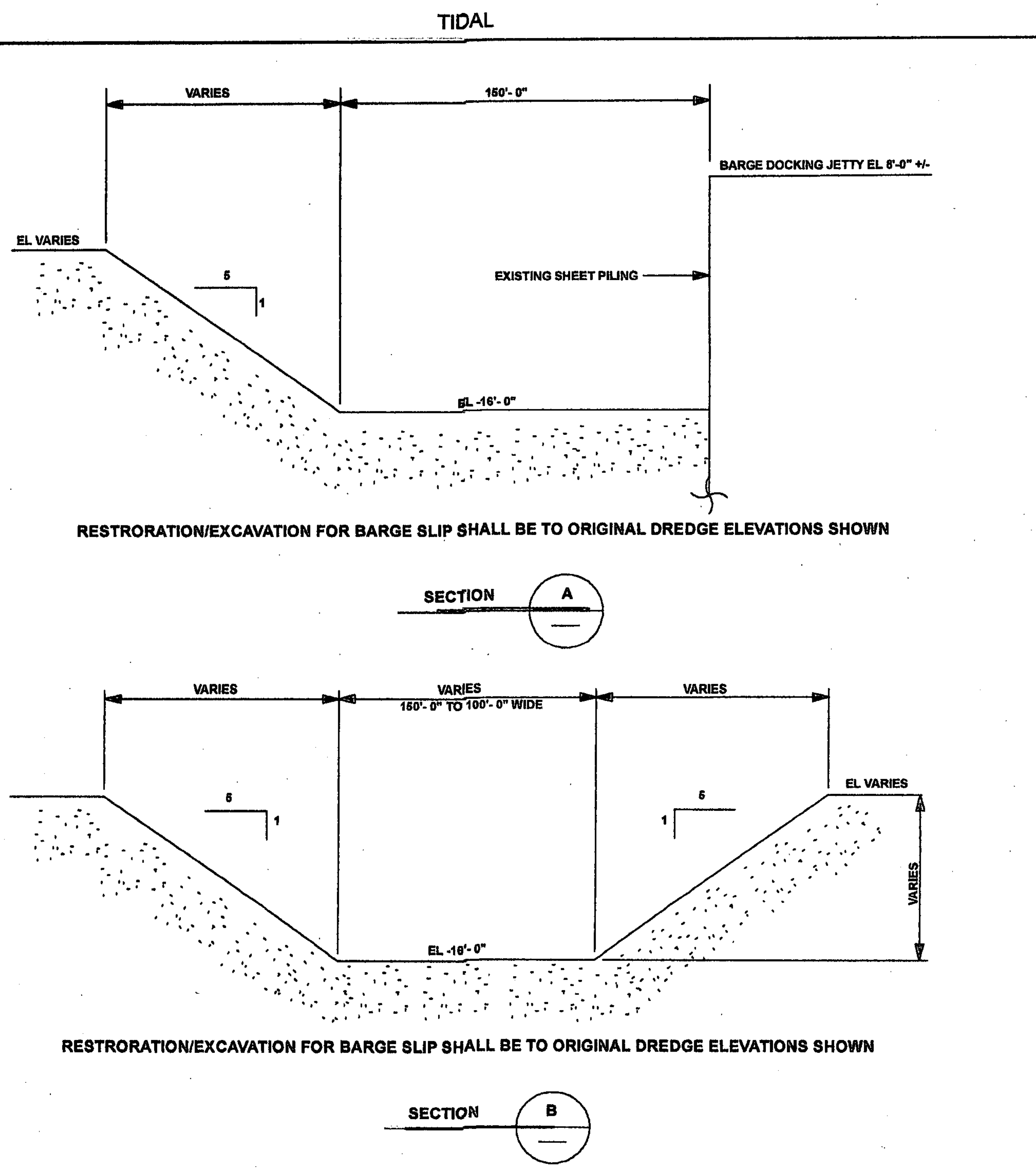

PURPOSE: PLANT EXPANSION
DATA SOURCE:
BECHTEL CORPORATION
DATUM: (NGVD 29)
PROJECT LATITUDE/LONGITUDE:
38.424133
-76.441598

FIGURE 6 C
SECTION @ PROPOSED BARGE SLIP MODIFICATION

SCALE IN FEET

NOT TO SCALE

CALVERT CLIFFS NUCLEAR POWER PLANT

IN:
PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD
APPLICATION BY:
CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC
AND UNISTAR NUCLEAR OPERATING SERVICES,LLC

DATE: 5/09/08 REV1 7/14/08

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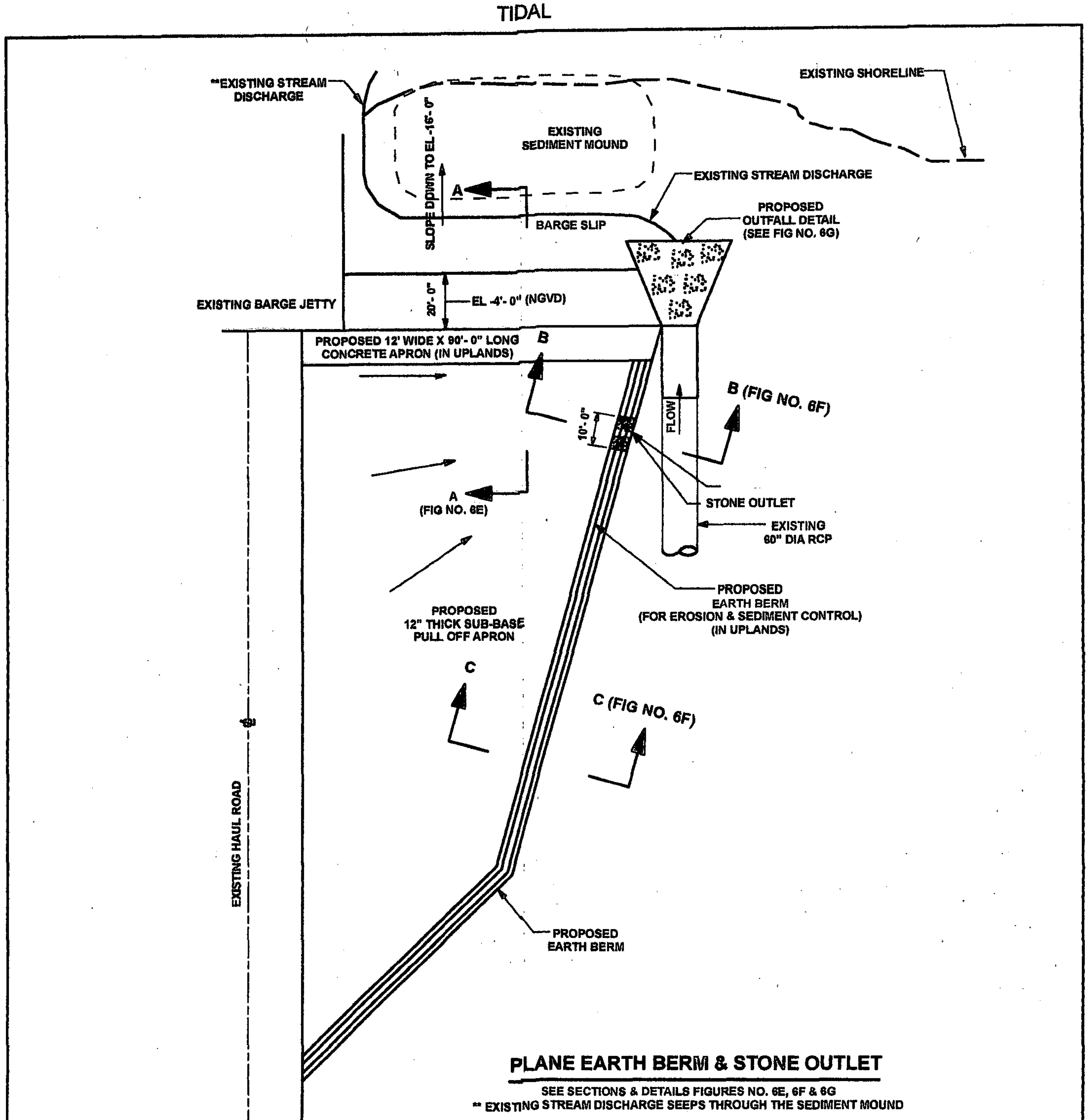

PLANE EARTH BERM & STONE OUTLET

SEE SECTIONS & DETAILS FIGURES NO. 6E, 6F & 6G
** EXISTING STREAM DISCHARGE SEEPS THROUGH THE SEDIMENT MOUND

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	**FIGURE 6 D** **MODIFICATIONS FOR NEW BULKHEAD & APRON** SCALE IN FEET **NOT TO SCALE**	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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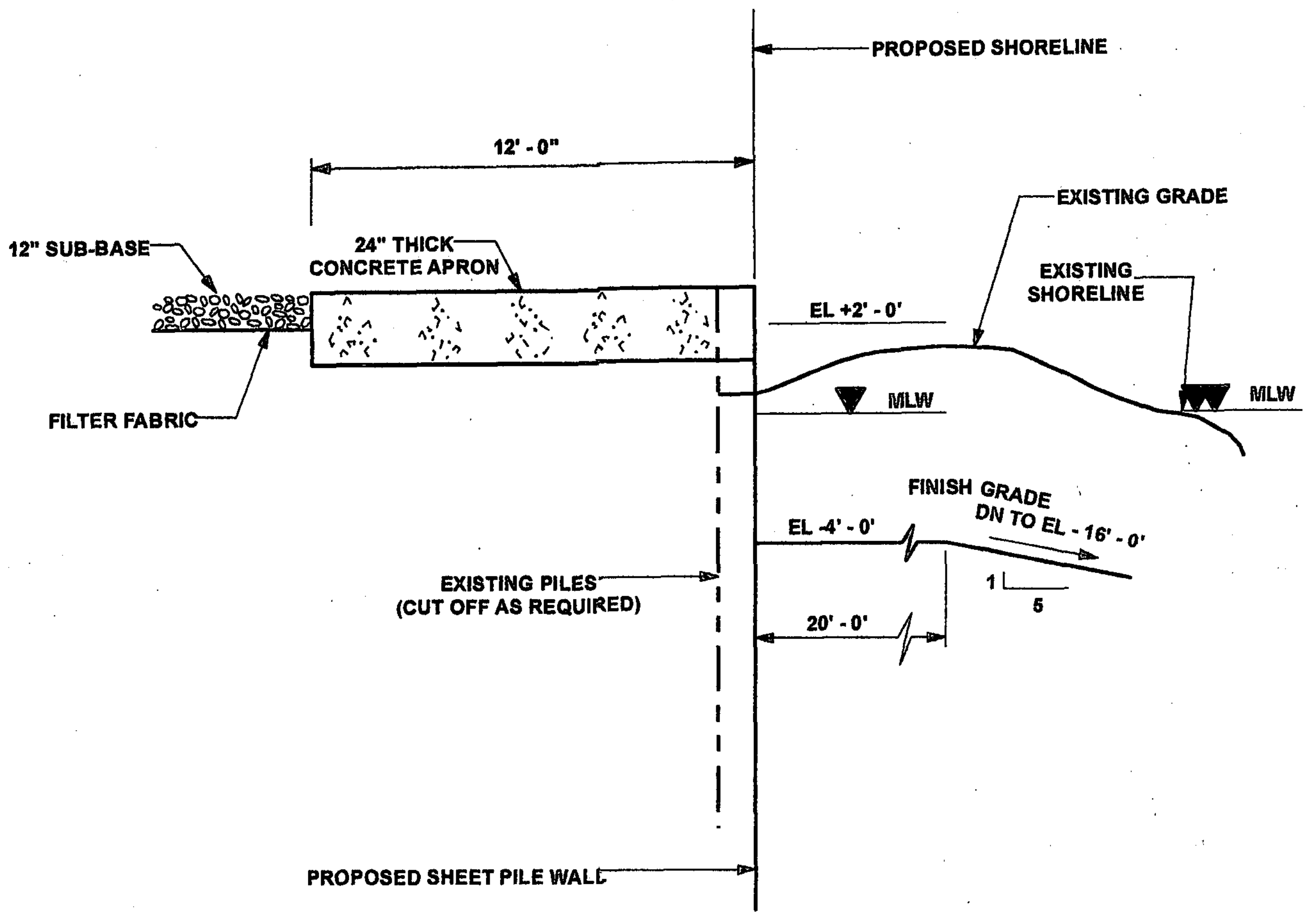

SECTION A-A

SEE FIGURE 6A FOR LOCATION OF APRON AND SHEET PILING
SEE FIGURE 6D FOR MODIFICATIONS OF NEW BULKHEAD AND APRON

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	FIGURE 6 E SECTION THRU CONCRETE APRON	CALVERT CLIFFS NUCLEAR POWER PLANT
	SCALE IN FEET NOT TO SCALE	IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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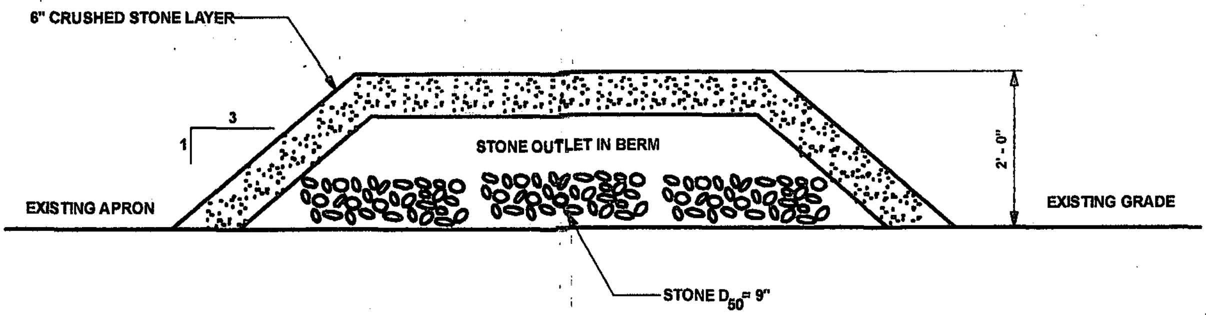
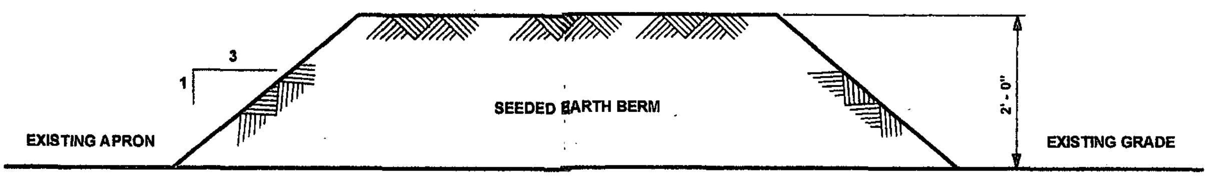


SECTION B-B



SECTION C-C

EARTH BERM & STONE OUTLET DETAILS

EROSION & SEDIMENT CONTROL

SEE MODIFICATIONS FOR NEW BULKHEAD & APRON FIGURE NO. 6D

PURPOSE: PLANT EXPANSION
DATA SOURCE:
BECHTEL CORPORATION
DATUM: (NGVD 29)
PROJECT LATITUDE/LONGITUDE:
38.424133
-76.441598

FIGURE 6F
STONE OUTLET &
EARTH BERM SECTIONS
(IN UPLANDS)

SCALE IN FEET

NOT TO SCALE

CALVERT CLIFFS NUCLEAR POWER PLANT

IN:
PATUXENT / WEST CHESAPEAKE BAY
COUNTY OF: CALVERT STATE: MD
APPLICATION BY:
CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC
AND UNISTAR NUCLEAR OPERATING SERVICES,LLC

DATE: 5/09/08 REV1 7/14/08

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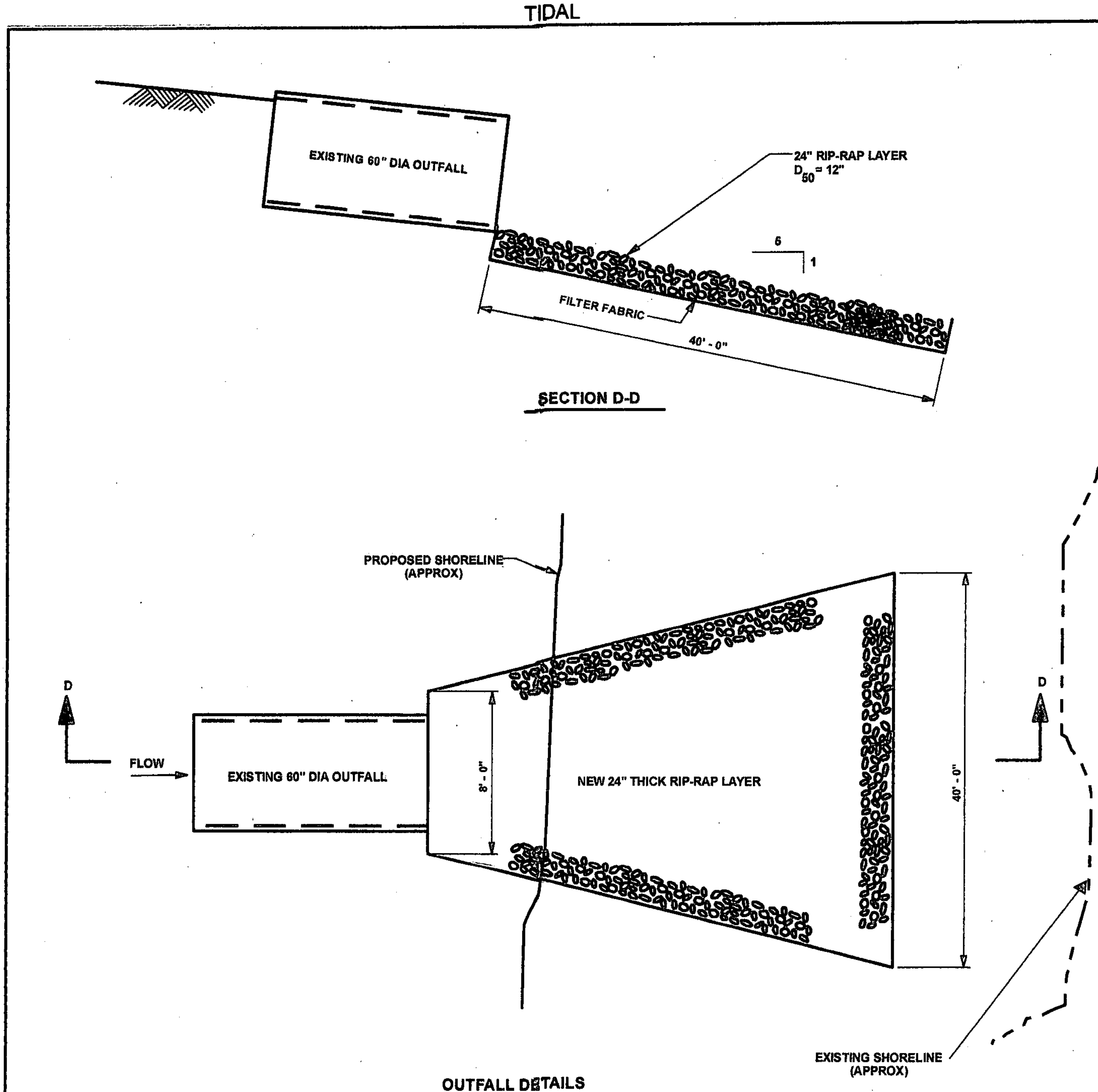

SEE MODIFICATIONS FOR NEW BULKHEAD & APRON FIGURE NO. 6D

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	**FIGURE 6G STREAM OUTFALL DETAILS** SCALE IN FEET **NOT TO SCALE**	**CALVERT CLIFFS NUCLEAR POWER PLANT** IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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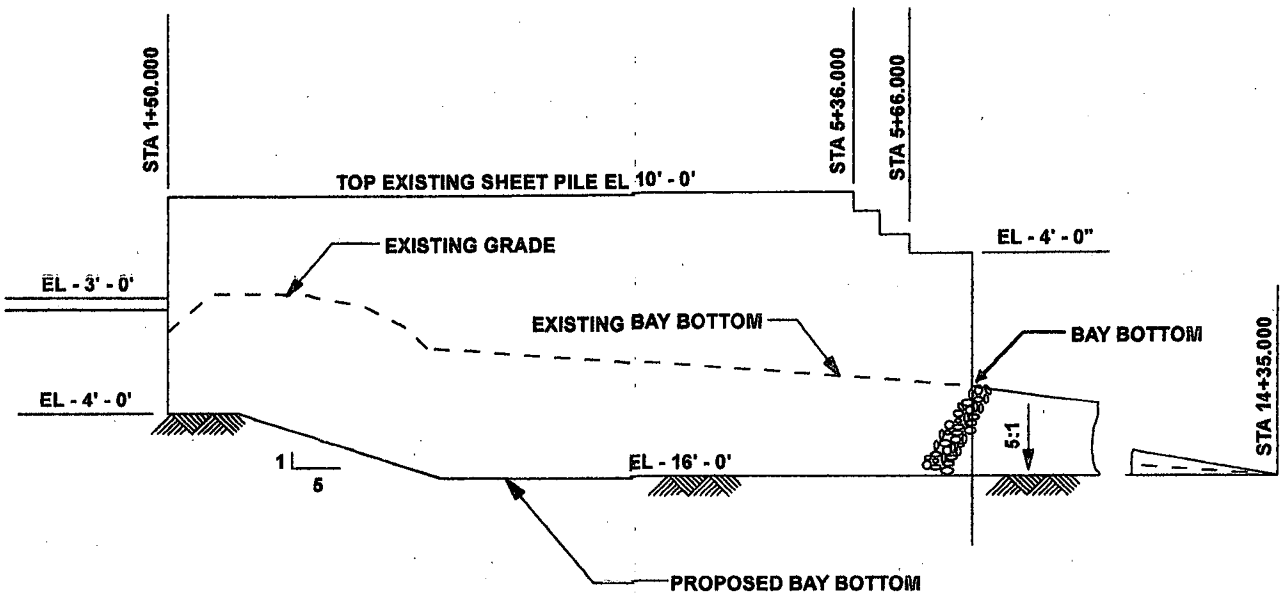

LONGITUDINAL SECTION
(SEE FIGURE 6)

PURPOSE: PLANT EXPANSION DATA SOURCE: BECHTEL CORPORATION DATUM: (NGVD 29) PROJECT LATITUDE/LONGITUDE: 38.424133 -76.441598	FIGURE 6H BARGE SLIP RESTORATION SCALE IN FEET NOT TO SCALE	CALVERT CLIFFS NUCLEAR POWER PLANT IN: PATUXENT / WEST CHESAPEAKE BAY COUNTY OF: CALVERT STATE: MD APPLICATION BY: CALVERT CLIFFS 3 NUCLEAR PROJECT, LLC AND UNISTAR NUCLEAR OPERATING SERVICES,LLC DATE: 5/09/08 REV1 7/14/08

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RAI Number: 1006-1

Cultural/Historical Resources

Provide a plan that ensures Unistar will not intentionally significantly adversely affect a historic property prior to issuance of the combined license for Calvert Cliffs Unit 3, or explain how other plans, such as the preservation plan and unanticipated discovery plan for historical and cultural resources, provide such assurance.

UniStar Response:

UniStar is actively engaged with the Maryland State Historical Preservation Organization (SHPO) to ensure that the Calvert Cliffs Nuclear Power Plant Unit 3 (CCNPP3) project is fully compliant with the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA).

Pursuant to Section 106, UniStar has conducted Phase I surveys on approximately 704 acres on the CCNPP Unit 3 site, which encompass the project's Area of Potential Effect (APE). In consultation with the SHPO, four of the 16 archaeological sites identified within the project APE were recommended as potentially eligible for listing in the National Register for Historic Places (NRHP). Phase II testing was conducted on these four sites and the results have been submitted to the SHPO for review and concurrence. UniStar is also awaiting SHPO review and concurrence on the need for Phase II testing at an historic-period archaeological site identified during Supplemental Phase I survey of a new project locality.

An architectural survey identified five historic properties in the project's viewshed, four of which were determined to be NRHP eligible. An assessment was conducted to determine the effects of the proposed project on the eligible properties and the results were submitted to the SHPO for concurrence in a Criteria of Effects Evaluation report. In addition, an intensive submerged cultural resources remote sensing survey was conducted of the near shore area being considered for placement of a 550-foot outflow pipeline. The results of this survey have been submitted to the SHPO for review and concurrence as well.

Proceeding through the 106 Process, UniStar will continue to consult closely with the Maryland SHPO on the development of a Memorandum of Agreement (MOA). The MOA will detail activities required as mitigation of adverse effects to historic properties and the means of protecting and safeguarding significant cultural resources on the CCNPP3 campus in the future. The MOA will include and/or reference a Data Recovery Plan for National Register-eligible archaeological resources and a Mitigation/ Minimization Plan for National Register-eligible architectural resources that will be adversely affected as a result of the proposed project. Additionally, a Preservation Plan and an Unanticipated Discoveries Plan will facilitate future compliance with the NHPA.

The Data Recovery Plan will stipulate procedures for mitigating, through archaeological data recovery, adverse effects to National Register-eligible archaeological sites that cannot be avoided by the project. Similarly, for National Register-eligible architectural resources that cannot be avoided, Unistar will develop a Mitigation/Minimization Plan taking into consideration input from key stakeholders identified by the SHPO. Mitigation measures detailed in these plans will be developed in consultation with the Maryland SHPO. All mitigation measures will be approved by and completed to the satisfaction of the SHPO. Mitigation associated with a particular cultural resource will be completed prior to initiation of pre-construction and/or construction activities associated with the CCNPP Unit 3 project with the potential to impact that resource.

UniStar will also develop in consultation with the Maryland SHPO, a Preservation Plan to manage the significant cultural resources on the Calvert Cliffs campus. This Plan will summarize the prehistory and history of the property, review past archaeological and historical survey efforts, summarize these findings, and characterize the potential for resources in those onsite areas not yet surveyed. The Plan will outline responsibilities for management of onsite cultural resources, and site processes and procedures for the preservation and treatment of these cultural resources. The Plan is intended for use by site personnel involved in project planning and environmental compliance to ensure compliance with historic preservation laws during future activities on site that may adversely affect both known and as yet unidentified cultural resources. In the event that unanticipated potential cultural resources are discovered during construction activities, the Unanticipated Discoveries Plan, to be provided by the Maryland SHPO and detailed in the MOA, will be implemented by UniStar to ensure compliance with Section 106. The draft Unanticipated Discovery Plan was submitted to the NRC on January 30, 2009 by letter UN#09-103.

The MOA and associated mitigation and protection plans therein, will constitute UniStar's Plan to ensure that activities conducted prior to the issuance of the NRC's COL, e.g. pre-construction activities, would not be undertaken without the approval of the Maryland SHPO in full accordance with the requirements of Section 106 of the NHPA.

COLA Impact:

Various Environmental Report sections have been revised to discuss the Phase 2 results. A markup of ER Sections 2.5.3, 4.1.3, 5.1.3, and 10.5 are attached. These changes will be included in a future revision to the COLA.

2.5.3 HISTORICAL PROPERTIES

May 2008
and Phase II National Register
Site evaluations

2.5.3.1 Overview

Detailed archaeological and historical surveys of the {CCNPP site for Unit 3} and associated onsite transmission corridors supporting {CCNPP Unit 3} have been conducted. The cultural resources investigation consisted of Phase Ia and Ib surveys that were conducted of the proposed project area between {October 2006 and ~~January 2007~~}. The Phase Ia survey was conducted to identify previously recorded or surface-visible archaeological resources and architectural resources, and to identify those areas with archaeological potential that would require a Phase Ib survey. ~~The Phase Ib survey was conducted to identify subsurface archaeological resources, record all known archaeological and architectural resources in the proposed project area, and to evaluate the recorded resources for eligibility to the National Register of Historic Places.~~

INSERT #1

archaeological resources 727 ~~704~~ ~~285~~ 294

There are {two} Areas of Potential Effect (APE) for cultural resources that could potentially be affected by the proposed project. The APE for ~~physical disturbance~~ is {~~600~~ acres (~~243~~ hectares)} and ~~was based on~~ represents the location and extent of areas required for all project-related construction activities. The APE for visual effects to architectural resources includes the {~~600~~ acres (~~243~~ 294 hectares)} and extends {1000 ft (305 m) beyond the ~~600~~ 727 acre (~~243~~ 294 hectare)} boundary. 727

INSERT #2

2.5.3.2 Survey Methodologies

The {Phase Ia and Ib} survey methodologies were developed and conducted in accordance with Federal and State laws, regulations, and guidelines, including: Section 106 of the National Historic Preservation Act (USC, 2007), guidelines developed by the Advisory Council on Historic Preservation, the amended Procedures for the Protection of Historic and Cultural Properties as set forth in 36 CFR 800 (CFR, 2007a), the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (NPS, 1983), National Register Bulletin 15 – How to Apply the National Register Criteria for Evaluation (NPS, 1992a), National Register Bulletin 21 – Defining Boundaries for National Register Properties (NPS, 1992b), {the Standards and Guidelines for Archeological Investigations in Maryland (MHT, 1994), the Standards and Guidelines for Architectural and Historical Investigations in Maryland (MHT, 2000), and General Guidelines for Compliance-Generated Determinations of Eligibility (MHT, 2002)}.

2.5.3.3 Qualification of Surveyors

{GAI Consultants, Inc. conducted the Phase Ia and Ib surveys}. The surveyors meet and exceed the professional qualifications as stipulated in 36 CFR Part 61 (CFR, 2007b). {The surveyors are listed on the Maryland Historical Trust Preservation Consultant List and have completed similar survey projects in Maryland.}

727 ~~704~~ ~~285~~ 294

2.5.3.4 {Phase Ia Investigation

Draft Technical Report Phase I Cultural Resource Investigations and Phase II National Register Site Evaluations and (GAI, 2008)

The Phase Ia survey, as discussed in the ~~Final Interim~~ Phase 1b Report (GAI, 2007), was conducted on the ~~600~~ acre (~~243~~ hectare) APE in October 2006. The Phase Ia survey included background research of files and records, geomorphological reconnaissance, and archaeological reconnaissance. Background research was conducted to identify previously recorded historic properties located within the proposed project area. Examination of archaeological site files, historic structure files, National Register of Historic Places listings, historic maps, and cultural resource reports was conducted at the Maryland Historical Trust in Crownsville, Maryland, and the Calvert County Historical Society and Calvert County Department of Planning and Zoning, both located in Prince Frederick, Maryland.

and September 2008

the Revised Letter Report, Second Supplemental Phase Ib Cultural Resource Investigation (GAI, 2008)

Geomorphological reconnaissance of the APE was conducted to identify landforms with moderate to high potential to contain archaeological sites, identify areas of surface disturbance, and estimate relative landform ages. The geomorphological reconnaissance included study of topographic maps and a walkover of the APE with periodic shovel and hand auger tests to observe the soils. Information was recorded on maps and with a GPS unit.

Archaeological reconnaissance of the APE was conducted to identify surface-visible archaeological resources and architectural resources. The archaeological reconnaissance included a walkover of the APE, excavation of occasional judgmental shovel tests, and locational recording of cultural resources observed. Information was recorded on maps and with a GPS unit. Architectural resources located within the APE for visual effects were noted and were photographed for preliminary review by an architectural historian.

245 one, 99 , the Parran's Park tobacco barn,

The Phase Ia background research identified ~~two~~ previously recorded cultural resources located within the proposed project area, ~~the CCNPP itself and a tobacco barn~~. The geomorphological reconnaissance determined that 195 ~~190~~ acres (~~77~~ hectares) of landforms within the APE have a moderate to high archaeological potential that required Phase Ib investigation. The remaining 482 ~~410~~ acres (~~166~~ hectares) were excluded due to slopes in excess of 10%, soil disturbance (largely associated with construction of the existing plant facility), or the presence of wetlands or recent deposits. The reconnaissance also determined that there are no settings within the APE with a potential for deeply buried archaeological resources. The archaeological reconnaissance re-located the previously recorded tobacco barn ~~and the power plant~~. Additional ~~New~~ cultural resources identified ~~discovered~~ within the APE ~~and the visual effects APE~~ during the Phase Ia archaeological reconnaissance include portions of the Baltimore and Drum Point Railroad, five historic-age archaeological sites, and four previously-unrecorded buildings.

2.5.3.5 Phase 1b Investigation

The initial Phase Ib archaeological survey ~~and cultural resource recording~~ was conducted on 190 acres (77 hectares), located in parcels throughout the APE, identified during the Phase Ia survey as having moderate to high potential for containing archaeological resources. ~~Phase Ib~~ An architectural survey ~~resource recording~~ was also conducted within the APE for visual effects. This survey was conducted ~~from~~ between November 2006 through January 2007. Supplemental Phase Ib surveys were conducted of 55 acres (22 hectares) of new project areas in April/May 2008 and January 2009. The Phase Ib survey included more extensive background research, systematic shovel testing within ~~the 190 acres~~ 245 (~~77~~ 99 hectares), and recording and evaluation of ~~all~~ identified archaeological and architectural resources located within the APE and visual effects APE. Background research was conducted to collect material to be used to develop a context for evaluation of recorded resources and to provide background information on specific resources. The research included review of architectural survey reports, published histories of Calvert County, historic maps of the project area, and files at the University of Baltimore's Langsdale Library.

Systematic shovel testing was conducted in the 245 ~~190~~ acres (99 ~~77~~ hectares) identified as having moderate to high potential for containing archaeological resources. Shovel testing, rather than pedestrian surface inspection, was necessary due to poor ground visibility. Systematic shovel test pits (STPs) were excavated at 50 ft (15 m) intervals within transects spaced 50 ft (15 m) apart. Additional STPs were excavated in select areas to confirm the presence of cultural artifacts, disturbed soils, or recent deposits. A total of 4,672 ~~3,573~~ STPs were excavated across the 245 ~~190~~ acres (99 ~~77~~ hectares). Excavated soils were screened through 0.25 in (0.6 cm) wire mesh for systematic artifact recovery.

Move to end of ¶ $\boxed{\text{Identified architectural resources were recorded using photographs, maps, and Maryland Historical Trust Determination of Eligibility forms.}}$ Prehistoric and historic artifacts recovered include Parran's Park, Preston's Cliffs, the Calvert Cliffs Nuclear Power Plant and the Baltimore and Drum Point Railroad.

during systematic shovel testing were bagged and labeled with appropriate provenience information. STP locations were recorded on project maps and were backfilled upon completion. Identified archaeological resources were recorded on standardized forms, plotted on maps, documented with photographs, and their locations were recorded using mapping grade GPS equipment.

architectural survey conducted as part of the

The Phase Ib ~~survey~~ study resulted in identification, recording, and evaluation of ~~5 historic-age~~ architectural resources within the APE for visual effects. These resources ~~all located within the boundaries of the CCNPP site~~ they comprise 21 buildings/structures. Table 2.5-38 summarizes the five resources and the recommended National Register of Historic Places status (GAI, 2007). Based on results of this study and MHT's review (MHT, 2007) four of these resources are concluded to be NRHP-eligible.

The Phase Ib survey excavated ~~3,573~~ 4672 STPs within the ~~196~~ 245 acres (~~77~~ 99 hectares), of which ~~229 STPs~~ 313 ~~yielded 844~~ 1,120 artifacts (~~830~~ 1102 historic-age and ~~14~~ prehistoric). The survey resulted in identification, 37 recording, and evaluation of ~~14~~ 17 archaeological sites and ~~25~~ 37 isolated archaeological finds. Table 2.5-39 summarizes the ~~14~~ 17 sites. Table 2.5-40 summarizes the ~~25~~ 37 isolated archaeological finds. Both tables show the recommended National Register of Historic Places status for each site and isolated find (GAI, 2007.) Based on Phase Ib results and with concurrence from MHT (MHT, 2007) four of the 17 sites were recommended Potentially Eligible for listing in the NRHP.

INSERT #3

Insert summary of Phase II Investigation 2.5.3.6

2.5.3.~~6~~7 Consultation

{The Maryland State Historic Preservation Officer (SHPO) has been consulted with throughout completion of the Phase Ia and Ib surveys to ensure compliance and maintain a strong working relationship. The results of the Phase Ia and Ib surveys were documented in a February 2007 report (GAI, 2007). This report was submitted the Maryland SHPO for review and consultation under Section 106 of the National Historic Preservation Act (USC, 2007). Comments from the Phase Ia and Ib surveys were received from the Maryland SHPO in a letter dated June 7, 2007 (MHT, 2007).}

INSERT #4

In addition, consultation with potentially interested Native American tribes is pending. Information from the tribal consultation could influence the National Register of Historic Places status of any of the recorded resources. As project design and layout are finalized, any additions to the APE would be surveyed and evaluated for potential impacts to historic properties (in consultation with the Maryland SHPO), prior to activities taking place in the additional APE.

2.5.3.~~7~~8 Site National Register Eligibility

Tables 2.5-41 and 2.5-42 list the ~~potentially~~ NRHP eligible archaeological sites and NRHP eligible architectural resources located within the project APEs. {These evaluations of eligibility reflect the comments received from the Maryland SHPO (MHT, 2007 and MHT, 2009). Phase ~~II archaeological~~ III Data Recovery investigations and subsequent consultation with the Maryland SHPO will be performed for the ~~four potentially eligible archaeological sites to determine their National Register of Historic Places eligibility. If they~~ NRHP-eligible Site 18CV474 this site cannot be avoided by construction activities.} in order to mitigate adverse effects from project construction.

2.5.3.~~8~~9 Offsite National Register Eligibility

{Research was conducted to identify previously recorded cultural resources located within 10 mi (16 km) of the proposed project site that are listed in the National Register of Historic Places; that have been determined eligible or determined potentially eligible for listing on the National Register of Historic Places; that have not been evaluated for National Register of Historic Places listing; and/or that are listed in the Maryland Register of Historic Places or county and local registers or inventories. Research was conducted at the Maryland Historical Trust archives and library, Calvert County Department of Planning and Zoning, St. Mary's County Department of Land Use and Growth Management, and the Dorchester County

Planning and Zoning Department. Research was also conducted of the National Register of Historic Places and list of National Historic Landmarks.

Research identified 1,029 previously surveyed, inventoried, and recorded cultural resources within a 10 mi (16 km) radius of the existing CCNPP site. This number includes historic districts, buildings, sites, and objects. Resource types range from archaeological sites and historic districts with numerous contributing resources to boats, a lighthouse, churches, dwellings, factories, commercial buildings, cemeteries, parks, and a tree. The resources identified are located in the Maryland counties of St. Mary's, Calvert, and Dorchester.

Appendix 2.5-A contains the full list of cultural resources located within the 10 mi (16 km) radius. None of the offsite cultural resources are affected by the construction and subsequent operation of the proposed CCNPP Unit 3.}

2.5.3.~~9~~ 10 References

{CFR, 2007a. Title 36, Code of Federal Regulations, Part 800, Protection of Historic Properties, 2007.

CFR, 2007b. Title 36, Code of Federal Regulations, Part 61, Procedures for Approved State and local Government Historic Preservation Programs, 2007.

{MHT, 1994. Standards and Guidelines for Archaeological Investigations in Maryland, Maryland Historical Trust, Shaffer, Gary D. and E. Cole, 1994.

MHT, 2000. Standards and Guidelines for Architectural and Historical Investigations in Maryland, Maryland Historical Trust, 2000.

MHT, 2002. General Guidelines for Compliance-Generated Determinations of Eligibility, Maryland Historical Trust, 2002.

MHT, 2007. Letter from J. Rodney Little, Director- State Historic Preservation Officer, Maryland Historic Trust to R.M. Krich, UniStar Nuclear, June 7, 2007.

NPS, 1983. Secretary of the Interior's Standards and Guidelines, Standards and Guidelines for Archeology and Historic Preservation, as published in the Federal Register (48 FR 44716 – 44742), National Park Service, U.S. Department of the Interior, Washington, D.C., 1983.

NPS, 1992a. National Register Bulletin 15 - How to Apply the National Register Criteria for Evaluation, National Park Service, U.S. Department of the Interior, Washington, D.C., 1992.

NPS, 1992b. National Register Bulletin 21 - Defining Boundaries for National Register Properties, National Park Service, U.S. Department of the Interior, Washington, D.C., 1992.

GAI, 2007. Management Summary, Phase Ib Cultural Resources Investigation, Calvert Cliffs Nuclear Power Plant, GAI Consultants Inc, February 23, 2007.

USC, 2007. Title 16, United States Code, Part 470, National Historic Preservation Act of 1966, as amended, 2007.}

INSERT #5 →
(insert 4 new references where appropriate)

Table 2.5-38—{Summary of Surveyed Architectural Resources}
(Page 1 of 1)

MHT No.	Name	Date	Resource Type	Location	Recommended NRHP Status
CT-58	Parran's Park	c1750	Abandoned Farmstead; 3 tobacco barns	In the ~~680 acre (243 hectare)~~ APE	~~Not Eligible~~ NRHP Eligible under Criterion A
CT-59	Preston's Cliff, Charles's Gift, The Wilson Farm	c1690	Ruins; 3 tobacco barns and house ruins	In the APE for visual effects	NRHP Eligible under Criteria A and C
CT-154	Calvert Cliffs Nuclear Power Plant	c1975	Nuclear Power Plant	In the APE and adjacent area	Not Eligible
CT-1295	Baltimore & Drum Point Railroad	c1890	Abandoned Railroad; railroad bed	In the APE	Offsite portions determined NRHP eligible; project portions NRHP Eligible under Criteria A and C
CT-1312	Camp Conoy	c1930	YMCA Camp; 6 buildings, 2 pavilions, playground, swimming pool, tennis courts	In the APE and adjacent area	NRHP Eligible under Criterion A

Notes:
MHT = Maryland Historical Trust
NRHP = National Register of Historic Places

ER Chapter 2.5

Table 2.5-39— Phase Ib {Summary of Surveyed Archaeological Sites}
(Page 1 of 2)

Site (MHT No.)	Dimensions feet (meters)	Artifacts (Hist.)	Artifacts (Prehist.)	Site Type	Age	Phase Ib Recommended NRHP Status	Phase Ib Recommendations
Site 1 (18CV474)	148 x 148 (45 x 45)	175	–	Artifact Scatter/ Foundation	19th century	Potentially Eligible	Avoid/Phase II
Site 2 (18CV475)	49 x 49 (15 x 15)	17	–	Artifact Scatter/ Foundation	19th century	Not eligible	No Further Work
Site 3 (18CV476)	82 x 26 (25 x 8)	4	–	Refuse Dump	20th century/ Modern	Not eligible	No Further Work
Site 4 (18CV477)	148 x 449 (45 x 137)	102	–	Refuse Dump/ Outbuilding	Mid-late 20th century	Not eligible	No Further Work
Site 5 (18CV478)	66 x 82 (20 x 25)	24	–	Artifact Scatter	20th century	Not eligible	No Further Work
Site 6 (18CV479)	49 x 66 (15 x 20)	--	7	Lithic Scatter	Indeterminate Prehistoric	Not eligible	No Further Work
Site 7 (18CV480)	997 x 499 (304 x 152)	294	–	Domestic Site	Mid 19th to 20th century	Potentially Eligible	Avoid/Phase II
Site 8 (18CV481)	148 x 108 (45 x 33)	31	–	Domestic Site	19th to early 20th century	Potentially Eligible	Avoid/Phase II
Site 9 (18CV482)	148 x 98 (45 x 30)	64	–	Domestic Site	Mid19th to early 20th century	Potentially Eligible	Avoid/Phase II
Site 10 (18CV483)	141 x 118 (43 x 36)	54	1	Domestic Site/ Artifact Scatter/ Lithic Findspot	Mid 19th to 20th century; Indeterminate Prehistoric	~~Potentially Eligible~~ Not Eligible	~~Avoid/Phase II~~ No Further Work
Site 11 (18CV484)	318 x 39 (97 x 12)	12	–	Field Scatter	20th century	Not eligible	No Further Work
Site 12 (18CV485)	16 x 33 (5 x 10)	5	–	Artifact Scatter	Mid 19th to 20th century	Not eligible	No Further Work
Site 13 (18CV486)	69 x 39 (21 x 12)	9	–	Artifact Scatter	19th to 20th century	Not eligible	No Further Work

Table 2.5-39—Phase Ib {Summary of Surveyed Archaeological Sites}

(Page 2 of 2)

Site (MHT No.)	Dimensions feet (meters)	Artifacts (Hist.)	Artifacts (Prehist.)	Site Type	Age	Phase Ib Recommended NRHP Status	Phase Ib Recommendations
Site 14 (18CV487)	115 x 33 (35 x 10)	7	—	Artifact Scatter	19th century	Not eligible	No Further Work
Site 15 (18Cv489)	148 x 295 (45x90)	83	—	Artifact Scatter	19th to early 20th century	Not Eligible	No Further Work
Site 16 (18Cv490)	148 X 98 (45x30)	12	—	Artifact Scatter	20th century	Not Eligible	No Further Work
Site 17 (18Cv7)	250 X 530 (76X162)	143	1	Domestic Site	Early 19th to 20th century	Potentially Eligible	No Further Work*

Notes:
NRHP = National Register of Historic Places
MHT = Maryland Historic Trust

* MHT (February 13, 2009) concludes No Further Work based on reforestation of the area through hand-planting of seedlings. In the event that hand-planting of seedlings is not possible further consultation regarding potential impacts to the site will be necessary.

Table 2.5-40—{Summary of Identified Isolated Finds}
(Page 1 of 1)

IF	Setting	Landform	Age	NRHP Eligibility
IF 1	Upland	Ridge spur	Prehistoric	Not eligible
IF 2	Upland	Upland Flat	Prehistoric	Not eligible
IF 3	Upland	Bench	Prehistoric	Not eligible
IF 5	Upland	Side Slope	Prehistoric	Not eligible
IF 6	Upland	Ridge	Historic	Not eligible
IF 7	Upland	Broad Ridgetop	Historic	Not eligible
IF 8	Upland	Ridge Spur	Historic	Not eligible
IF 9	Upland	Saddle	Historic	Not eligible
IF 12	Upland	Saddle	Historic	Not eligible
IF 13	Upland	Bench	Historic	Not eligible
IF 14	Upland	Bench	Historic	Not eligible
IF 15	Upland	Bench	Historic	Not eligible
IF 16	Upland	Ridgetop	Historic	Not eligible
IF 17	Upland	Ridgetop	Historic	Not eligible
IF 18	Upland	Ridgetop	Historic	Not eligible
IF 19	Upland	Ridgetop	Historic	Not eligible
IF 20	Upland	Ridgetop	Historic	Not eligible
IF 21	Upland	Ridgetop	Historic	Not eligible
IF 22	Upland	Broad Ridgetop	Historic	Not eligible
IF 23	Upland	Broad Ridgetop	Historic	Not eligible
IF 24	Upland	Broad Ridgetop	Historic	Not eligible
IF 25	Upland	Ridgetop	Historic	Not eligible
IF 26	Upland	Broad Ridgetop	Historic	Not eligible
IF 27	Upland	Broad Ridgetop	Historic	Not eligible
IF 28	Upland	Broad Ridgetop	Historic	Not eligible

Notes:
IF numbers are not sequential (numbers 4, 10 and 11 do not appear).
IF = Isolated Find
NRHP = National Register of Historic Places

INSERT # 6

Phase II National Register Site Evaluations

Table 2.5-41—{Summary of ~~Potentially Eligible Archaeological Sites~~ [a]}

(Page 1 of 1)

Site (MHT No.)	Site Type	Age	NRHP Status	Recommended Action
Site 1 (18CV474)	~~Artifact Scatter/ Foundation~~ Domestic Site	~~19th century~~ Mid 19th to early 20th century	~~Insufficient Data~~ Eligible, Criterion C	Avoid/Phase ~~II~~ III
Site 7 (18CV480)	Domestic Site	Mid 19th to 20th century	~~Insufficient Data~~ Not Eligible	~~Avoid/Phase II~~ No Further Work
Site 8 (18CV481)	Domestic Site	Late 19th to early 20th century	~~Insufficient Data~~ Not Eligible	~~Avoid/Phase II~~ No Further Work
Site 9 (18CV482)	Domestic Site	~~Mid 19th to early 20th century~~ Late 19th century	~~Insufficient Data~~ Not Eligible	~~Avoid/Phase II~~ No Further Work

Notes:

NRHP = National Register of Historic Places

MHT = Maryland Historic Trust

[a] Based on Maryland SHPO comments (February 13, 2009)

Table 2.5-42—{Summary of Eligible Architectural Resources [a]}

(Page 1 of 1)

MHT No.	Name	Date	Resource Type	Location	Recommended NRHP Status
CT-58	Parran's Park	C1750	Abandoned Farmstead; 3 tobacco barns	In the ~~600 acre (243 hectare)~~ APE	NRHP Eligible under Criterion A
CT-59	Preston's Cliff, Charles's Gift, The Wilson Farm	c1690	Ruins; 3 tobacco barns and house ruins	In the APE for visual effects	NRHP Eligible under Criteria A and C
CT-1295	Baltimore and Drum Point Railroad	c1890	Abandoned Railroad; railroad bed	In the APE	Offsite portions determined NRHP eligible; project portions NRHP Eligible under Criteria A and C
CT-1312	Camp Conoy	c1930	YMCA Camp; 4 buildings, pavilion, playground, swimming pool, tennis courts	In the APE and adjacent area	NRHP Eligible under Criterion A

Notes:

NRHP = National Register of Historic Places
MHT = Maryland Historical Trust
[a] Based on Maryland SHPO comments

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- Two existing 500 kV, 3,500 MVA circuits that are currently connected to the existing CCNPP Units 1 and 2 substation will be disconnected from the substation and extended 1.0 mi (1.6 km) to the CCNPP Unit 3 substation.

Numerous breaker upgrades and associated modifications would also be required at Waugh Chapel substation, Chalk Point Generating Station, and other existing substations.

The North and South Circuits of the CCNPP power transmission system are located in corridors totaling approximately 65 miles (105 km) of 350 to 400 ft (100 to 125 m) wide corridors owned by Baltimore Gas and Electric. The lines cross mostly secondary-growth hardwood and pine forests, pasture, and farmland. The existing CCNPP Units 1 and 2 are also connected to the Southern Maryland Electric Cooperative's Bertha substation via a 69 kV underground transmission line.

The transmission line work being considered to support this project would require new towers and transmission lines to connect the CCNPP Unit 3 switchyard to the existing switchyard for CCNPP Units 1 and 2. Line routing would be conducted to avoid or minimize impact on the existing Independent Spent Fuel Storage Installation (ISFSI), wetlands, and threatened and endangered species identified in the local area. No new offsite corridors or widening of existing corridors are required. The proposed onsite connector corridor would be located on land already in use to generate electric power. Some of the proposed facility locations associated with the project are located on land currently zoned and used as light industrial. The remainder is zoned as Farm and Forest District. CCNPP Unit 3 will be exempt from the Calvert County Zoning Ordinance once the CPCN for CCNPP Unit 3 is issued. However, all federal, state, and local regulations and requirements including those that deal with construction impacts, and those regulations pertaining to the Coastal Zone Management Program, the Chesapeake Bay Critical Area, and the Maryland Public Service Commission would be complied with.

There are no Federal actions that would have cumulatively significant land use impacts within the vicinity and region of the CCNPP site activity and offsite areas as described in Section 2.8.

Because there are no new offsite transmission corridors, it is concluded that there will be no additional impacts to the offsite transmission corridor lands associated with the proposed construction of CCNPP Unit 3. The proposed onsite transmission line connector corridor would be located on land already in use to generate electric power. No new access roads of modifications to existing roads are currently anticipated.}

4.1.3 HISTORIC PROPERTIES

{Tables 2.5.~~3-43~~ 41 and 2.5.~~3-5-3~~ 42 list resources as well as resources that have been evaluated as ineligible based on Phase II testing within the proposed project's Area of Potential Effect (APE) that are ~~potentially eligible or~~ eligible for listing on the National Register of Historic Places (NRHP). These tables reflect the comments received from the Maryland State Historic Preservation Office (SHPO) (MHT, 2007 and MHT, 2009). As described in Section 2.5.3, the ~~cultural~~ resource survey of the CCNPP site identified seventeen ~~fourteen~~ archaeological sites, one ~~four~~ of which ~~are~~ is considered ~~potentially~~ eligible for inclusion on the NRHP. The survey also identified five architectural resources, four of which are considered eligible for the NRHP.

The ~~preliminary~~ assessment of ~~adverse~~ effects to the ~~eight~~ five NRHP-eligible resources from project construction activities is as follows. It is likely that ~~the four identified~~ archaeological site~~s~~ (18CV474) would be heavily damaged by construction activities and use, thereby resulting in an adverse effect to th~~ese~~ resource~~s~~. Of the four architectural resources, two would be adversely affected. These two architectural resources are the Baltimore and Drum Point Railroad roadbed and Camp

Consultation with the SHPO and interested parties is ongoing concerning measures to avoid, minimize, or mitigate adverse effects to these resources. 294

Conoy. These two architectural and historical resources are located within the ~~600~~ 727 acre (~~243~~ 294 hectares) APE and would be heavily damaged by construction activities and use, resulting in an adverse effect to these resources. ~~The Preston Cliffs property is located approximately 1,500 ft (457 m) away from the outer boundary of the APE and would not be damaged by construction activities and use. There would also be no adverse effect to the setting of this property, as CCNPP Units 1 and 2 are adjacent to this property and would be located between the property and CCNPP Unit 3 and its cooling tower facility. The Parran's Park property is within the 600 acre (243 hectares) APE. However, it is located in a portion of the project site that would only include development of a construction access road and would not be damaged by construction activities and use. There would also be no effect to the setting of this property, as the access road is already in existence and facilities associated with CCNPP Units 1 and 2 are adjacent to this property.~~

INSERT #7

INSERT #8

Consultation on the Phase I and II cultural resources ~~survey~~ investigations with Native American tribes is pending. This consultation could result in changes to the recommended National Register of Historic Places eligibility of the ~~15~~ 22 identified resources. Phase ~~II archaeological~~ III Data Recovery investigations and subsequent SHPO consultation ~~would~~ will be conducted on ~~potentially~~ NRHP-eligible archaeological resources that are located within the proposed project area and cannot be avoided, ~~to determine their eligibility. Upon completion of Phase II investigations and SHPO consultations, assessments of effect on the National Register of Historical Places eligible resources on the project site would be determined and consultation conducted with the SHPO to identify measures to avoid,~~ minimize, or mitigate any adverse effects, per Section 106 of the National Historic Preservation Act (USC, 2007). A Memorandum of Agreement (MOA) will be prepared for these NRHP-eligible resources that will be adversely affected by the proposed project.

~~Extensive~~Some areas in the Chesapeake Bay have been previously dredged for the existing discharge conduit and channel, cooling water intake channel, the barge dock and channel, and the shore protection revetment. Construction of the new intake channel and portions of the discharge conduit would occur within areas previously dredged or disturbed by construction. Cultural resource surveys were conducted in the areas of the discharge piping (PANAM, 2008). This survey identified areas to ideally avoid in piping routing. Thus, in routing the piping with consideration of this survey result, there would be no impacts to underwater historic properties from construction of these facilities.

With construction activities, there is always the possibility for inadvertent discovery of previously unknown cultural resources or human remains. Prior to initiation of land disturbing activities, procedures will be developed which include actions to protect cultural, historic, or paleontological resources or human remains in the event of discovery. These procedures will comply with applicable Federal and State laws. These laws include the National Historic Preservation Act (USC, 2007), and Code of Maryland, Criminal Law, Title 10, Subtitle 4, Sections 10-401 through 10-404 (MD, 2004a) and the Code of Maryland, Title 4, Subtitle 2, Section 4-215 (MD, 2004b).

It is concluded that there will be adverse ~~inputs~~ impacts to ~~historic or~~ cultural resources from construction. ~~Upon completion of the Phase II investigations and SHPO consultation,~~ An assessment~~s~~ of effect on the National Register-eligible resources located in the APEs ~~would be determined~~ has been conducted and consultation ~~conducted~~ has been initiated with the SHPO to identify measures for avoidance, minimization, or mitigation of any adverse effects, per Section 106 of the National Historic Preservation Act. Any identified measures would be delineated in a Memorandum of Agreement ~~between~~ NRC, U.S. Army Corps of Engineers ?, the SHPO, ~~Constellation Generation Group~~Calvert Cliffs 3 Nuclear Project, UniStar Nuclear Operating Services, and possibly the Advisory Council on Historic Preservation.

The magnitude of the impacts and requirements for mitigation are (generally) determined to be moderate.

4.1.4 REFERENCES

{CAC, 2006. Critical Area Commission for the Chesapeake and Atlantic Coastal Bays, Critical Area Commission, Website: www.dnr.state.md.us/criticalarea/, Date accessed: May 7, 2006.

CALCO, 2006. Calvert County Zoning Ordinances, Calvert County, Website: Date accessed: May 16, 2006.

FEMA, 1997. Flood Hazard Boundary Map, Calvert County, Maryland, Federal Emergency Management Agency, July 15, 1997, Website: www.fema.gov/hazard/flood/index.shtm, Date accessed: December 21, 2006.

MD, 2004a. Code of Maryland, Criminal Law, Title 10, Subtitle 4, Sections 10-401 through 10-404, January 2004.

MD, 2004b. Code of Maryland, Criminal Law, Title 4, Subtitle 2, Section 4-215, January 2004.

MDE, 2004. A Guide to Maryland's Coastal Zone Management Program Federal Consistency Process, Maryland Department of the Environment, February 2004.

MHT, 2007. Letter from J. Rodney Little, Director/State Historic Preservation Officer, Maryland Historic Trust to R. M. Krich, June 7, 2007.

PANAM, 2008. Submerged Cultural Resources Survey of Proposed Outfall Pipe, Calvert Cliffs Nuclear Power Plant Unit 3 Construction, Calvert County, Maryland, Pan American Consultants, June 12, 2008.

USC, 2007. Title 16, United States Code, Part 470, National Historic Preservation Act of 1966, as amended, 2007.}

MHT, 2009. (See 2.5.3.10 References)

ER Section 4.0

ER Section 5

the boundaries of the existing substations. There will be no operational impact to land use along the corridors as the result of the proposed action.

The onsite transmission line work necessary to support CCNPP Unit 3 will require new towers and a transmission line to connect a new switchyard for CCNPP Unit 3 to the existing CCNPP Units 1 and 2 switchyard. Line routing will be conducted to avoid or minimize impact on the existing Independent Spent Fuel Storage Installation, wetlands, and threatened and endangered species identified in the local area. No new operational land use impacts will occur as the result of the operation of the new connector transmission lines or the CCNPP Unit 3 substation.

In general, the transmission line owner (Baltimore Gas and Electric (BGE)) ensures that land use in the corridors and underneath the high voltage lines is compatible with the reliable transmission of electricity. Vegetation communities in these corridors are kept at an early successional stage by mowing and application of herbicides and growth-regulating chemicals. In some instances, BGE could allow agricultural activities in these rights-of-way. BGE could also allow hunt clubs and individuals to plant wildlife foods for quail, dove, wild turkey, and white-tailed deer. However, BGE's control and management of these rights-of-way precludes virtually all residential and industrial uses of the transmission corridors. As described in Section 3.7, BGE has established corridor vegetation management and line maintenance procedures that will continue to be used to maintain the corridor and transmission lines.

There will be no need for additional access roads along the existing offsite transmission corridors. Offsite corridor maintenance activities will be in accordance with existing right-of-way agreements between BGE and current landowners, where applicable. Should additional access be warranted, BGE will negotiate/renegotiate access agreements with the appropriate landowner. Therefore, it is concluded that land use impacts to offsite transmission corridors from operation of CCNPP Unit 3 will be identical to impacts from the existing CCNPP Units 1 and 2.

Onsite transmission corridor activities are limited to tying about 1 mi (1.6 km) of onsite transmission line from a new CCNPP Unit 3 switchyard to the existing CCNPP Units 1 and 2 switchyard. The basic transmission system electrical and structural design parameters for this new onsite transmission corridor are addressed in Section 3.7. Land use impacts from construction of the new onsite transmission corridor and new CCNPP Unit 3 switchyard are described in Section 4.1.

It is therefore concluded that impacts to land use in the existing transmission corridors or offsite areas would be SMALL and not require mitigation.}

as well as resoures that have been evaluated as ineligible based on Phase II Studies.

5.1.3 HISTORIC PROPERTIES AND CULTURAL RESOURCES

and MHT, 2009

{Tables 2.5-41 and 2.5-42 list historic properties within the project Areas of Potential Effect that are ~~potentially eligible or~~ eligible for listing on the National Register of Historic Places. These tables reflect the comments received from the Maryland SHPO (MHT, 2007). As described in Section 2.5.3, the cultural resource survey of the CCNPP site identified ~~fourteen~~ seventeen archaeological sites, ~~four~~ one of which ~~are~~ is considered eligible for inclusion on the National Register of Historical Places. The survey also identified five architectural resources, four of which are considered eligible for the National Register of Historical Places.

~~Five of the eight historic properties would not be affected by operation of CCNPP Unit 3 due to the mitigation actions that will be taken during construction activities. All four of the potentially eligible archaeological sites will be addressed during construction as described in~~

~~Section 4.1.3, thus operation of CCNPP Unit 3 would have no effect on these resources. Although the Eagle's Den building at Camp Conoy would remain, because the rest of the property would be affected during construction, this building would not retain National Register of Historic Places eligibility. Thus there would be no effect to this property from operation of the plant.~~ is

INSERT#9

~~Portions of the roadbed for the former Baltimore and Drum Point Railroad will be affected during construction of CCNPP Unit 3, resulting in a potentially adverse effect to this property. However, other portions both on and off the CCNPP site property will remain intact and remain eligible to the National Register of Historic Places.~~ The Preston's Cliff property and the Parran's Park property will also remain intact and eligible to the National Register of Historic Places post-construction of CCNPP Unit 3. Potential sources of effects to these three properties would be maintenance activities and operation of the cooling tower which are addressed below.

Yvonne – Reference preparation of Historic Properties management plan?

Maintenance activities will occur in areas previously disturbed during CCNPP Unit 3 construction. Thus, effects to the three properties from maintenance activities are expected to be SMALL and not warrant mitigation. As discussed in Section 5.3.3.1, operation of the cooling tower would not produce a visible plume~~, occasional fog and ice, and s~~. Salt deposition which could effect the settings or materials of historic properties. Due to the nature of the Baltimore and Drum Point Railroad property, the effects of ~~these products of cooling tower operation~~ salt deposition on the railroad are expected to be SMALL and not warrant mitigation. Effects to the Preston's Cliff property's setting from the visible plume and fog are expected to be SMALL and not warrant mitigation due to the property's location near CCNPP Units 1 and 2. ~~Effects to the property from ice are expected to be SMALL and not warrant mitigation due to the short-duration and intermittent basis of ice formation. Effects to the property from salt deposition could occur but are expected to be SMALL and not warrant mitigation due to the small amount that would be deposited in the area (7.6 kg per hectare per month)~~ and the location of the property adjacent to salt water. The same levels of effect are expected for the Parran's Park property, for the same reasons.

Previously recorded historic or archaeological resources located within 10 mi (16 km) of the CCNPP site were also identified through research of existing records. Research identified 1,029 previously inventoried cultural resources. These resources are provided in Appendix A of Section 2.5. ~~Potential sources of effects to these resources would be operation of the cooling tower and the resulting fog, ice, and the visible plume.~~ There are no anticipated impacts from the operation of CCNPP Unit 3 on these sites.

~~Fogging and icing would occur mostly onsite. Fogging is predicted to reach site boundaries less than 13 hours per year, and icing is expected to occur offsite for less than 7 hours per year as discussed in Section 5.3.3.1. Because of the short duration and intermittent basis of fogging and icing, any adverse effect to offsite historic properties and their settings or materials would be SMALL and not warrant mitigation. The plume above the cooling tower would be visible from archaeological and historic resources in the region surrounding the CCNPP site and would introduce a modern feature into their viewsheds. However, due to the presence of numerous modern features in the region already, the effect to these properties would be anticipated to be SMALL and not warrant mitigation.~~

Consultation on the Phase I and II cultural resources ~~survey~~ investigations with Native American tribes is pending. 22 This consultation could result in changes to the recommended National Register of Historical Places eligibility of the ~~78~~ identified resources. Phase ~~II archaeological~~ III Data Recovery investigations and subsequent SHPO consultation will be conducted on ~~potentially~~ NRHP-eligible archaeological resources that are located within the proposed project area and cannot be avoided, to

~~determine their eligibility. Upon completion of Phase II investigations and SHPO consultations, assessments of effect on the National Register of Historical Places eligible resources on~~ the project site ~~will be determined and consultation conducted with the SHPO to identify measures to avoid,~~ minimize, or mitigate any adverse effects, per Section 106 of the National Historic Preservation Act (USC, 2007). A Memorandum of Agreement (MOA) will be prepared for three NRHP eligible resources that will be adversely effected by the proposed project.

With maintenance and operations activities, there is always the possibility for inadvertent discovery of previously unknown cultural resources or human remains. Prior to initiating land disturbing activities, procedures will be developed which include actions to protect cultural, historic, or paleontological resources or human remains in the event of discovery. These procedures would comply with applicable Federal and State laws. Section 106 of the National Historic Preservation Act (USC, 2007) and Article 83B Section 5-617 and 5-618 of the Maryland Code, respectively, require any project requiring licenses, permits, or that are funded by State and Federal agencies to examine the impact of their undertaking on significant cultural resources and to take steps to avoid, reduce or mitigate any adverse effects. The Code of Maryland, Criminal Law Title 10, Subtitle 4, Sections 10-401 through 10-404 (MD, 2007a) requires consultation with the State of Maryland for removal and reburial of human remains. The Code of Maryland, Health – General, Title 4, Subtitle 2, Section 4-215 (MD, 2007b) requires a permit to disinter a burial.

The continued use of the existing transmission corridors by the proposed project would not result in new impacts to cultural and historical resources. There would be no new offsite transmission corridors or offsite transmission lines for the proposed project. Because there will be no new corridors or construction of new transmission lines within the existing corridors required for this project, there will be no new impacts as the result of this project. However, should new and significant cultural and historic resources be encountered during maintenance operations along the existing corridors, ~~Constellation Generation Group~~Calvert Cliffs 3 Nuclear Project and UniStar Nuclear Operating Services would contact the Maryland Historic Trust to consult on the discovery.

It is therefore concluded that CCNPP Unit 3 operations would have a SMALL impact on historic or cultural resources and would not require mitigation.}

5.1.4 REFERENCES

{**MD, 2007a.** Code of Maryland, Criminal Law, Title 10, Subtitle 4, Sections 10-401 through 10-404, 2007.

MD, 2007b. Code of Maryland, Health – General, Title 4, Subtitle 2, Section 4-215, 2007.

MHT, 2007. Letter from J. Rodney Little, Director/State Historic Preservation Officer, Maryland Historic Trust to R. M. Krich, dated June 7, 2007.

MHT 2009 (see 2.5.3.10)

PJM, 2006. Feasibility Study for Calvert Cliffs Nuclear Power Plant Unit 3 (Draft), PJM Designation Q48, PJM Interconnection, LLC, November, 2006.

NRC, 1999. Environmental Standard Review Plan, NUREG-1555, Nuclear Regulatory Commission, October 1999.

SPX, 2008. SPX Cooling Technologies, website http://spxcooling.com/en/products/detail/hybrid-circular-tower/

USC, 2007. Title 16, United States Code, Part 470, National Historic Preservation Act of 1966, as amended, 2007.}

{Groundwater is currently utilized by CCNPP Units 1 and 2 for domestic, plant service and demineralized makeup water needs. Groundwater use conforms to an allocation imposed by the Maryland Department of the Environment. Of the 450,000 gpd (1,700,000 lpd) allocated, CCNPP Units 1 and 2 utilize, on average, approximately 388,000 gpd (1,470,000 lpd). Groundwater use during construction will remain within that allocated and its use will eventually be replaced with an onsite desalinization plant for CCNPP Unit 3. However, to date, neither saltwater intrusion nor land subsidence has been reported.

Additional impacts on wetlands, surface waters and groundwater resources may occur due to excavation or other activities that change flow patterns such as construction of sedimentation impoundments, stormwater runoff and dewatering, or that receive construction related waste effluents. It is anticipated that several vernal streams and impoundments will be affected by these activities. Environmental controls will conform to applicable regulations to minimize these effects. Efforts to reclaim areas not occupied by permanent structures or to provide offsetting habitat such as constructed wetlands will also be undertaken.

Protection of important or otherwise unique terrestrial habitats, flora and fauna were also considered in developing the construction plan for CCNPP Unit 3. Surveys of the site were undertaken to identify sensitive locations and protected species and efforts made to limit encroachment on these areas. Examples include the Chesapeake Bay Critical Area that encompasses lands within 1,000 ft (305 m) of mean sea high tide, locations with federally or state designated threatened or endangered species, wetland buffers and contiguous forest blocks. While certain state or federal designated vegetation and faunal species were found onsite, their presence was not found to be unique to areas potentially affected by construction.

Impacts to aquatic organisms found within freshwater impoundments and streams may be realized to the extent these surface waters are removed or water quality is affected. A survey of aquatic resources identified no unique aquatic species occurring with the construction zone. Typical fauna included the eastern mosquito fish, bluegill sunfish, invertebrate larvae, and submerged vegetation. Construction activities that may affect these natural resources, such as erosion and waste water discharge, will be managed using best management practices in conformance with applicable State and Federal permits and regulations.

Because of the preventive measures and corrective actions identified above and the short-term nature of construction activities, the cumulative impact on surface and groundwater from CCNPP Unit 3 construction in conjunction with the continued operation of CCNPP Units 1 and 2 should be small. Further, use of the existing offsite transmission right-of-way will limit the amount of land and related natural resources potentially impacted by construction.

This site is one

Data Recovery

An archaeological survey identified ~~14~~ site~~s~~ ~~potentially~~ eligible for listing on the National Register of Historic Places. ~~Four of these are~~ located within the construction footprint. Phase ~~II~~ III ~~archaeological~~ investigations, and subsequent consultation with the Maryland State Historic Preservation Officer (SHPO) will be performed ~~for the four potentially eligible archeology sites to determine their National Register of Historic Places eligibility if they~~ to mitigate adverse effects from project construction in the event that the site cannot be avoided.

Potential impacts to the Chesapeake Bay would be associated with construction of the cooling water intake and discharge structures and improvements to the barge unloading facility. The Circulating Water Supply System (CWS) and the Essential Service Water System (ESWS) (Ultimate Heat Sink) will utilize independent structures located in the southern portion of the existing CCNPP Units 1 and 2 intake embayment.

Sections 2.5.3, 4.1.3 and 5.1.3.

2.5.3.1 Overview

Insert #1 (end of 1st paragraph)

Phase Ib survey (including an initial and two supplemental Phase Ib studies) was conducted to identify cultural resources within the project area, to evaluate the eligibility of identified architectural and historical resources for listing in the National Register of Historic Places (NRHP), and to provide recommendations on the potential National Register eligibility of identified archaeological sites. Phase II studies were performed to conclusively determine NRHP eligibility of potentially-eligible archaeological sites that could not be avoided by project construction.

Insert #2 (final paragraph)

Phase Ib survey identified 17 archaeological sites and 37 isolated archaeological finds within the project area. Based on Phase Ib results and review by the Maryland Historical Trust (MHT) four of the 17 identified archaeological sites were concluded to be Potentially Eligible for listing in the National Register of Historic Places (NRHP). Because these four potentially-eligible archaeological sites could not be avoided by proposed construction activities, Phase II National Register evaluations were conducted to conclusively determine their NRHP eligibility. Based Phase II results and concurrence from MHT one site (18Cv474) is recommended as eligible to the NRHP; the other three sites were concluded to be ineligible for listing in the NRHP. Because this site is located within the proposed construction footprint of CCNPP Unit No. 3 and cannot be avoided by proposed construction, a Phase III Data Recovery of this site will be conducted to mitigate project impacts.

Five architectural and historical resources were also identified within the project area. Based on review of Phase I results by the MHT, four of these resources were determined eligible for listing in the NRHP and would likely be affected by proposed construction activities. These four properties include portions of the Baltimore and Drum Point Railroad prism, the abandoned YMCA Camp Conoy, Preston's Cliffs, and Parran's Park; the existing CCNPP facility was determined ineligible for listing in the NRHP. Three of the four NRHP- eligible historic properties may be impacted by proposed construction activities; no impacts are anticipated at Preston's Cliffs. Based on a Criteria of Effects Evaluation (GAI 2008b) and review by MHT, the project will have an Adverse Effect on two of these properties: the Baltimore and Drum Point Railroad and Camp Conoy. The undertaking will have No Effect on Preston's Cliffs and will have No Adverse Effect on Parran's Park.

Insert #3 (new section 2.5.3.6.)

2.5.3.6. Phase II Investigations

Phase II National Register Evaluations were conducted of four archaeological sites (18Cv474, 18Cv480, 18Cv481 and 18Cv482) identified during Phase Ib survey that could not be avoided by project construction. This study included site-specific archival research, fieldwork and laboratory analysis. Phase II fieldwork, performed between March 10 and May 3, 2008, consisted of close-interval shovel testing and test unit excavations at each site. This work included excavation of 961 STPs and 46 test units.

Based on the results of this study and on MHT's concurrence with site eligibility recommendations (MHT, 2009), one of the four sites, Site 18Cv474, is concluded to be eligible for listing in the NRHP, under Criterion D. Site 18Cv474 is a mid-nineteenth to early-twentieth-century domestic site centered on the remains of a stone foundation and containing diagnostic artifacts, and features. The site has good integrity and a potential to yield additional dateable artifacts and features which may address research questions relating to nineteenth-century domestic agricultural sites in the region. Because of its NRHP eligibility, project impacts to Site 18Cv474 would constitute an adverse effect on this significant archaeological resource. Accordingly, it will be necessary to avoid or mitigate the adverse effect on the site. If Site 18Cv474 cannot be avoided by project construction Phase III data recovery excavations will be required to resolve adverse effects from project development.

The other three sites (18Cv480, 18Cv481 and 18Cv 482) are recommended as Not Eligible to the NRHP under Criterion D. Based on this assessment, proposed construction impacts will constitute a "No Effect" to these sites. Consequently, no further archaeological investigations are required at Sites 18Cv480, 18Cv481 and 18Cv482.

2.5.3.7. Consultation

Insert #4 (end of first paragraph)

A Phase I/II Technical Report (GAI 2008a), a Supplemental Phase Ib Letter Report (GAI 2009) and a Criteria of Effects Evaluation (GAI 2008b), presenting the results of Phase I and II archaeological investigations and an assessment of effects for architectural and historical resources for the project, have been submitted to the MHT for review and consultation. The MHT provided comments on these three documents in a February 13, 2009, review letter (MHT 2009).

2.5.3.10. References

Insert #5 (add following four references where noted on hard copy)

MHT, 2009. Letter from J. Rodney Little, Director-State Historic Preservation Officer, Maryland Historical Trust to William Seib, U.S. Army Corps of Engineers, February 13, 2009.

GAI, 2008a. Draft Technical Report, Phase I Cultural Resource Investigations and Phase II National Register Evaluations, Calvert cliffs Nuclear Power Plant, GAI Consultants, Inc., August 2008.

GAI, 2008b. Letter Report, Criteria of Effects Evaluation, Calvert Cliffs Nuclear Power Plant, GAI Consultants, Inc. October 31, 2008.

GAI 2009. Revised Letter Report, Second Supplemental Phase Ib Cultural Resources Investigation, Calvert cliffs Nuclear Power Plant, GAI Consultants, Inc., February 2009.

Table 2.5.-40—Summary of Identified Isolated Finds

Insert #6 (add following lines of date to end of table)

Table 2.5-40. ADDITIONS

IF #	Settin g	Landform	Age	NRHP Eligibility
IF 29	Upland	Broad Ridgetop	Prehistoric	Not eligible
IF 30	Upland	Broad Ridgetop	Prehistoric/Hist oric	Not eligible
IF 31	Upland	Broad Ridgetop	Prehistoric/Hist oric	Not eligible
IF 32	Upland	Broad Ridgetop	Historic	Not eligible
IF 33	Upland	Broad Ridgetop	Historic	Not eligible
IF 34	Upland	Broad Ridgetop	Historic	Not eligible
IF 35	Upland	Broad Ridgetop	Historic	Not eligible
IF 36	Upland	Broad Ridgetop	Historic	Not eligible
IF 37	Upland	Broad Ridgetop	Prehistoric	Not eligible
IF 38	Upland	Broad Ridgetop	Prehistoric/Hist oric	Not eligible
IF 39	Upland	Broad Ridgetop	Historic	Not eligible
IF 40	Upland	Broad Ridgetop	Historic	Not eligible

4.1.3. HISTORIC PROPERTIES

Insert #7 (end of second paragraph)

The assessment of effects conducted for the Preston's Cliffs property, located in the northeast corner of the 727-acre (294-hectare) project APE, concluded that proposed project impacts, consisting of tree planting within the limits of its NRHP boundary, will result in no effect to this resource. The Parran's Park property will be impacted by at-grade road construction within the resource's NRHP boundary. However, an assessment of effects concluded that because an existing roadway is located in closer proximity to the resource, because the proposed new roadway construction will not cause destruction or damage to any significant elements of the historic resource, and because the proposed construction of the Unit 3 facilities will be obscured from view by vegetation, the proposed project impacts will result in no adverse effect to the Parran's Park property.

Insert #8 (third paragraph)

One NRHP-eligible archaeological site has been identified within the project APE. In the event that this site cannot be avoided by project construction, a Phase III Data Recovery Plan for the site will be prepared in consultation with the SHPO. If avoidance is not feasible, Phase III Data Recovery investigations of the site will be conducted to mitigate adverse effects, per Section 106 of the National Historic Preservation Act (USC, 2007).

4.1.3. HISTORIC PROPERTIES AND CULTURAL RESOURCES

Insert #9 (beginning of new second paragraph)

Three of the five historic properties (Site 18Cv474, the Baltimore and Drum Point Railroad, and Camp Conoy) will be mitigated prior to project construction. Project construction will have no adverse effect to the remaining two historic properties (Preston's Cliffs and Parran's Park).

RAI Number: 1007-1

ESRP 4.2 - 1

Water-Related Impacts

Using the best estimate of final site utilization plot plan, and other data, describe the criteria that will be used in the groundwater monitoring plan to quantify the impacts of construction and the impacts of operation. Describe the criteria that will be used to denote an impact as being significant. (Related to May 13, 2008 RAI #136)

UniStar Response:

The CCNPP Unit 3 COLA Environmental Report, Revision 3, states in part, in the following subsections:

2.3.2.2.10 Groundwater Monitoring

Groundwater monitoring (water level observations) for the CCNPP Unit 3 area is currently being implemented through the use of the groundwater observation wells installed in 2006 for the CCNPP Unit 3 site subsurface investigation and through the periodic review of water levels from selected wells within the Calvert County Ground Water Level Monitoring Network as discussed in Section 2.3.2.2.7. Some of the existing CCNPP Unit 3 area observation wells will need to be taken out of service prior to construction activities due to anticipated earth moving and construction requirements. Prior to construction activities, the observation well monitoring network will be evaluated in order to determine groundwater data gaps and needs created by the abandonment of existing wells. These data needs will be met by the installation of additional observation wells, if required. Additionally, the hydrologic properties and groundwater flow regimes of the shallow water bearing units (Surficial aquifer, and to a lesser extent, the Chesapeake units) will be impacted by the proposed earthmoving, regrading, and construction of infrastructure (buildings, parking lots, etc.). Revisions to the observation well network will be implemented to ensure that the resulting changes in the local groundwater regime from construction activities will be identified.

5.2.1.2.2 Groundwater Use

Groundwater monitoring wells are installed on the site to study and model the groundwater in the CCNPP site vicinity as described in Section 2.3. Groundwater withdrawals will not be used to support operation of CCNPP Unit 3.

Based on COLA descriptions of groundwater monitoring plans and the analysis identified in UniStar to NRC Letter UN#09-001, dated January 9, 2009, there will be no significant impact from increasing groundwater withdrawal for a six-year period at CCNPP Unit 3. Impacts during the years of construction are included in the scope of the analyses. Although the water level in the vicinity of CCNPP will be lowered, the results of numerical modeling indicate the projected drawdown in the closest wells of major water users to be approximately 13 ft, even after 6 years of increased pumping from the CCNPP wells and from those of other domestic and major users of the Aquia aquifer. Drawdowns of this amount do not significantly impact the relevant water management factors. It is important to note that the anticipated use of the additional groundwater is for construction purposes which are expected to last approximately 6 years. After that time, a desalination plant is planned to be on-line producing

1,225 gpm (1,764 ,000 gpd). As indicated in the UniStar response to RAI HS-32 (UN#08-018, dated June 12, 2008), about 413 gpm (595,000 gpd) of this production will be excess capacity that may be used to decrease the overall future groundwater withdrawals for CCNPP Units 1 and 2 (starting in about 2014). Three and a half years of this excess capacity, when used to reduce the groundwater extracted from the Aquia aquifer for Units 1 and 2, will compensate for the 6 years of additional water withdrawal during construction of CCNPP Unit 3.

UniStar shall conduct the following monitoring activities in support of the ground water appropriation consistent with CPCN Condition 27 identified in UniStar letter to Maryland Public Service Commission, dated October 24, 2008:

a) Flow Measurement— UniStar shall measure all water used under this authorization by a method which shall be approved by MDE WMA.

b) Water Level Measurements—Pumping equipment shall be installed in the production well so that water levels can be measured during withdrawal and non-withdrawal periods without dismantling any equipment. Any opening for tape measurements of water levels shall have a minimum inside diameter of 0.5 inch and be sealed by a removable cap or plug. UniStar shall provide a tap for taking raw ground water samples before water enters a treatment facility, pressure tank, or storage tank.

c) Withdrawal Reports—Submit withdrawal records to MDE WMA semiannually (for July-December, no later than January 31; for January-June, no later than July 31). These records shall show the total quantity of ground water withdrawn each month under this appropriation.

These measures will assure withdrawals from the water table will not exceed the limits of the appropriation.

The criteria used to denote an impact as being significant are included in Maryland regulations. First, "The requested appropriation or use may not have an unreasonable impact on: a) waters of the state, and b) other users of waters of the state (COMAR 26.17.06.05.A. (2))". Further, The regional sustained yield potentiomeric surface of the confined aquifier may not be lowered below 80 percent of the drawdown available between the top of the aquifier and the historic prepumping level of the potentiometric surface (COMAR 26.17.06.05.D.(4))". Determination of compliance with this latter criteria is accomplished in accordance with monitoring activities

COLA Impact:

No changes to the COLA are required.

RAI Number: 1007-2

Water-Related Impacts

ESRP 4.2 - 2

Provide an estimate of the total dissolved solids concentrations in the three following locations before, during, and after disposal of dredging material: surface water and groundwater leaving Lake Davies; spring/seep water entering the nearest branch to Johns Creek; Johns Creek water leaving the CCNPP site boundary. (Related to May 13, 2008 RAI HS-16)

UniStar Response:

A comprehensive analysis by UniStar and vendors has been completed. The methodology and details of the analysis are as follows:

1.0 Data Requirements for Quantitative Analysis

The plan for the construction of Unit 3 at the CCNPP site involves the dredging of sediment in the Chesapeake Bay. This will occur in the barge slip area and as a part of the construction of the intake/discharge structures for Unit 3. The dredged material will ultimately be disposed in the laydown area just north of Lake Davies. The material from the dredging in the barge slip area will first be placed on a barge and thence onto haul trucks, which will transport it to the Lake Davies area. The material removed from the area of the intake/discharge structures will be loaded directly onto haul trucks and then transported to the laydown area. It is assumed that in the process of transporting the dredge spoil, most of the excess water will have drained away, so that by the time it reaches the laydown area it will resemble more a wet soil rather than a slurry.

UNISTAR obtained from earlier reports and studies at the site the data required to perform quantitative analyses for estimating the impact of disposing of the dredge spoils on the local surface water and groundwater. The following information was either obtained as measured data or was estimated before the analyses were performed:

- Volume of the dredge spoil to be disposed
- Dimensions and orientation of the spoil pile
- Soil texture of the spoil material and its estimated hydraulic conductivity
- TDS concentrations of the interstitial water of the dredge spoil
- Existing TDS concentrations of surface water in ponds and streams on the property
- Range of average groundwater recharge in the vicinity of the disposal area
- Hydraulic conductivity, porosity and dispersivity of the existing soil/aquifer material underlying the dredge spoil
- Area of the portion of the Johns Creek basin upstream of the western property boundary and area of the portion of this basin that potentially drains the dredge spoils disposal area.

1.1.1 Volume of the Dredge Spoil to be Disposed

It has been estimated that approximately 60,000 cubic yards will be dredged to restore the channel dimensions for the Barge Uploading Facility.[1] UniStar assumes that 60,000 yd^3 represents a reasonable estimate for the volume of dredged material to be placed on the Lake Davies laydown area. Figure 1 is a site location map showing the location of the dredge spoils disposal area.

1.1.2 Dimensions and Orientation of Spoil Pile

The assumption was made that the spoil pile will be formed by spreading it over the laydown area to a significant extent such that its average thickness will be approximately two feet. This implies that the areal dimensions of the disposed spoil could amount to approximately 1,350 ft by 600 ft. UniStar assumes that the long side of spoil disposal area will be oriented in a north-south direction. Also, for the purpose of this analysis, it is assumed that the entire spoil pile will lie in the southernmost portion of the Lake Davies laydown area so that all of it will lie within the Johns Creek catchment. Figure 1 shows the location and dimensions of the dredge spoils disposal area.

1.1.3 Soil Texture of the Spoil Material and its Estimated Hydraulic Conductivity

The dredged material is expected to be predominantly sandy. The grain-size analysis of typical near-shore sediment at the CCNPP showed the following percentage contents:

Grain-Size category	Range in percent determined in three samples
Gravel	1.5 – 5.1
Sand	93.5 - 96
Silt	0 – 0.2
Clay	2.1 – 2.7

These data are presented in Table 2.3.3-9 of the 2007 ER and in Table 12-8 of *Aquatic Field Studies for UniStar Calvert Cliffs Expansion Project* by EA Engineering, Science, and Technology, Inc. (May 2007).

[1] MACTEC Engineering and Consulting, Inc., May 2008, *Supplemental Environmental Resource Report, Calvert Cliffs Nuclear Power Plant Unit 3, Calvert County, Maryland*, Section 3.9.2.1

1.1.4 TDS Concentrations of the Interstitial Water of the Dredge Spoil

Pertinent data were obtained from the 2008 report *Entrainment Characterization Data Report for Calvert Cliffs Nuclear Power Plant* by EA Engineering, Science, and Technology, Inc. (EA). In addition, during February, March and May 2007, EA collected grab samples at the CCNPP intake structure and these were subsequently analyzed for TDS. A summary of these data is presented in Table 1. Based on the three independent sources presented in the table, the average TDS concentration, which is considered equivalent with salinity for the purpose of this analysis, ranged from 13,048 to 13,342 milligrams per liter (mg/L). Therefore, a mean TDS concentration of the interstitial water of the dredge spoil of 13,000 mg/L is assumed.

1.5 Existing TDS Concentrations of Surface Water in Ponds and Streams on the Property

Laboratory data relating to the water quality of local streams and ponds were included in EA's May 2007 *Aquatic Field Studies for UniStar Calvert Cliffs Expansion Project.* Water samples were collected in September 2006 and March 2007 at 11 surface-water monitoring stations on the property. The locations of these stations are shown on Figure 2 of the EA report. The results of the TDS analysis of these samples are given in Table 2. Of particular importance for this analysis are the TDS levels reported for the three Lake Davies stations, the station on the Goldstein Branch and the Johns Creek downstream station (located very close to the western property boundary). The Lake Davies stations for both sampling events evidenced TDS levels ranging from 860 to 980 mg/L. These elevated levels are judged to be the result of seepage through the dredge spoils previously disposed in the Lake Davies laydown area. The TDS concentration at the Goldstein Branch station ranged from 320 to 440 mg/L, and the level in the downstream Johns Creek station ranged from 180 to 280 mg/L, significantly higher than the upstream levels of 30 to 49 mg/L. The vadose zone water and the groundwater underlying the dredge spoil disposal area is best represented by the TDS levels shown at the Lake Davies stations; hence, the initial concentration in the existing groundwater in that area is assumed to be 900 mg/L.

1.6 Range of Average Groundwater Recharge in the Vicinity of the Disposal Area

Based on published reports concerning recharge in the coastal plain of western Maryland, it is expected that recharge is likely to range from 5 to 12 inches per year. Various recharge rates within this range were tested in the groundwater model employed for the analysis until the most reasonable results were obtained.

1.7 Hydraulic Conductivity, Porosity and Dispersivity of the Existing Soil/Aquifer Material Underlying the Dredge Spoils

Based on Table 2.4.12-4 of the 2007 FSAR for Unit 3, slug testing of several wells tapping the Surficial Aquifer resulted in ranges in horizontal hydraulic conductivity (K_h) of 0.04 to 17.4 ft/day with a mean of 3.72 and a geometric mean of 0.91 ft/day. For the purpose of the groundwater modeling (discussed in Section 3.0), a K_h value of 2.0 ft/day and a vertical conductivity of 0.5 ft/day was assigned to the existing soil and underlying aquifer material at the disposal area. Effective porosities and dispersivities of 0.20 and 5 feet, respectively, were employed across the model domain.

1.8 Area of the Portion of the Johns Creek Basin Upstream of the Western Property Boundary and Area of the Portion of this Basin That Potentially Drains the Dredge Spoils Disposal Area

Figure 2.4.3-2 of the FSAR for Unit 3 shows four sub-basins making up the portion of the Johns Creek basin lying within the plant property. Table 2.4.3-2 of the FSAR provides the drainage area (2.283 square miles) of the four sub-basins taken together. For the purpose of this analysis, another sub-basin representing the portion of the Johns Creek basin that can potentially drain the dredge spoils disposal area was delineated. This sub-basin includes a portion of the Goldstein Branch catchment, a portion of Sub-Basin 3 adjoining the disposal area on the east, and Assessment Area VI made up of Lake Davies and the two associated downstream ponds, all of which drain directly into Johns Creek. The area of this sub-basin was planimetered and determined to be 0.489 square miles.

2.0 Modeling Vertical Flow and Salt Migration using CHEMFLO™ - 2000

CHEMFLO™ - 2000 was developed by researchers at Oklahoma State University for the US Environmental Protection Agency Office of Research and Development.[2] It is interactive software for simulating water and chemical movement in unsaturated soils.

In these simulations, a one-dimensional 12-foot long vertical column of soil is assumed. The column of soil consisted of two layers—an upper two-foot layer of loamy sand representing the dredge spoils and a lower 10-foot section of sandy loam or silty sand representing the upper portion of the existing soils at the disposal area. The default parameter values for these soil types provided by the program, including the saturated hydraulic conductivity, the saturated water content and the parameters required to calculate the unsaturated permeability and the matric potential at varying soil moisture contents were accepted. A constant recharge is assumed such that the soil at the surface was near saturation. The initial soil water concentrations were set at 13,000 mg/L for the upper layer and 900 mg/L for the lower layer (actually 13.5 and 0.90 in the model, respectively, as the model required scaling down the concentrations proportionally).

Four simulations were run, one of 340 hours (14.2 days), one of 2,500 hours (104.2 days), one of 3,500 hours (145.8 days) and the last of 4,000 hours (166.7 days) duration. The output

[2] Nofziger, D.L. and Jinquan Wu, 2003, *CHEMFLO™ - 2000, Interactive Software for Simulating Water and Chemical Movement in Unsaturated Soils*, Oklahoma State University, for the US Environmental Protection Agency Office of Research and Development, EPA/600/R-03/008, March 2003.

displaying plots of distance versus concentration showed curves typical for a slug of elevated TDS concentrations moving slowly through the soil column. As the slug proceeded downward, its peak concentration declined and it spread out more and more within the column.

Figure 2 shows a plot of the peak concentrations and the depth where the peaks occurred versus time. The depth at which the peak concentrations occurred appears to be linear with time, while peak concentrations appear to decline in an exponential fashion. As shown in the figure, after 340 hours the peak concentration was approximately 10,000 mg/L. At this time the slug extended over a depth interval of only 1.4 feet. After 2,500 hours the slug extended from a depth of approximately 6.4 to 9.7 feet, with a peak concentration of approximately 3,200 mg/L at a depth of 8.3 feet. After 4,000 hours the slug had reached essentially to the bottom of the soil column and had a peak concentration of approximately 2,400 mg/L. Based on the simulation results, it was estimated that at a depth of about 10 feet the approximate time required for the slug to move entirely away from its position at a given time was 65 days.

The results of these simulations are indicative of the extent of attenuation of the dissolved solids concentration as the slug migrates downward to the water table. Additional attenuation occurs within the Surficial Aquifer as migration occurs downward and laterally toward Johns Creek and its tributaries. The following section describes the results of numerical simulations of this latter flow and migration.

3.0 <u>Modeling Flow and Salt Migration in the Surficial Aquifer using Visual MODFLOW</u>

Visual Modflow™ was developed by Schlumberger Water Services. [3] It provides a graphical user interface for performing numerical simulations using the MT3DMS and the USGS MODFLOW program codes, among others. The model domain extended 3,100 feet in a north-south direction and 3,000 feet in a east-west direction. It encompassed the southern part of the Lake Davies laydown area as well as Johns Creek on the south and the tributaries on the eastern and western sides. Constant-head boundaries to simulate Johns Creek and the tributaries were established on the southern, western and eastern sides of the model domain. The grid spacing ranged from 50 ft by 50 ft in the center of the grid lying over the disposal area to 100 ft by 100 ft on the sides. Figure 3 shows the model grid, the constant-head boundaries in Layer 2 (Surficial Aquifer) representing the bounding water bodies, and the hypothetical observation points used in the model to monitor concentrations during the simulations. The dredge spoils disposal area lay within the central portion of the grid represented by the fine grid of 50 ft by 50 ft cells. Table 3 summarizes the input parameters utilized in the modeling, which relates to the discussion on input data in Section 1.0.

As shown in Table 3, the portion of the upper two-foot layer representing the dredge spoil disposal area was assigned an initial TDS concentration of 13,000 mg/L, while elsewhere in that layer and in the underlying layer, representing the Surficial Aquifer, the initial concentration was set at 900 mg/L. It is recognized that in reality concentrations as high as 900 mg/L will not be likely to occur over the entire domain; this value is conservative.

The flow portion of the model was run as steady state. Mass transport was modeled with the MT3DMS module using the implicit upstream finite-difference method of solving the advective

[3] Schlumberger Water Services, 2007, *Visual MODFLOW Version 4.3* User's Manual, Waterloo, Ontario, Canada.

portion of the partial differential equation. Simulations were run up to a simulation time of 2,000 days. In the course of the mass transport modeling, TDS concentrations were computed at 16 hypothetical observation points (OW-1 through OW-16) in Layer 2, the underlying Surficial Aquifer. Plots of concentration vs. time for the observation points were created from the model output (Figure 4). These curves were similar to those that reflected the passage of a slug in the simulations with CHEMFLO 2000 as described in Section 2.0; however, the duration of the higher-concentration slug and the corresponding spreading of the slug naturally increased with increasing distance from the disposed dredge spoils. Those observation points immediately beneath, or close to the footprint of, the disposed spoils had the highest peak TDS concentrations, ranging from 1,100 to 1,800 mg/L, as shown on Figure 4. The decline of the computed TDS concentrations below 900 mg/L at the later times shown in the figure is due to the influence of the recharge of rain water having negligible dissolved solids.

Iso-concentration contour maps were produced by Visual MODFLOW at specified times ranging from 200 to 2,000 days. Figures 5 through 10 display the predicted iso-concentration contours in Layer 2 at simulation times of 200, 400, 600, 900, 1500 and 2000 days, respectively. A tabular summary of the estimated ranges of concentration in the groundwater obtained by inspection of the contour maps is given in Table 4. An overall average concentration value for each time has been estimated for the locations close to Lake Davies and the nearby tributaries to Johns Creek. As shown in the table, these average values declined from approximately 820 mg/L after 200 days to approximately 570 mg/L after 2,000 days. Considering that these values apply to the locations close to the bounding water bodies, they are consistent with Figure 4's concentration curves for the observation points. The predicted decline of TDS concentrations by the model in Layer 2 reflects the effect of efficient flushing of the soils and aquifer materials due to recharge.

4.0 Discussion and Conclusions

Based on the physical data and parameter values discussed in Section 1.0 and on the results of both unsaturated flow modeling and groundwater modeling covering the area of interest, we conclude that there is not likely to be a major impact on the quality of the groundwater. In the underlying Surficial Aquifer immediately below the disposed dredge spoils, peak TDS values of up to 2,300 mg/L may occur, but are predicted to decline to about 800 mg/L after approximately five years.

As presented in Table 4, estimates of the average TDS concentration in the Surficial Aquifer close to the adjacent water bodies may be expected to range from 780 to 850 mg/L after 200 days and decline to concentrations in the range of 310 to 660 mg/L after 2,000 days.

The potential impact of this discharge to the local tributaries and Lake Davies on Johns Creek is shown in Table 5. The estimated TDS concentration of the groundwater seepage into these water bodies shown in column 5 of Table 5 is taken from Table 4. These values constitute the contribution from the Lake Davies sub-basin, which is discussed in Section 1.8. The value of 60 mg/L, the assumed TDS level for the remainder of the Johns Creek basin, is based on the upstream water quality data for Ponds 1 and 2 and the Lake Canoy surface-water stations given in Table 2. The assumed starting concentration of 900 mg/L for the Lake Davies sub-basin is based on the values for Lake Davies given in Table 2. The seventh column of Table 5 shows the weighted average TDS concentrations that will be expected in Johns Creek at the point where it reaches the western property boundary. It turns out that the computed value of 240 mg/L, representing the condition before dredging begins, is within the range of 180 to 280 mg/L shown for the Johns Creek downstream station in Table 2.

Table 5 shows that the estimated TDS concentration in Johns Creek following the placement of the Unit 3 dredge spoils will decrease from 240 mg/L after 50 days to 169 mg/L after 2,000 days. We recognize that such a decrease is not expected nor is it likely, as the model assumes a relatively efficient flushing of the entire aquifer system by recharge, which apparently is not occurring judging by the quality of the surface water reported at the stations in and around Lake Davies. UniStar concludes the model results indicate that the quality of the groundwater near the local water bodies and the quality of the surface water in the local ponds and streams will not be significantly impacted.

The impact of overland flow from the disposed spoils to nearby water bodies will be minor, no more than the impact due to groundwater seepage, although the travel time by overland flow will be much less than that via groundwater. The primary reasons to expect that the surface route will involve as low an impact as that due to groundwater seepage are the storm-water management practices that will be put into place prior to, during and after the placement of the dredge spoils. These will include establishing dikes, and earthen berms to minimize runoff from the disposal area.

The following table summarizes the findings of the analysis with respect to the estimated TDS Concentrations, as requested in the RAI:

Potentially Impacted water bodies	Before Disposal of Dredge Spoils	During Disposal of Dredge Spoils	After Disposal of Dredge Spoils
Surface water leaving Lake Davies	860 – 980 mg/L	860 – 980 mg/L	860 – 980 mg/L
Groundwater leaving Lake Davies	860 – 980 mg/L	860 – 980 mg/L	860 – 980 mg/L
Spring/seep water entering the nearest branch to Johns Creek**	320 – 440 mg/L	550 – 650 mg/L	350 – 600 mg/L
Johns Creek at the point where it leaves the CCNPP site boundary	180 – 280 mg/L	180 – 280 mg/L	180 – 280 mg/L

** The Goldstein Branch is the nearest tributary to the disposal area. To account for flow from the western side of the Branch in estimating the range of TDS concentrations, the relevant values from the bottom section of Table 4 were averaged with those for Station GB-1 given in Table 2. The values in Table 4 for 200 days was assumed to be reasonable estimates for the TDS *during* the dredge spoils disposal and values in the table for 1500 days was accepted for conditions *after* the dredge spoil disposal was completed.

COLA Impact:

No changes to the COLA are required.

Table 1: Summary of Data on Bay Water Salinity and Total Dissolved Solids

Surface Salinity in Chesapeake Bay at Cove Point, MD at Mid-Channel in Bay+
(Average Salinity from 1985 to 2006)

Month	Surface salinity (ppm)
January	14,520
February	14,440
March	12,870
April	10,620
May	10,140
June	10,970
July	12,050
August	13,130
September	14,880
October	16,060
November	15,720
December	14,700
Average:	**13,342**

Salinity in Chesapeake Bay at CCNPP Baffle Wall in Bay April - Dec 2006++

Date	Salinity (ppm)
4/6/2006	13,190
4/13/2006	15,750
4/18/2006	12,200
4/24/2006	14,350
5/1/2006	13,850
5/8/2006	13,000
5/15/2006	14,600
5/23/2006	15,430
5/30/2006	13,500
6/5/2006	13,230
6/12/2006	12,800
6/20/2006	14,180
6/28/2006	10,680
7/3/2006	9,430
7/10/2006	10,700
7/17/2006	6,900
7/24/2006	8,960
7/31/2006	8,730
8/7/2006	8,660
8/21/2006	17,880
8/28/2006	13,510
9/11/2006	13,030
9/25/2006	18,100
10/9/2006	13,170
10/26/2006	17,630
11/27/2006	12,580
12/5/2006	14,670
12/18/2006	14,620
Average:	**13,048**

Total Dissolved Solids in Grab Samples Collected at the CCNPP intake During Ebb and Flood Tide Conditions+++

Date	TDS (mg/L)
Feb 07 Ebb	12,000
Feb 07 Flood	12,000
Mar 07 Ebb	14,000
Mar 07 Flood	11,000
May 07 Ebb	18,000
May 07 Flood	13,000
Average:	**13,333**

+ EA Engineering, Science & Technology, 2008, Entrainment Characterization Data Report for Calvert Cliffs Nuclear Power Plant, Page 9

++ EA Engineering, Science & Technology, 2008, Entrainment Characterization Data Report for Calvert Cliffs Nuclear Power Plant, Table C-3

+++ Results of analysis of samples collected by EA Engineering, Science & Technology at the request of Constellation Generation Group.

TDS - Total Dissolved Solids
ppm - parts per million
mg/L - milligrams per liter

Prepared by: A.Mills
Checked by: W. Burch

Table 2: Summary of Data on Total Dissolved Solids in CCNPP Streams and Ponds+

Water Body	TDS (mg/L)	
	September 2006	March 2007
Pond 1	41	32
Pond 2	51	63
JCUS-01	30	49
JCDS-01	280	180
GB-1	440	320
LC-01	35	47
LC-02	67	61
LC-03	48	46
LD-01	980	860
LD-02	950	900
LD-03	980	980

Notes:
JCUS-01 - Johns Creek upstream
JCDS-01 - Johns Creek downstream (just east of property boundary)
GB-1 - Goldstein Branch
LC-01 - Lake Canoy (west side)
LC-02 - Lake Canoy (north side)
LC-03 - Lake Canoy (east side)
LD-01 - Lake Davies (north side of area)
LD-02 - Lake Davies (southern edge of area)
LD-03 - Lake Davies (west side of area)
TDS - Total Dissolved Solids
mg/L - milligrams per liter

+ Source: Engineering, Science & Technology, 2007, Aquatic Field Studies for Unistar Calvert Cliffs Expansion Project, Tables 2-1 and 3-1.

Prepared by: A. Mills
Checked by: W.Burch

Table 3: Summary of Parameters Used in Visual MODFLOW Modeling

Layer	Description	Layer Thickness (ft)	Hydraulic Conductivity (ft/day)			Recharge (inches/year)	Initial TDS Concentration (mg/L)	Effective Porosity	Longitudinal dispersivity (ft)
			Kx	Ky	Kz				
1	Dredge Spoil area	2	20	20	14	10	13,000	0.20	5.0
	Remainder of model domain	2	1	1	0.2	10	900	0.20	5.0
2	Surface soil and Surficial Aquifer	28	2	2	0.5	--	900	0.20	5.0

Prepared by: A. Mills
Checked by: W. Burch

Table 4: Summary of Estimated TDS Concentrations from Inspection of Model's Iso-Concentration Maps

Description	Time (days)	Range of TDS Concentration (mg/L)	Estimated Average Concentration (mg/L)
Layer 1 in dredge spoils	200	500 - 3800	--
	400	400 - 1300	--
	600	200 - 550	--
	900	150 - 300	--
	1500	80 - 200	--
	2000	40 - 180	--
Layer 2 below dredge spoils	200	900 - 2300	--
	400	1100 - 2000	--
	600	1000 - 1600	--
	900	900 - 1300	--
	1500	870 - 1030	--
	2000	730 - 910	--
Layer 2 in close proximity to Lake Davies and the nearby tributaries to Johns Creek	200	780 - 850	820
	400	690 - 800	750
	600	580 - 820	710
	900	520 - 820	670
	1500	380 - 760	620
	2000	310 - 660	570

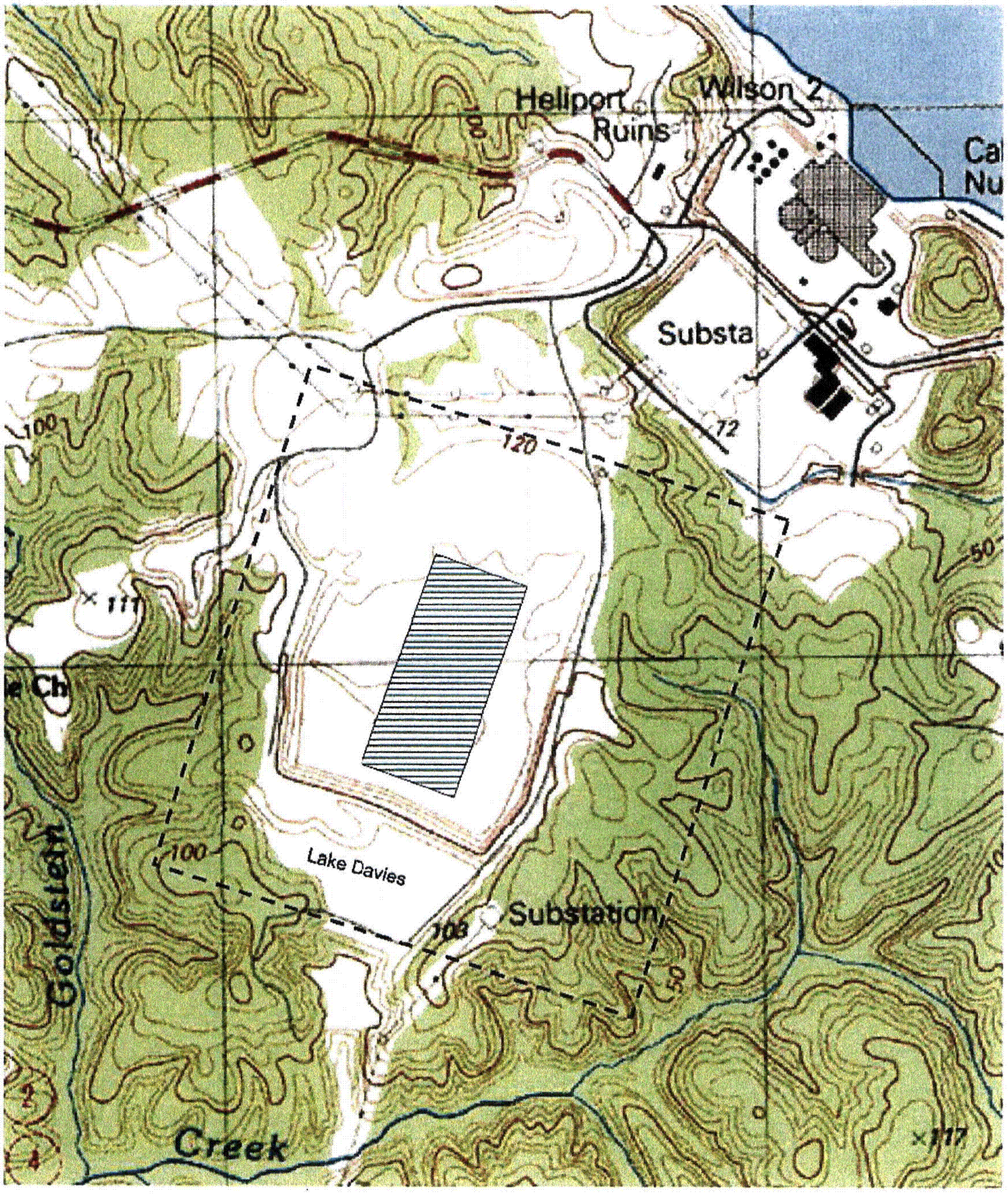
Prepared by: A. Mills
Checked by: W. Burch

Table 5: Estimated Total Dissolved Solids Impact on Johns Creek Resulting from Placement of Dredge Spoils in Construction of Calvert Cliffs Nuclear Power Plant, Unit 3

Case No.	Description	Area of entire catchment+ (sq mi)	Area of Lake Davies sub-basin+ (sq mi)	Estimated TDS for Lake Davies sub-basin (mg/L)	Assumed TDS for remainder of the catchment (mg/L)	Computed TDS at western property boundary (mg/L)
1	Before dredging for Unit 3	2.283	0.489	900	60	240
2a	50 days after new dredge spoils placed	2.283	0.489	900	60	240
2b	200 days after new dredge spoils placed	2.283	0.489	820	60	223
2c	400 days after new dredge spoils placed	2.283	0.489	750	60	208
2d	600 days after new dredge spoils placed	2.283	0.489	710	60	199
2e	900 days after new dredge spoils placed	2.283	0.489	670	60	191
2f	1500 days after new dredge spoils placed	2.283	0.489	620	60	180
2g	2000 days after new dredge spoils placed	2.283	0.489	570	60	169

+ Reference: Table 2.4.3-2 CCNPP Unit 3 FSAR
TDS - Total Dissolved Solids
mg/L - milligrams per liter

Prepared by: A.Mills
Checked by: W. Burch



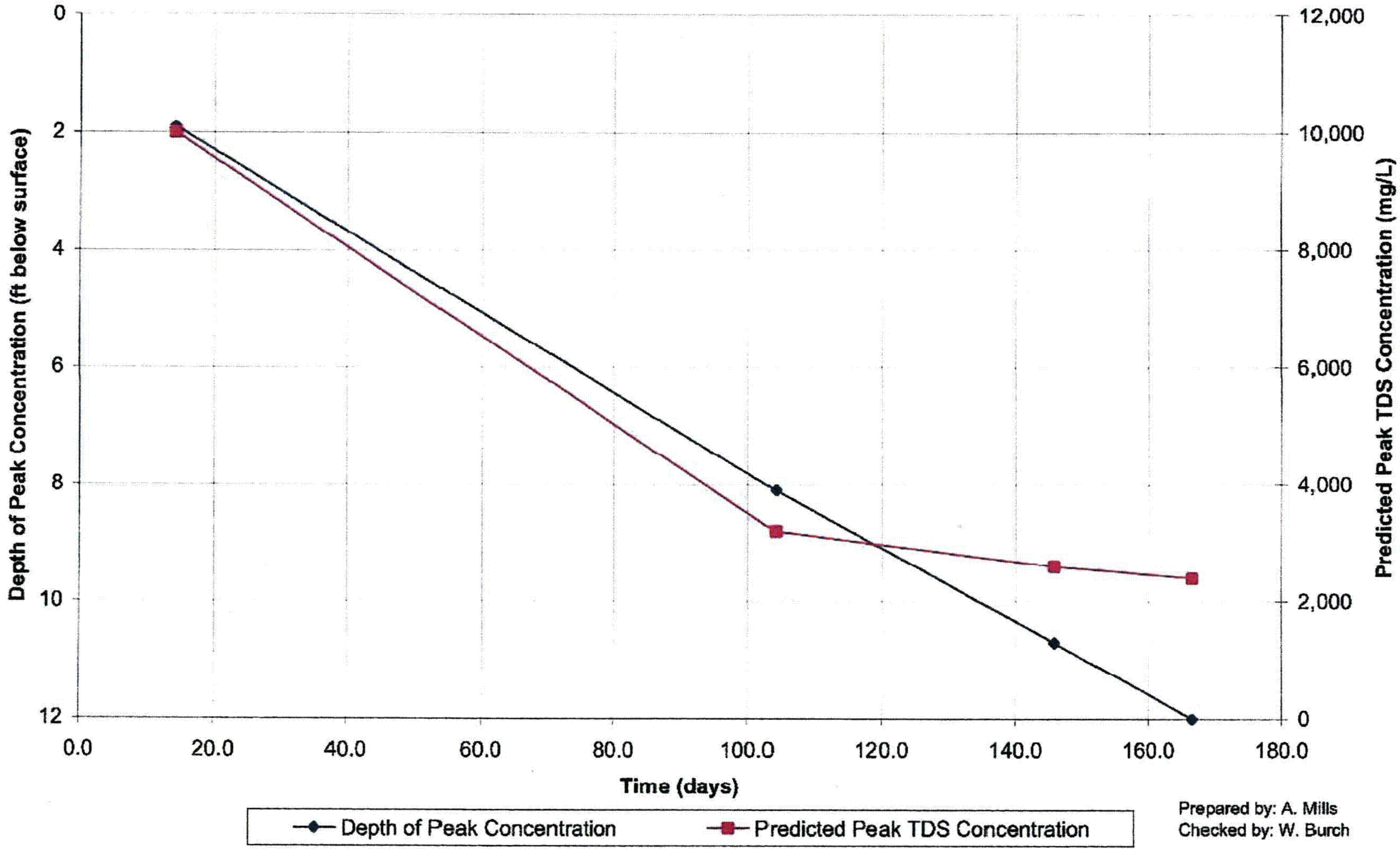
ASSUMED DREDGE SPOIL DISPOSAL AREA

GROUNDWATER MODEL DOMAIN BOUNDARY

SCALE: I INCH = 1,000 FEET

MACTEC Engineering & Consulting, Inc.	FIGURE 1 SITE LOCATION MAP SHOWING SPOILS DISPOSAL AREA AND MODEL DOMAIN CCNPP UNIT 3, COVE POINT, MD	Date: 02/20/2009 Drawn by: A. Mills Checked by: W. Burch Project No: 8093076565

Figure 2: Results of Simulations with CHEMFLO 2000



Prepared by: A. Mills
Checked by: W. Burch

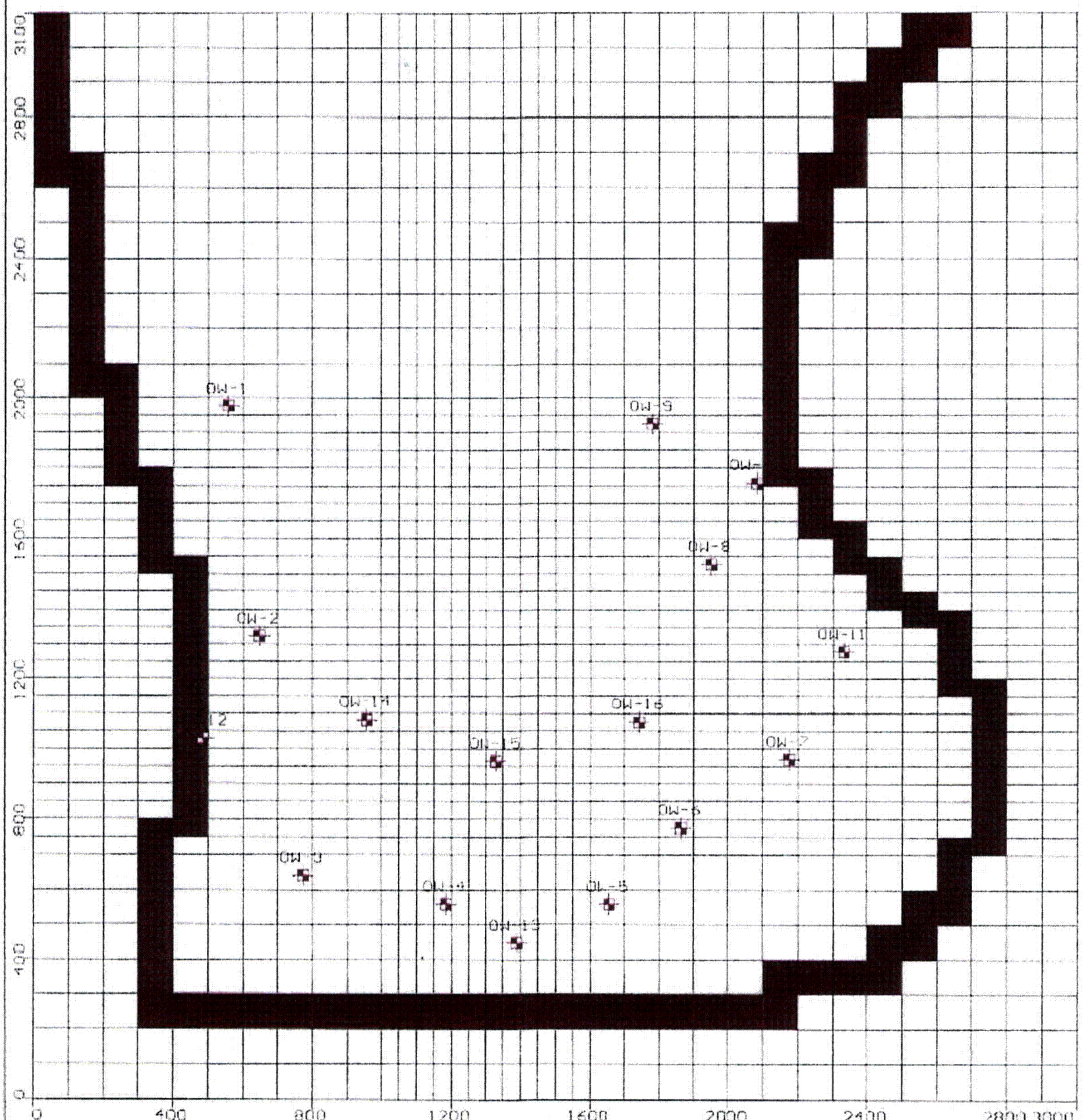
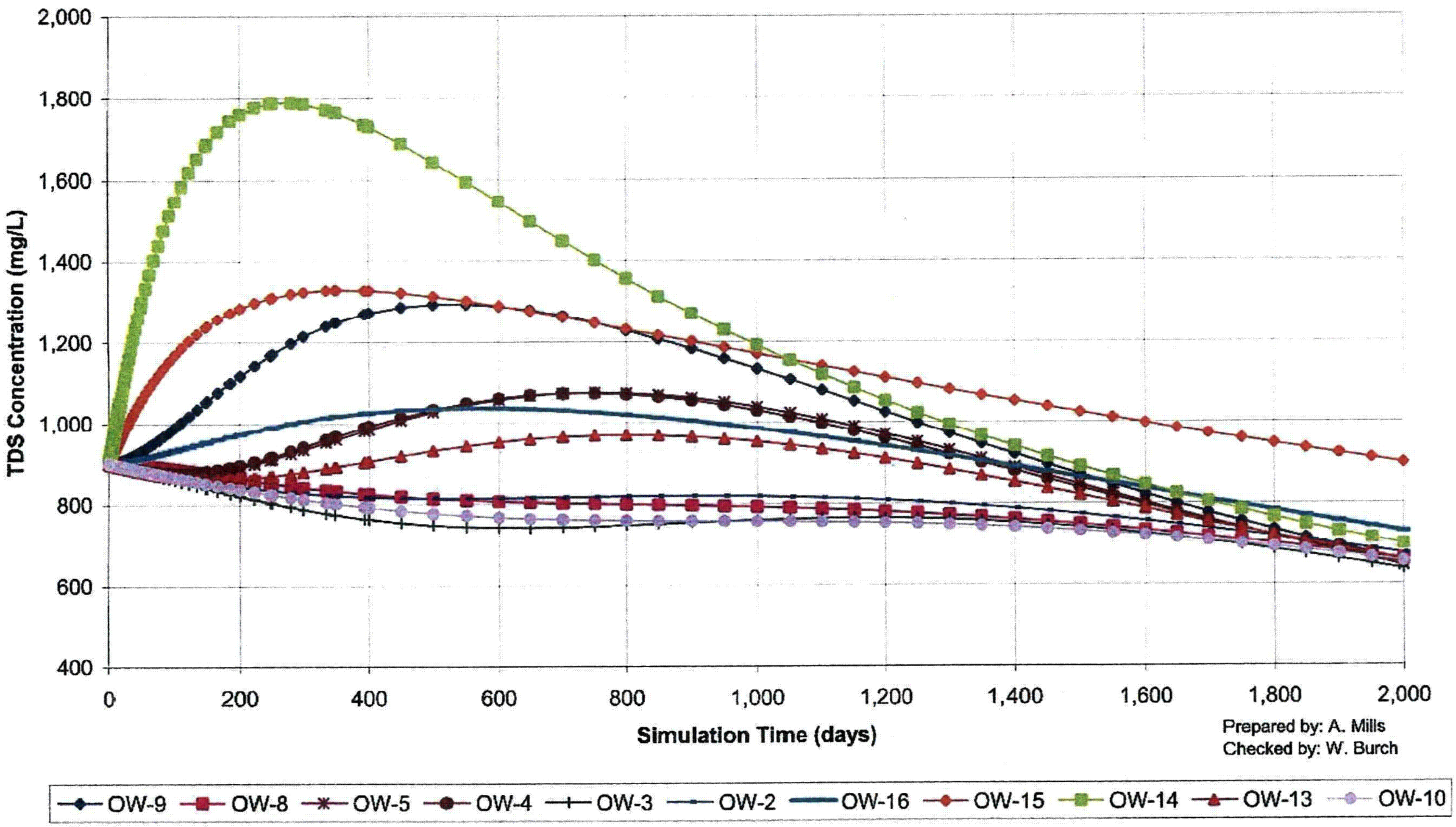


FIGURE 3
GROUNDWATER MODEL GRID
SHOWING CONSTANT HEAD BOUNDARY FOR LAYER 2
AND LOCATIONS OF HYPOTHETICAL OBSERVATION POINTS

CCNPP UNIT 3 UNISTAR NUCLEAR OPERATING SERVICES, LLC	Mactec Engineering and Consulting, Inc. Prepared by A. Mills Checked by: W. Burch

Figure 4: Concentrations at Selected Observation Points vs. Time Computed by MODFLOW/MT3DMD in Visual MODFLOW



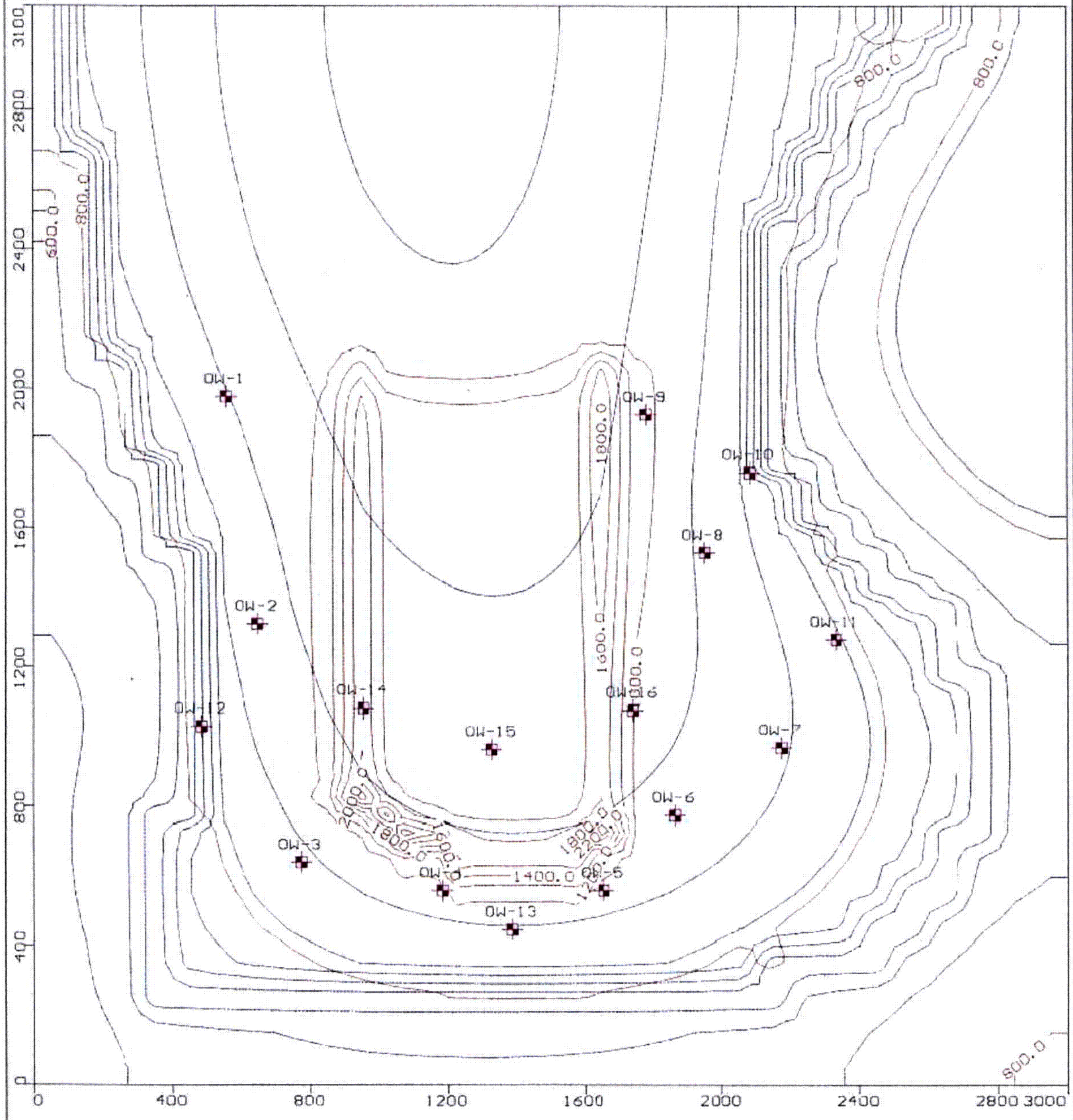


FIGURE 5
PREDICTED TDS ISO-CONCENTRATION CONTOURS IN LAYER 2 AT T = 200 DAYS

CCNPP UNIT 3
UNISTAR NUCLEAR OPERATING SERVICES, LLC

Mactec Engineering and Consulting, Inc.
Prepared by A. Mills
Checked by: W. Burch

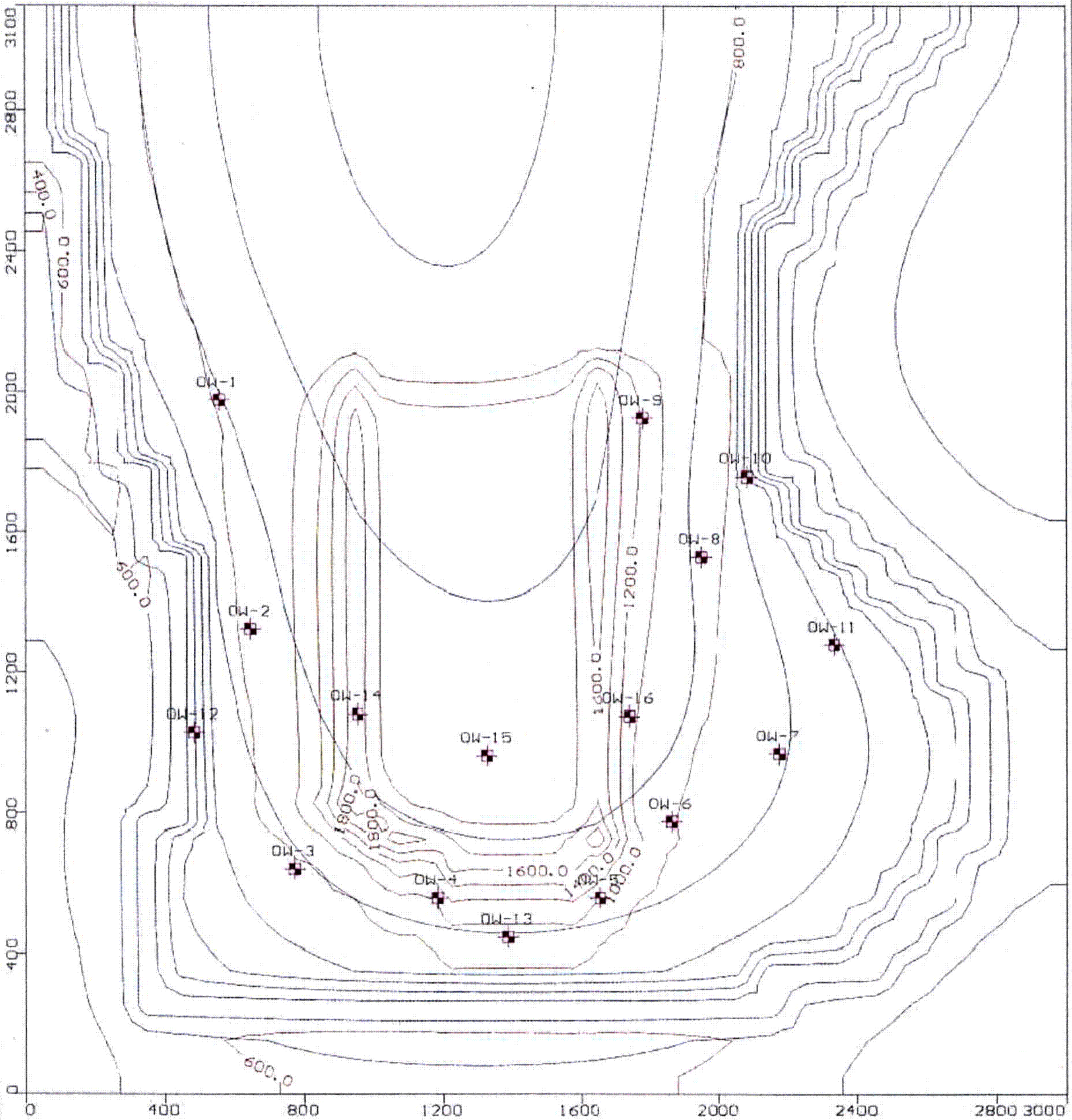


FIGURE 6
PREDICTED TDS ISO-CONCENTRATION CONTOURS IN LAYER 2 AT T = 400 DAYS

CCNPP UNIT 3 UNISTAR NUCLEAR OPERATING SERVICES, LLC	Mactec Engineering and Consulting, Inc. Prepared by A. Mills Checked by: W. Burch

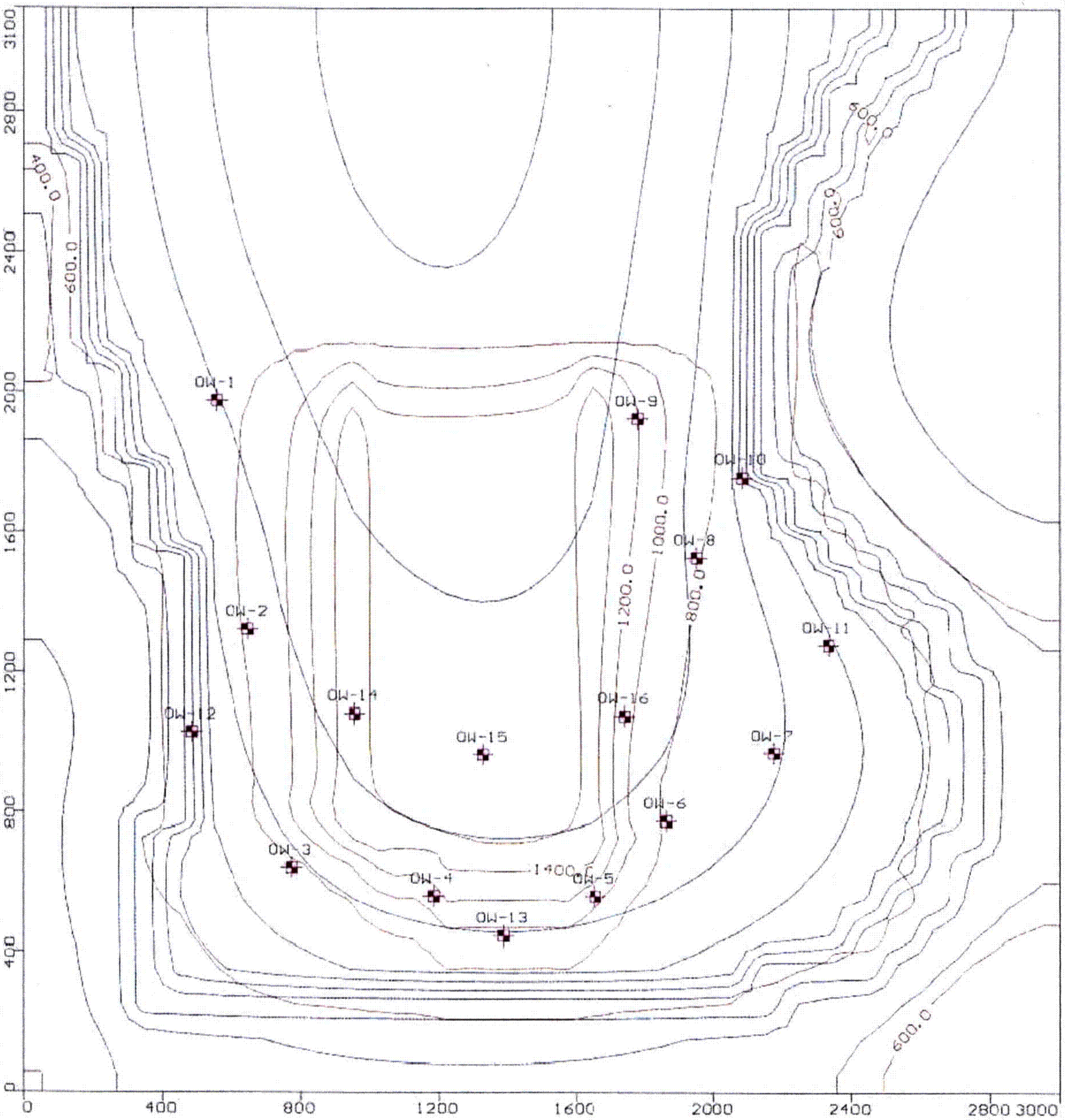


FIGURE 7
PREDICTED TDS ISO-CONCENTRATION CONTOURS IN LAYER 2 AT T = 600 DAYS

CCNPP UNIT 3 UNISTAR NUCLEAR OPERATING SERVICES, LLC	Mactec Engineering and Consulting, Inc. Prepared by A. Mills Checked by: W. Burch

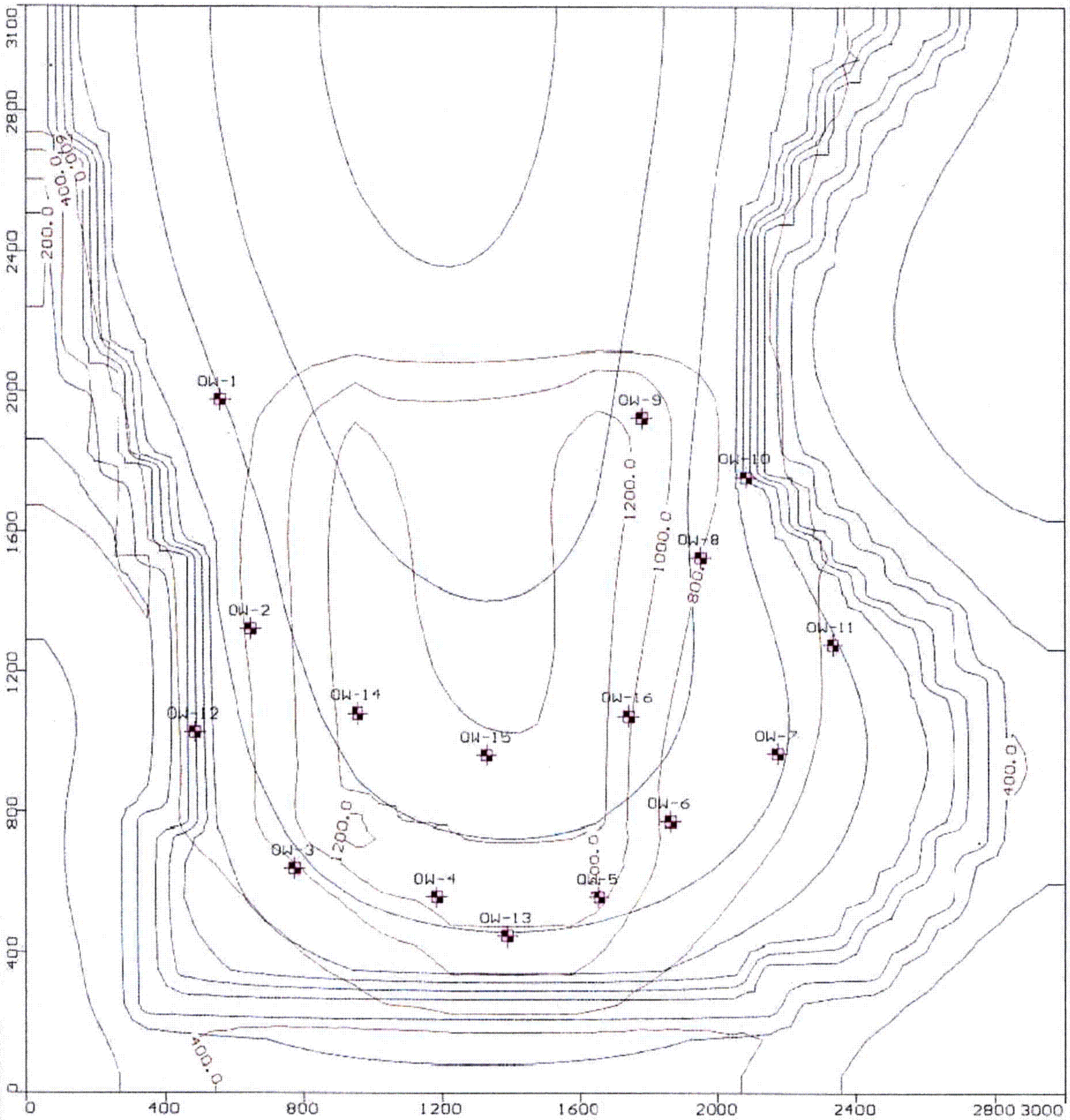


FIGURE 8
PREDICTED TDS ISO-CONCENTRATION CONTOURS IN LAYER 2 AT T = 900 DAYS

CCNPP UNIT 3 UNISTAR NUCLEAR OPERATING SERVICES, LLC	Mactec Engineering and Consulting, Inc. Prepared by A. Mills Checked by: W. Burch

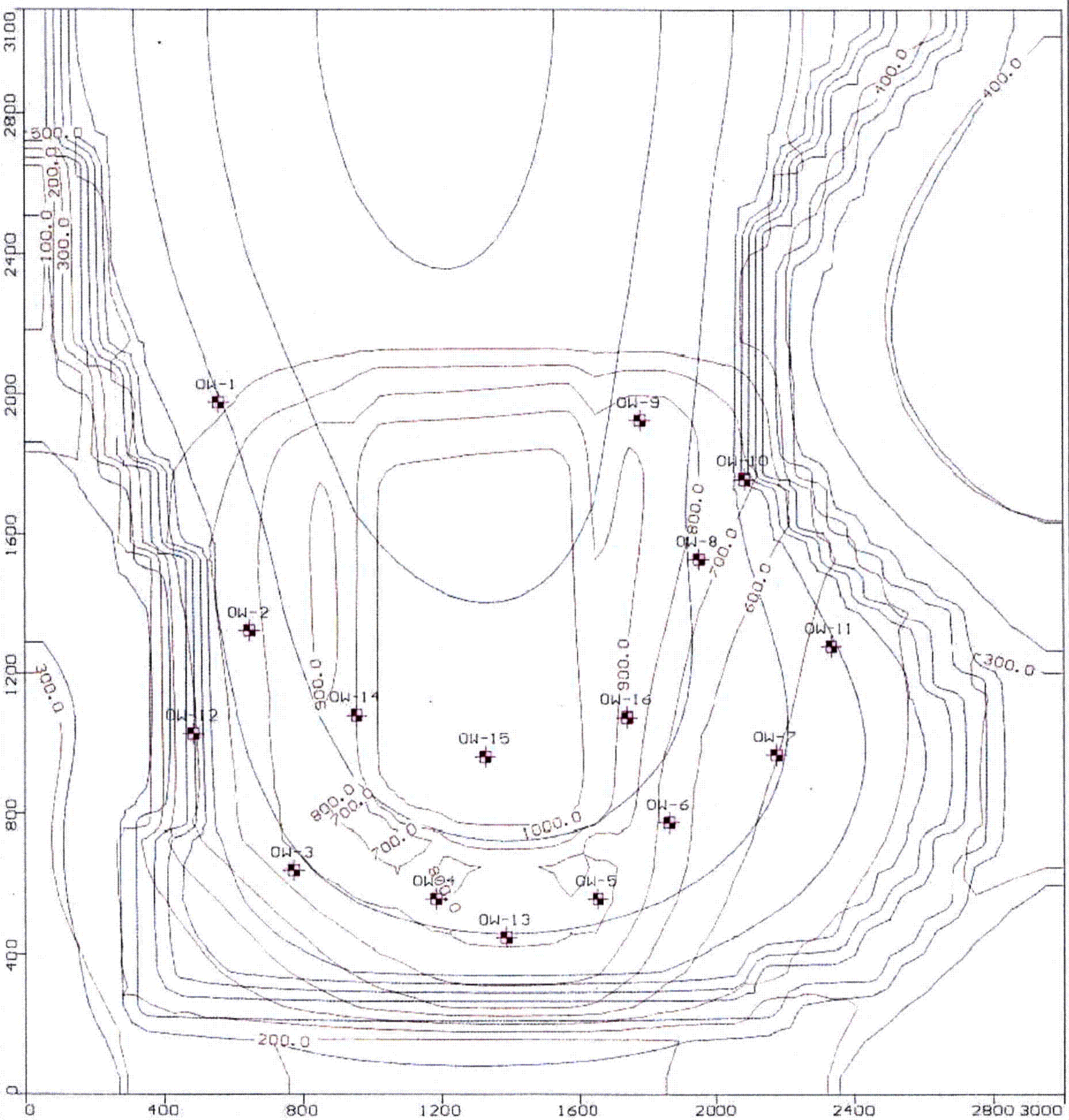


FIGURE 9
PREDICTED TDS ISO-CONCENTRATION CONTOURS IN LAYER 2 AT T = 1500 DAYS

CCNPP UNIT 3 UNISTAR NUCLEAR OPERATING SERVICES, LLC	Mactec Engineering and Consulting, Inc. Prepared by A. Mills Checked by: W. Burch

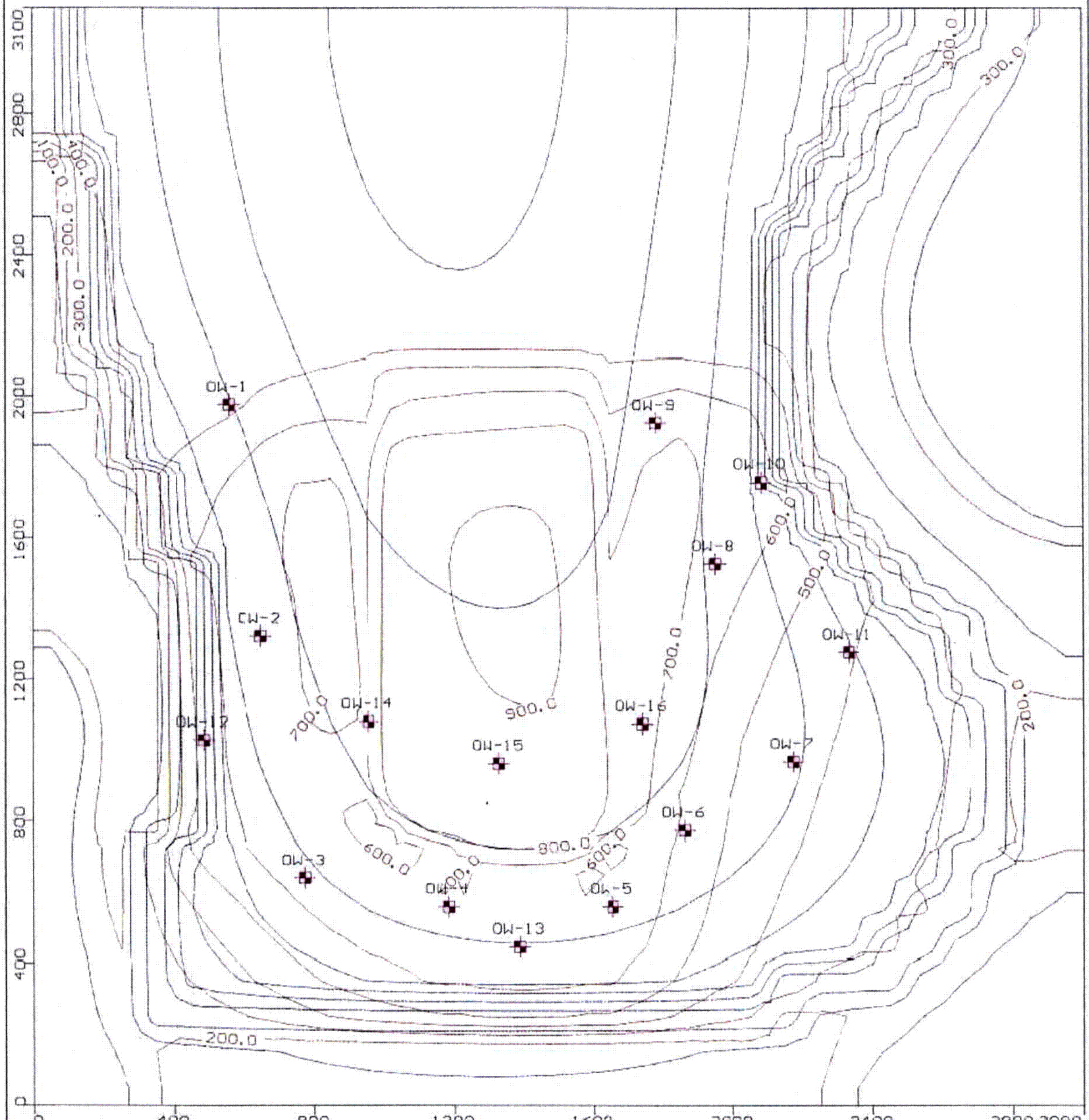


FIGURE 10
PREDICTED TDS ISO-CONCENTRATION CONTOURS IN LAYER 2 AT T = 2000 DAYS

CCNPP UNIT 3 **UNISTAR NUCLEAR OPERATING SERVICES, LLC**	**Maclec Engineering and Consulting, Inc.** **Prepared by A. Mills** **Checked by: W. Burch**

RAI Number: 1008-1

Ecological Impacts

ESRP 4.3.1 - 1
4.3.2-1

Provide a description of terrestrial and aquatic impacts to tidal wetlands. A discussion of these impacts was omitted in the ER.

UniStar Response:

No tidal wetlands occur at the project site. Wetlands within the CCNPP site have been designated as palustrine wetlands, which are defined as freshwater wetlands (U. S. Fish and Wildlife Service, 2007).

The nearest downstream tidal wetland is approximately 2 miles (3.0 kilometers) to the west of the site boundary, where Johns Creek empties into St. Leonard Creek (please see ER Figure 2.3-25 in the ER). Small tidal marshes are also present in the Flag Ponds Natural Area north of the CCNPP site. Neither of these tidal wetlands is within the area potentially affected by proposed construction.

The project area consists of a steeply rolling landscape dissected by a dendritic pattern of stream valleys with narrow floodplains adjoined by steep side slopes whose grade exceeds 25% in places. The eastern part of the site, including most lands east of Camp Conoy Road, drains directly into the Chesapeake Bay. Drainage enters a series of unnamed intermittent and first-order perennial streams that flow generally eastward. The streams become increasingly incised as they approach the cliffs and then cascade over the cliffs and across the narrow beach into the bay. All stream reaches on the site are non-tidal; the cliffs prevent tidal influence from extending west of the beach.

The western part of the site, west of Camp Conoy Road, drains toward the Patuxent River. Lands west of Camp Conoy Road drain into intermittent headwaters of Johns Creek, which flows west under Maryland Route 2/4 and ultimately to the Patuxent River. Most lands in the northwestern part of the site flow into the headwaters to Goldstein Branch. Goldstein Branch flows South, close to the western site perimeter, entering Johns Creek just east of Maryland Route 2/4. A small area in the northern part of the site drains to the north and east into small streams that flow to the Chesapeake Bay north of the CCNPP Units 1 and 2; these are shown as Branch 1 and Branch 2 on ER Figure 2.3.1-2. The dredge spoil disposal area drains to the man-made Lake Davies, which discharges into a tributary to Goldstein Branch. Three other ponds retain surface water onsite: Camp Conoy Fishing Pond, Pond 1 and Pond 2.

Johns Creek is a tributary to St. Leonard Creek, which drains a watershed area of approximately 35.6 mi2 (92.2 km2) into the Patuxent River. St. Leonard Creek is tidally influenced at the confluence with Johns Creek, which is about 2 miles (3.0 km) downstream of the CCNPP site boundary (see ER Figure 2.3-25).

Surface drainage on the portion of the site affected during the construction period moves through the Johns Creek watershed into the St. Leonard Creek, which then drains into the Patuxent River approximately 4 mi (7 km) from the plant. Site grading for CCNPP Unit 3 will affect the headwaters of the unnamed creek, Branch 1, in the Maryland Western Shore watershed. In the St. Leonard Creek watershed, the unnamed creek, Branch 3, will be affected by the switchyard. Post-construction drainage from the CCNPP Unit 3 power block area will be directed towards the Chesapeake Bay, while drainage from the CWS cooling towers and switchyard will be directed to Johns Creek.

The main channel of Johns Creek flows through a stream valley bounded throughout on both sides by mature deciduous forest cover free of agricultural or urban development. The channel is generally diffuse and poorly defined, spreading its flow through dense wetland vegetation that is more than 100 ft (30.5 m) in width at many locations. The vegetation is capable of attenuating flow velocity, filtering out dissolved nutrients or contaminants in the water and causing suspended sediment to settle out before flowing downstream to the tidal waters of St. Leonard's Creek.

All construction will follow best management practices and permit requirements to reduce soil erosion and retain sediment on site. Minor siltation from the dredge spoil area may occur in Lake Davies, a manmade storm water impoundment on site. Any siltation that escapes the construction area will enter Goldstein Branch, which drains to Johns Creek and then to St. Leonard's Creek. Such minor siltation from a properly managed spoil disposal area would settle out long before reaching the tidal wetlands of St. Leonard's Creek. Therefore, no impacts from construction are expected to affect tidal wetlands.

ER Sections 2.3.1 and 2.4.2.1.1 of the ER describe the surface water bodies at the CCNPP site in greater detail.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1008-2

Ecological Impacts

ESRP 4.3.2 - 2

The response to RAI Item #7 (September 29, 2008) that asked for clarification on a previous RAI (#59, June 2008) stated that the barge dock would be in use for about five years. To better understand the incremental impacts from Unit 3 to aquatic organisms in the barge area, knowledge of past operations and planned future operations and maintenance activities is needed.

(1) Has the barge dock been used within the last ten years (e.g., in conjunction with the operation of Units 1 and 2)?

(2) Will the barge dock need to be used during the operation of the proposed new unit? Will maintenance dredging be required during the operation of proposed Unit 3?

(3) Will the dredged area be backfilled with native sediment after the five-year construction period to restore the benthic habitat?

UniStar Response:

The following supplemental information is provided:

(1) The barge dock has been used on multiple occasions during the last ten years. The Vessel that performs baffle wall maintenance uses the barge dock annually. During 2001 the barge dock was used to receive two replacement steam generators for Unit 1. The barge dock was also used during 2001 to receive two replacement main transformers. During 2002 the barge dock was used to receive two replacement steam generators for Unit 2. During a period of 2003-2004 four old transformers were transported from the barge dock. During 2006 the barge dock was used to support the performance of Section 316 (b) entrainment studies. During 2007 two reactor vessel heads were shipped via the barge dock.

(2) The barge dock is not used for normal operations. However, it is evident from the foregoing that it is used with some regularity to accomplish the replacement of major plant components. Future uses are likely to include the receipt and shipment of replacement ISFSI modules and turbine rotors in addition to its regular use for baffle wall maintenance. There are no specific plans for maintenance dredging of the barge dock area. However, the plant's need for the replacement of major components might require dredging in the future.

(3) There are no plans to backfill the existing dredged area due to the probable future use of the barge dock as stated in the preceding discussion.

COLA Impact:

No changes to the COLA are required

RAI Number: 1008-3

Ecological Impacts

ESRP 4.3.2 - 3

Describe the impacts to aquatic organisms and habitat from the relocated intake structure and the Unit 3 fish return.

UniStar Response:

The intake structure was relocated because of concerns about security and constructability. The principal change in design is that the withdrawal point was moved outboard toward the bay. The main construction activities were moved about 150 yards southward so that these activities will not impact existing operations. The intake for the pipes supplying the CWS and UHS intake forebay for CCNPP Unit 3 will be located on a protected section of shoreline adjacent to the south side of the existing intake structure for Units 1 and 2. None of the changes to the intake location affect the previous evaluation of impacts to aquatic organisms or habitat either during the construction phase (this section) or the operations phase (Section 5.3).

The new CCNPP Unit 3 intake piping draws water from the Chesapeake Bay via the existing intake channel and forebay of CCNPP Units 1 and 2, and directs it into a common Unit 3 CWS and UHS intake forebay which serves as the inlet for a separate circulating water makeup structure and UHS makeup structure. The flow velocities at the inlets to the circulating water makeup structure and the UHS makeup structure will be less than 0.3 fps (0.15 mps) and less than 0.1 fps (0.003 mps), respectively. These velocities obviate the need for a fish return system; however, a fish return system will be constructed to further reduce impacts to aquatic species.

Expected impacts of construction of the circulating water system (CWS) are summarized below:

No effects of sedimentation or runoff into the Chesapeake Bay are expected. However, construction of the CWS intake inlet area, CWS discharge pipe, and fish return outfall will cause some disturbance in the Chesapeake Bay. As described in ER Section 4.2.1, a sheet pile cofferdam and dewatering system may be installed on the south side of the CCNPP Units 1 and 2 intake structure to facilitate the construction of the CCNPP Unit 3 CWS intake piping and trash rack structure. Pilings may also be driven into the seabed to facilitate construction of new discharge system piping.

Dredging will be performed to allow for construction at the shoreline location of the CWS intake piping inlet and the discharge line. In addition, some dredging may be required to maintain the CWS and ultimate heat sink (UHS) supply forebay. Dredged material will be disposed of in the previously used disposal area known as Lake Davies. Excavation and dredging of the CWS intake piping area would result in increased suspended sediment in the immediate area. All dredging will conform to guidance provided by the Maryland Port Authority and dredging permit conditions including mitigation measures to minimize suspended sediment and other impacts.

Dredging of the shoreline pipe entrance and fish return outfall areas are expected to be one-time events and are not expected to require maintenance dredging. Consequently, any hydrologic alterations, such as disruption of the longshore current and drift mechanism, are expected to be local, transitory, reversible, and small. Additionally, based on operational experience at CCNPP Units 1 and 2, it is expected that no maintenance dredging will be needed to keep the shoreline pipeline entrance clear.

The assemblage of aquatic species present near the CCNPP site varies throughout the year, due to spawning and migration patterns of individual fish and invertebrate species, as described in Section 2.4.2. The season of the year in which dredging and construction occur would determine to a large extent the impact on specific aquatic resources within the Chesapeake Bay. However, because the area to be dredged is small and in a protected near shore area that is in proximity to an area already dedicated to intake and other industrial functions, the overall impact on eggs, larvae, benthic macroinvertebrates, juvenile and adult fish and submerged aquatic vegetation (SAV do not exist in this area) is expected to be SMALL and TEMPORARY.

Impacts to aquatic resources during operation of the CWS intake are presented in more detail in Section 5.3 of the ER. The relocation will not change the nature or magnitude of the operational impacts. The CCNPP Unit 3 CWS and UHS makeup intakes will meet the U.S. Environmental Protection Agency (EPA) Phase 1 design criteria, as described in Section 5.3.1.1. The overall percentage of Chesapeake Bay water entrained will remain less than 1%, with the maximum additional makeup required to meet the CCNPP Unit 3 cooling water requirement of 40,440 gpm (153,082 lpm).

While fish impingement and entrainment will occur, CCNPP Unit 3 will employ closed cycle cooling as the primary impingement/entrainment mitigation technique. In addition, it will utilize low through-screen velocity traveling screens to further minimize the impact on aquatic resources. A fish return system and outfall will be used at the CCNPP Unit 3 CWS makeup water intake to reduce the mortality of aquatic species. Details of the fish return system are provided in Section 3.4

The intake structures will incorporate fish and invertebrate protection measures that maximize impingement survival. Design through-screen velocities for both CCNPP Unit 3 intake structures will be less than 0.5 ft/s (0.15 m/s). The screen wash system provides a pressurized spray to remove fish, shellfish, and debris from the water screens. In both intake structures, a fish return system is provided even though the flow velocities through the screens are less than 0.5 ft/s (0.15 m/s) in the worst case scenario (minimum Chesapeake Bay level with highest makeup demand flow).

Although it is expected that addition of the CCNPP Unit 3 closed cycle cooling system will increase fish impingement and entrainment by less than 3.5% (based on preliminary cooling tower performance) over the existing condition the addition of a fish return system will help mitigate mortality to aquatic species.

UniStar's response to RAI 1008-4 (ES RP 4.3.2-4) provides additional evaluations of the impacts to aquatic organisms due to the relocated intake structure.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1008-4

Ecological Impacts

ESRP 4.3.2 - 4

Provide more detailed information about how the piping to be used for the fish return system will be designed to enhance potential survival of aquatic organisms (smooth walls, no 90° turns, etc.). Is there any design feature that reduces the likelihood that aquatic organisms will become entrapped in the intake forebay? Is there any design feature, in addition to trash racks, in the wedge-shaped intake pool that prevents aquatic organisms from entering the intake pipes? Specify mesh sizes for all screens. How would installation of the new intake pipe affect the existing fish return system for Units 1 and 2? Would the existing fish-return system be shutdown for any amount of time during construction of Unit 3? If so, for how long and would any measures be taken to return organisms to the Bay?

UniStar Response:

The proposed Unit 3 intake pipes located in the wedge-shaped pool will be smooth walled and consist of mostly a straight run with slight bends (>150°) to route water around the CWS intake structure. There are no 90° turns in the intake system. Trash racks are the only design feature in the wedge-shaped pool that have been added to prevent larger fish and debris from entering the intake pipes. Trash rack bar spacing will be 3.5 inches (8.9 cm) from center to center. Any fish that pass through the trash racks at the inlet of the intake pipes and enter the forebay will get directed into a fish return system which is comprised of travelling screens provided between the forebay and CWS intake and UHS intake. The travelling screens will be metal or plastic with mesh size expected to be standard 3/8 inch mesh or smaller. The former is consistent with the mesh currently in place at CCNPP Units 1 and 2 and has proven to provide optimal performance for the bay conditions in this location. t

The proposed Unit 3 fish return system is designed to be similar to those in place for Units 1 and 2 and will include a holding pit, isolation gates (default is open position), and a flow trough. Screen wash water containing impinged fish collected from the traveling screens of the CWIS will be discharged via an underground conduit to the Bay. The fish return structure is located between the Unit 3 intake forebay and the Bay. All bends in the fish troughs will be greater than 90° and the interior of the troughs will be smooth to minimize the potential for abrasion. The discharge from the fish return system will be positioned in the Bay so that it is submerged below the low tide line. The piping material for the fish return system's discharge conduit will be 18" diameter HDPE pipe. This smooth-walled pipe, and smoothed joints, is intended to reduce likelihood of injury to fish being returned to the Bay.

As described in 3.4.2.1.1[1], the Unit 1 fish return which is located to the northeast side of the CCNPP Unit 1 and 2 Intake Forebay will not be affected by the Unit 3 construction activities. It is expected that the existing Unit 2 fish return system which is located to the southeast side of the Unit 1 and 2 Intake Forebay will continue to operate during the installation of the new intake structure for Unit 3. The primary construction workaround for continuous operation of the existing Unit 2 fish return system during installation of the new intake pipe is expected to include installation of support walls for the Unit 2 fish return while the underlying intake pipes are installed. This approach was determined to be feasible based upon the following design parameters:

- The new intake pipes will be 60" in diameter (5ft)
- The bottom of the excavation is expected to be 25 ft
- The top of the Unit 3 intake pipe is 20 ft below grade
- The Unit 2 fish return is ~8 - 10 ft below grade
- Gap between top of intake pipe and bottom of CC2 fish return is ~10 - 12 ft

In consideration of the above design features, supporting the existing fish return during construction of the new intake, via use of support walls is feasible. With this approach, the fish return system from Unit 2 would be maintained in operation and would not be shut down.

If interruption of operation of the Unit 2 fish return system is required during construction, the fall-back approach for returning the fish from Unit 2 during construction of the new Unit 3 intake will be to reroute fish from the Unit 2 screen wash either through a temporary fish return or the Unit 1 fish return.

[1] Section 3.4.2.1.1 currently characterizes the existing Unit 1 and 2 fish return as a single common system when in fact each unit has its own independent fish return system. Attached is an annotated copy of the section showing the correct description.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached markup.

Markups per RAI 1008-4

, respectively. Each unit has its own independent Fish Return System. However, both systems are of the same design and

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3.4.2.1.1 Fish Return System

The existing Units 1 and 2 Fish Return System ~~is~~ located to the southeast side of the Units 1 and 2 Intake Forebay~~. Currently wa~~ter ~~from Units 1 and 2~~ flows through the ~~existing~~ Fish Return System where environmental aquatic studies can be performed. Traveling screen wash water leaving the facility then enters the Chesapeake Bay directly through a buried conduit to the shoreline outfall. The Fish Return System contains a holding pit, two isolation gates and flow trough. The main isolation gate is normally open, allowing discharge of screen wash water...

RAI Number: 1008-5

Ecological Impacts

Provide additional information about the intake system for proposed Unit 3. Will the existing baffle wall separating the intake area for Units 1 & 2 from the Chesapeake Bay be removed after the new baffle wall for proposed Unit 3 is installed? What is the length of the new baffle wall that will be in contact with the bay bottom?

UniStar Response:

The proposed Unit 3 Intake, also referred to as the "wedge-shaped pool", is a triangular shaped area which is bounded on the east side by the new proposed sheet pile wall, on the southwest side by the existing shore and on the northwest side by the existing Unit 1&2 baffle wall.

A new sheet pile wall connecting the existing Unit 1 & 2 baffle wall and the shoreline, thus, creating a wedge, is proposed for the construction of Unit 3. The existing baffle wall for Unit 1 & 2 will not be removed. As described in the Joint Permit Application (JPA) "Work Description" Supplement dated 08/17/08, the existing Unit 1&2 baffle wall will remain, as originally designed, after construction of the proposed Unit 3 intake is completed.

The new wall will consist of approximately 180 feet of sheet pile, about 60 feet in length, installed vertically, with an embedded depth of approximately 15 feet and supported by soldier piles, driven approximately 10 feet on centers.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1008-6

Ecological Impacts

Provide a figure that shows the bayward extent of the armoring that would be added to protect the new baffle wall installed for the intake system for proposed Unit 3. This is Figure 3B, which was not included in the September 29, 2008 RAI response. The figure should fit on one 8.5" × 11" page.

UniStar Response:

UniStar response to RAI 1001-14 (ESRP 4.3.2-3) provides the requested figure.

COLA Impact:

Fig 3B will be incorporated into a future revision of the COLA as identified in UniStar response to RAI 1001-14).

RAI Number: 1009-1

Radiological Monitoring

ESRP 6.2

Describe any additional radiological monitoring that has been instituted at Calvert Cliffs, Units 1 and 2, to support the Nuclear Energy Institute Ground Water Protection Initiative, including number of monitoring wells and locations. Describe any changes being planned by Unistar to provide monitoring coverage under the initiative for the proposed Unit 3.

UniStar Response:

CCNPP, Inc., plant owners for Units 1 and 2, identified that a groundwater monitoring program meeting the intent of NEI 07-07 is being implemented. This program includes:

- Groundwater sample points include five piezometer tubes (11, 12, 13, 15, and 18); location based on plant design and hydrogeology and ensure timely detection of inadvertent radiological releases;

- Proceduralized sampling and analysis protocols including three action levels. These action levels established criteria for additional sampling, analysis, and stakeholder communications;

- A documented communications protocol for stakeholder notifications (NRC inspector, state and local officials). Communications protocol establishes thresholds for inadvertent spills/leaks and sample result activity levels;

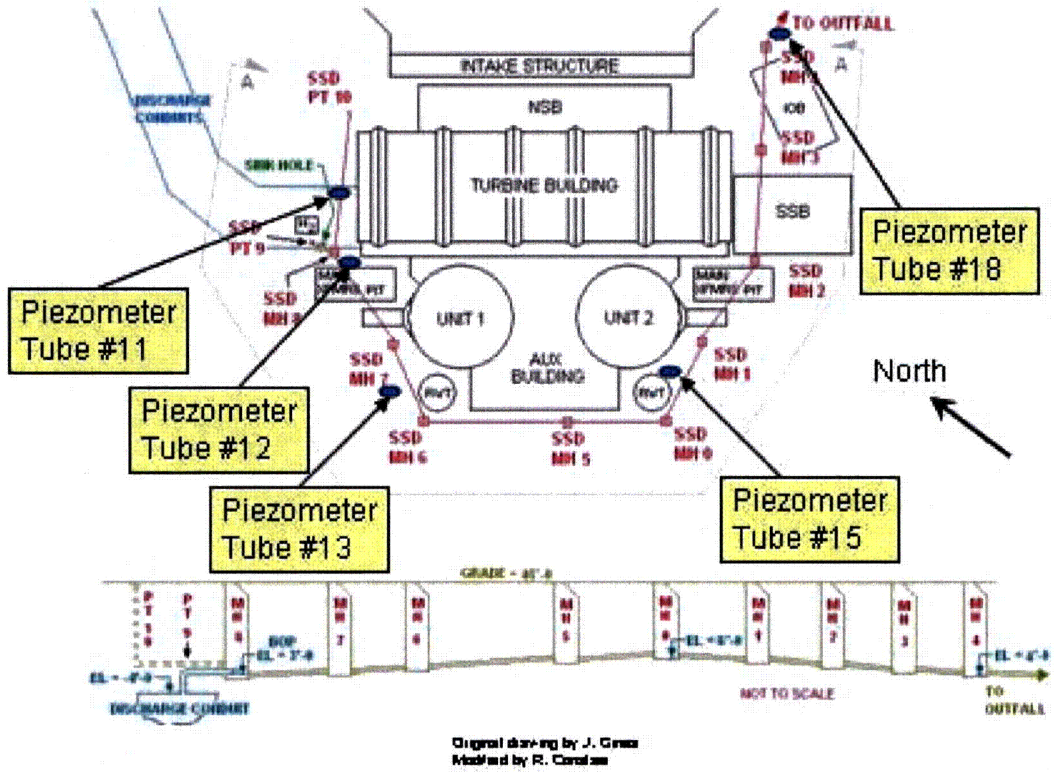
- Application of existing spill response and remediation program;

- Record keeping requirements consistent with 10 CFR 50.75(g); and

- Inclusion of groundwater sampling results in the Annual Radiological Effluent Release Report (Sample results have been included in the Annual Radioactive Effluent Release Report, CCNPP Units 1 and 2 are transitioning to include 2008 results the Annual Radiological Environment Operating Report to be released in May 2009. This issue is tied to the monitoring not being specified in the Offsite Dose Calculation Manual. See NEI 07-07 Objective 2.4).

The geology and groundwater flow in the vicinity of CCNPP Units 1 and 2 is well understood and documented in the CCNPP Units 1 and 2 Environmental Report for License Renewal. In 2006 in response to industry activities regarding groundwater contamination from inadvertent leaks, a study was commissioned to better understand shallow groundwater flow in the vicinity of the plant. This study confirmed the understanding of groundwater flow and sampling locations. Piezometer tube locations are all inside the protected area (see Figure 1) and are sampled at least quarterly and analyzed for gamma isotopes and Tritium. If a sample result for tritium exceeds 2,000pCi/l, additional analyses are performed for Strontium-90 and transuranics. As noted, results are included in the Unit 1 and 2 Annual Radiological Effluent Operating Report.

Figure 1. CCNPP Units 1 and 2 Groundwater Monitoring Locations



CCNPP, Inc. responded to NRC's Data Collection Questionnaire in July of 2006. A groundwater protection self assessment was performed prior to the release of NEI's final guidance. This self assessment will be updated and reformatted to meet the criteria of NEIs final guidance published in August 2007. An independent review of the updated self assessment has been planned for the 3rd quarter 2009.

It is important to note that CCNPP, Inc., is the named licensee for Units 1 & 2 and is a separate legal entity from the Unit 3 Applicants submitting this response. These parties have entered into a Reciprocal Easement Agreement, dated June 27, 2008, and Section 2.1.(k) of that agreement cites that CCNPP, Inc., will continue to perform certain radiological effluent monitoring functions for all the land previously owned by CCNPP, Inc., for the foreseeable future.

The response to RAI #133 (UniStar Letter UN#08-018, dated June 12, 2008) addresses plans by UniStar for Unit 3 operations in that:

a) it provides for the inclusion of groundwater monitoring in the routine Radiological Effluent Monitoring Program (RAI #133, Table 1);

b) it describes the on-site monitoring well locations (RAI #133, Table 3); and

c) it shows the locations of these wells on maps (RAI #133, Figures 1 and 2).

UniStar letter UN#09-108, dated February 6, 2009, describes additional details of radiological monitoring requirements applicable to the licensing basis for CCNPP Unit 3.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1010-1

Energy Alternatives

ESRP 9.2-1

Information on a coal-fired energy alternative is provided in Section 9.2.3.1 of the ER. The staff requests additional information on the type of coal plant assumed in the ER. The staff also requests that estimated emissions for the coal plant be recalculated, if appropriate, using updated emission factors including the 2007 National Energy Technology Laboratory report, *Cost and Performance Baseline for Fossil Energy Plants Volume 1: Bituminous Coal and Natural Gas to Electricity*, DOE/NETL-2007/1281 Rev. 1.

The most recent published information that the staff is aware of regarding the performance of fossil energy power systems is the report cited above (online at: http://www.netl.doe.gov/energy-analyses/pubs/Bituminous%20Baseline_Final%20Report.pdf). The report examines four cases of subcritical and supercritical pulverized coal-fired power plants and includes emission estimates for each case. Section 9.2.3.1 of the ER does not state whether a subcritical or supercritical coal plant is assumed. The ER also uses EPA's 1995 AP-42 document to estimate emissions from a new coal-fired power plant. Emission estimates in the 2007 NETL report assume environmental regulations that would most likely apply to plants built in 2010 (see p. 18 of the report). The staff also notes that EPA published a version of AP-42 applicable to coal combustion in 1998 (see p. 8-54 of draft NUREG-1437, Supplement 36).

UniStar Response:

As requested, the estimated emissions for the coal plant were recalculated using updated emission factors from the referenced 2007 National Energy Technology Laboratory (NETL) report. The recalculated emissions were based on use of a supercritical pulverized coal (PC), wall-fired unit. Sulfur emissions were assumed to be controlled through the use of a flue gas desulfurization system to control acid gas emissions. The revised estimated emissions are shown in ER Table 9.2-2 (attached).

The primary reason for the significantly higher estimated emissions using the NETL report as compared to the previous estimated emissions using the AP-42 report that were included in Revision 3 of the CCNPP Unit 3 ER is due to the net plant heat rate used in the calculations. The AP-42 report does not provide guidance for determination of the net plant heat rate. The typical range for net plant heat rate is 6800 to 7800 Btu/kW-hr for natural gas fired turbine generators, depending on the type of operation (with or without duct firing). For coal-fired plants, the net plant heat rate can range between 9,000 to 13,000 BTU/kW-hr, depending on the type of facility. The net plant heat rate assumed in the NETL report for the cases being modeled was used to calculate the revised emissions. Much lower rates were assumed for the previous emissions calculations.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached markup.

The second paragraph of ER Section 9.2.3.1.1, Air Quality, will be revised as follows (changes are shown in track changes):

> Air emissions were estimated for a coal-fired generation facility based on the emission factors contained in NETL document DOE/NETL-2007/1281 (NETL, 2007). The emissions from this facility are based on a power generation capacity of 1,600 MWe. The coal-fired generation facility assumes the use of bituminous coal fired in a supercritical pulverized coal (PC), wall-fired unit. Emissions control was assumed to include the use of a flue gas desulfurization system to control acid gas emissions, selective catalytic reduction to minimize NOx emissions and a baghouse to control PM. Table 9.2-2 summarizes the air emissions produced by a 1,600 MWe coal-fired facility.

Table 9.2-1, Impacts Comparison Table will be revised as follows. Impact Category of Air Quality for Coal-Fired Generation will be revised to:

~~Moderate to~~ Large
SO_2 = ~~415 (457)~~4,700 (5,177)
NO_2 = ~~734 (809)~~3,884 (4,278)
~~CO = 4,402 (4,852)~~

ER Table 9.2-2, Air Emissions from Alternative Power Generation Facilities, will be revised as follows. The NETL report does not provide emissions factors for carbon monoxide or particulate matter less than 10 micrometers so these emissions will be deleted from the table.

Table 9.2-2 Air Emissions from Alternative Power Generation Facilities
(Page 1 of 1)

Fuel	Bituminous Coal	Natural Gas
Combustion Facility	~~Circulating FBC~~Supercritical, pulverized coal, wall fired	Combined Cycle GTG, no duct firing
Generation Capacity	1,600 MWe	1,600 MWe
Air Pollutant Emissions – metric tons (tons) per year		
Sulfur Dioxide (SO_2)	~~415 (457)~~4,700 (5,177)	~~17 (19)~~ 83 (92)
Nitrogen Dioxide (NO_2)	~~734 (809)~~ 3,884 (4,278)	~~661 (729)~~ 385 (424)
~~Carbon Monoxide (CO)~~	~~4,402 (4,852)~~	~~152 (168)~~
Particulate Matter (PM)	~~21 (23)~~ 722 (795)	~~34 (37)~~ negligible
~~PM less than 10µm (PM10)~~	~~15 (17)~~	~~24 (26)~~
Carbon Dioxide (CO_2)	~~1,731,000 (1,908,000)~~ 11,260,000 (12,407,000)	~~565,000 (623,000)~~ 5,086,000 (5,603,000)

~~CO_2e – CO_2 equivalent~~
~~FBC – fluidized bed combustor~~
GTG – gas turbine generator
MWe – megawatt electric

The following reference will be added to ER Section 9.2.5:

National Energy Technology Laboratory (NETL), 2007. *Cost and Performance Baseline for Fossil Energy Plants Volume 1: Bituminous Coal and Natural Gas to Electricity*, U.S. Department of Energy, National Energy Technology Laboratory report, DOE/NETL-2007/1281 Rev. 1, August 2007; Available online at: http://www.netl.doe.gov/energy-analyses/pubs/BituminousBaseline_Final Report.pdf

RAI Number: 1010-2

Energy Alternatives

ESRP 9.2-2

Information on the natural gas combined-cycle (NGCC) energy alternative is provided in Section 9.2.3.2 of the ER. The staff requests that estimated emissions for the NGCC plant be recalculated, if appropriate, using updated emission factors including the 2007 National Energy Technology Laboratory report, *Cost and Performance Baseline for Fossil Energy Plants Volume 1: Bituminous Coal and Natural Gas to Electricity*, DOE/NETL-2007/1281 Rev. 1.

The most recent published information that the staff is aware of regarding the performance of fossil energy power systems is cited above (online at: http://www.netl.doe.gov/energy-analyses/pubs/Bituminous%20Baseline_Final %20Report.pdf). The report includes emission estimates for NGCC power plants. Section 9.2.3.2 of the ER uses EPA's 1995 AP-42 document to estimate emissions from a new NGCC power plant. Emission estimates in the 2007 NETL report assume environmental regulations that would most likely apply to plants built in 2010 (see p. 18 of the report). The staff also notes that EPA published a version of AP-42 applicable to natural gas combustion in 2000 (see p. 8-54 of draft NUREG-1437, Supplement 36).

The most recent published information that the staff is aware of regarding the performance of fossil energy power systems is cited above (online at: http://www.netl.doe.gov/energy-analyses/pubs/Bituminous%20Baseline_Final %20Report.pdf). The report includes emission estimates for NGCC power plants. Section 9.2.3.2 of the ER uses EPA's 1995 AP-42 document to estimate emissions from a new NGCC power plant. Emission estimates in the 2007 NETL report assume environmental regulations that would most likely apply to plants built in 2010 (see p. 18 of the report). The staff also notes that EPA published a version of AP-42 applicable to natural gas combustion in 2000 (see p. 8-54 of draft NUREG-1437, Supplement 36).

UniStar Response:

As requested, the estimated emissions for the natural gas combined-cycle plant were recalculated using updated emission factors from the referenced 2007 NETL report. The recalculated emissions were based on use of a combined cycle gas turbine generator with no duct firing. Nitrous oxide emissions were assumed to be controlled through the use of selective catalytic reduction. The revised estimated emissions are shown in ER Table 9.2-2 in the response to RAI 1010-1 (ESRP 9.2-1).

The primary reason for the significantly higher estimated emissions using the NETL report as compared to the previous estimated emissions using the AP-42 report that were included in Revision 3 of the CCNPP Unit 3 ER is due to the net plant heat rate used in the calculations. The AP-42 report does not provide guidance for determination of the net plant heat rate. The typical range for net plant heat rate is 6800 to 7800 Btu/kW-hr for natural gas fired turbine generators, depending on the type of operation (with or without duct firing). For coal-fired plants, the net plant heat rate can range between 9,000 to 13,000 BTU/kW-hr, depending on the type of facility. The net plant heat rate assumed in the NETL report for the cases being modeled was used to calculate the revised emissions. Much lower rates were assumed for the previous emissions calculations.

The EPA AP-42 emission factors for NOx were based on steam injection to control NOx emissions. The NETL report assumes the use of a low NOx burner and SCR, resulting in a lower emission rate.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached markup.

The second paragraph of ER Section 9.2.3.2.1, Air Quality, will be revised as follows (changes are shown in track changes).

> Human health effects are SMALL based on decreased air quality impacts. Natural gas technologies produce fewer pollutants than other fossil technologies, and SO_2, a contributor to acid rain, is not emitted ~~at all~~in significant quantities (NRC, 1996). Air emissions were estimated for a natural gas-fired generation facility based on the emission factors contained ~~USEPA document, AP-42 (USEPA, 1995)~~in the NETL document DOE/NETL-2007/1281 (NETL, 2007). Emissions from the facility were based on a power generation capacity of 1,600 MWe.

The last paragraph of ER Section 9.2.3.2.1, Air Quality, will be revised as follows.

> The natural gas-fired generation facility assumes the use of a combined cycle gas turbine generator (GTG) with no duct firing. ~~Water injection~~Selective catalytic reduction is used to control NO_x emissions. Table 9.2-2 summarizes the air emissions produced by a 1,600 MWe natural gas-fired facility. Based on the emissions generated from a natural gas-fired facility, air impacts would be MODERATE.

ER Table 9.2-1, Impacts Comparison Table, will be revised as follows. Impact Category of Air Quality for Gas-Fired Generation will be revised to:

Moderate
SO_2 = ~~17 (19)~~ 83 (92)
NO_2 = ~~661 (729)~~ 385 (424)
~~CO = 152 (168)~~

ER Table 9.2-2, Air Emissions from Alternative Power Generation Facilities, will be revised as shown in the response to RAI Energy Alternatives ESRP 9.2-1. The NETL report does not provide emissions factors for carbon monoxide or particulate matter less than 10 micrometers so these emissions will be deleted from the table.

The following reference will be added to ER Section 9.2.5:

National Energy Technology Laboratory (NETL), 2007. *Cost and Performance Baseline for Fossil Energy Plants Volume 1: Bituminous Coal and Natural Gas to Electricity*, U.S. Department of Energy, National Energy Technology Laboratory report, DOE/NETL-2007/1281 Rev. 1, August 2007; Available online at: http://www.netl.doe.gov/energy-analyses/pubs/BituminousBaseline_Final Report.pdf

RAI Number: 1011-1

ESRP 9.3-1

UniStar's region of interest is stated in the ER to be New York and Maryland. The ER discusses four candidate sites, two in Maryland and two in New York. Need for power is analyzed in the ER for Maryland but not for New York. Explain why the two New York sites were included in the ER as alternative sites given that no need for power in New York is identified or discussed in the ER.

UniStar Response:

The New York/Maryland region of interest was selected for locating the proposed and alternative sites under the provisions of NUREG-1555 (1999) Section 9.3, which states "Region of Interest" (ROI) is the geographic area considered in searching for candidate sites."

UniStar Reference Combined License Application (R-COLA) plants located within this ROI are merchant plants, which may sell power to any power market. The R-COLA business model is based on power sales to the Pennsylvania New Jersey Maryland Interconnection, LLC -East power market, regardless of plant location. The two alternate sites identified in New York would sell power to the Maryland PJM-East power market under this model if they were selected as the proposed site. Accordingly, only a Maryland (PJM-East) need for power analysis is provided in accordance with NUREG-1555 (1999), which states "Applicants may be power generators rather than utilities; therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type."

COLA Impact:

No changes to the COLA are required.

RAI Number: 1011-2

ESRP 9.3-2

Assuming that a need for power exists in both New York and Maryland, why did UniStar select a Maryland site for the proposed site?

UniStar Response:

The Calvert Cliffs Nuclear Power Plant (CCNPP) site was selected based on the exception process as described in the response to RAI 1011-4 (Alternate Sites 9.3-4). Also, the response to RAI 1011-1 (Alternate Sites ESRP 9.3-1) provides information relative to the desired power market and business model for the initial (reference) Combined License Application (COL). A Maryland (CCNPP) site was selected as the proposed site based upon evaluations conducted by Constellation and NuStart in 2004 and 2005. In 2004, Constellation assessed the CCNPP, Nine Mile Point, and R.E. Ginna nuclear sites for their potential to add a new nuclear unit for inclusion within an overall site study to be performed by NuStart. The CCNPP site was favored in this assessment based upon local political climates and site size. In 2005, a NuStart Site Selection Committee assessed 12 potential sites offered by utility members using the EPRI Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application. The NuStart study ranked the CCNPP and Nine Mile Point sites as two of the top 5 candidate sites. The study also identified CCNPP strengths as having the most favored merchant power market, transmission infrastructure, and utility relation with the local community, and ranked the Maryland site above Nine Mile Point New York site on cumulative scoring.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached markups.

ER Section 9.0

9.3 ALTERNATIVE SITES

This section identifies and evaluates a set of alternative site locations to the {Calvert Cliffs Nuclear Power Plant (CCNPP)} site. The object of this evaluation is to verify that there are no "obviously superior" sites to build and operate the {CCNPP Unit 3} facility.

Siting new units at existing nuclear sites has provided another option to the way alternatives are reviewed and selected. Existing sites offer decades of environmental and operational information about the impact of a nuclear plant on the environment. Because these sites are licensed nuclear facilities, the Nuclear Regulatory Commission (NRC) has already found them to be acceptable relative to other undeveloped sites in the region of interest. The NRC recognizes (in NUREG-1555, (NRC, 1999), Section 9.3(III)(8)) that proposed sites may not be selected as a result of a systematic review:

> Recognize that there will be special cases in which the proposed site was not selected on the basis of a systematic site-selection process. Examples include plants proposed to be constructed on the site of an existing nuclear power plant previously found acceptable on the basis of a NEPA review and/or demonstrated to be environmentally satisfactory on the basis of operating experience, and sites assigned or allocated to an applicant by a State government from a list of State-approved power-plant sites. For such cases, the reviewer should analyze the applicant's site-selection process only as it applies to candidate sites other than the proposed site, and the site-comparison process may be restricted to a site-by-site comparison of these candidates with the proposed site. As a corollary, all nuclear power plant sites within the identified region of interest having an operating nuclear power plant or a construction permit issued by the NRC should be compared with the applicant's proposed site (NRC, 1999).

RAI 1011-2
RAI 1011-4
INSERT A

The information provided in this section is consistent with the special case noted in NUREG-1555, (NRC, 1999), Section 9.3(III)(8). This section identifies and discusses the evaluation of a set of alternative locations for the proposed plant and compares the suitability of these alternative sites with the suitability of the proposed site. The objective of this assessment is to verify that no site is "environmentally preferable" (and thus, no site is "obviously superior") for the siting of a new nuclear plant exists. ~~{In addition to three existing nuclear sites, this section evaluates the characteristics of a generic greenfield site and a non-nuclear brownfield site.}~~

9.3.1 SITE SELECTION PROCESS

The site selection process focuses on identifying and evaluating locations that represent a range of reasonable alternative sites for the proposed project. The primary objective of the site-selection process is to determine if any alternative site is "obviously superior" to the preferred site for eventual construction and operation of the proposed reactor units. The preferred site is chosen from within the candidate sites, and then compared with the remaining candidate sites to demonstrate that none are "environmentally preferable." The basic constraints and limitations applicable to the site-selection process are the currently implemented rules, regulations, and laws within the federal, state, and local agency levels. These provide a comprehensive basis and an objective rationale under which this selection process is performed.

9.3.1.1 Region of Interest and Candidate Areas

{The proposed new nuclear unit will be a merchant plant, that is, a plant that is connected to the grid for the purpose of selling energy to customers in a wholesale market. UniStar Nuclear Operating Services and Constellation Generation Group evaluated the market in the

RAI 198
RAI 1011-2
RAI 1011-3
RAI 1011-4
INSERT B1
AND B2

northeastern region of the U.S. and chose Maryland and New York as ~~candidate areas~~ based on the location of nuclear and non-nuclear sites to which it had access. Chapter 8 discusses the need for power in this region.

ROI

RAI 196

ER Section 9.0

~~Potential sites within the candidate areas were evaluated further for the proposed new nuclear facility. The potential sites included a brownfield/non-nuclear site, existing nuclear sites, and a greenfield site. The non-nuclear site chosen for further analysis is a coal burning power plant that is currently owned and operated by Constellation Energy.~~

~~The nuclear sites include CCNPP and two located in the New York candidate area on the south shore of Lake Ontario. The sites in New York were chosen because they are owned by Constellation (with ready access to the site and other information), are in relatively close proximity to the CCNPP site, and are within the applicant's candidate areas. Other nuclear sites within the candidate area were not evaluated because none of these sites are owned or controlled by Constellation Generation Group or its subsidiaries.~~

~~Purchase of, or access to, a competitor's nuclear site would be cost prohibitive and therefore would not be viable options for siting of a new reactor by the applicant. Furthermore, detailed information concerning competitor owned plants is not readily available for analysis.}~~

9.3.1.~~2~~ 3 Candidate Sites

RAI 1011-3
INSERT CC1

RAI 199
DELETE

~~{An initial review of potential sites was conducted. Due to the cost of acquiring existing generating facilities that are currently owned by competitors, only those locations already owned by Constellation were considered for further evaluation as candidate sites. To be considered as candidate sites, a location must meet the following criteria as outlined in NUREG-1555, (NRC, 1999), Section 9.3 (III)(4c):~~

- ~~Consumptive use of water should not cause significant adverse effects on other users.~~
- ~~There should not be any further endangerment of Federal, State, regional, local, and affected Native American tribal listed threatened, endangered, or candidate species.~~
- ~~There should not be any potential significant impacts to spawning grounds or nursery areas of populations of important aquatic species on Federal, State, regional, local, and affected Native American tribal lists.~~
- ~~Discharges of effluents into waterways should be in accordance with Federal, State, regional, local, and affected Native American tribal regulations and would not adversely impact efforts to meet water-quality objectives.~~
- ~~There would be no preemption of or adverse impacts on land specially designated for environmental, recreational, or other special purposes.~~
- ~~There would not be any potential significant impact on terrestrial and aquatic ecosystems, including wetlands, which are unique to the resource area.~~
- ~~Population density and numbers conform to 10 CFR 100.~~
- ~~There are no other significant issues that affect costs by more than 5% or that preclude the use of the site.~~

RAI 199

~~In addition to meeting all applicable regulations and guidelines, the following factors influenced the decision to review sites.~~

- ~~The site would be suitable for the design parameters contemplated for the new plant design.~~

- ~~The location would be compatible with the applicant's current system and transmission capabilities.~~

- ~~The site's expected licensing and regulatory potential must minimize the schedule and financial risk for establishing new baseload generation.~~

~~{Given the factors listed above, three existing nuclear sites and a non-nuclear (or brownfield) site were carried forward as candidate sites for further review. The three existing nuclear sites include the CCNPP site, the Nine Mile Point site, and the R.E. Ginna site. The Crane Generating Station is the non-nuclear site. Additionally, a generic greenfield site was considered.~~

A greenfield site is a location that has not previously been developed for any use. The NRC has noted that the general environmental impact of new nuclear construction on a greenfield site is generally severe (NRC, 1996), and greater than the impacts associated with construction and operation of a facility at an existing nuclear plant site. However, for the purposes of this site analysis, the possible general impacts of a greenfield site were reviewed.

It was assumed that the greenfield site would be located in an area that met the siting criteria of 10 CFR 100. As a result the characteristics of the site could be largely rural, or at least in an area with low population in Maryland. For the purposes of this analysis, it was also assumed that the site would be near a possible supply of cooling water such as Chesapeake Bay. It was assumed that the site would consist of at least 500 to 1000 acres (200 to 400 hectares) to accommodate construction and operation needs (for comparison, the CCNPP Unit 3 project area requires about 420 acres (170 hectares). It was also assumed that a supply of cooling water would be available. Additionally, it was assumed that the general environmental considerations associated with construction and operation at a greenfield site would be similar to those discussed in NUREG-1555 (NRC, 1999) and Chapters 4 and 5 of this Environmental Report. The greenfield site was not the environmentally preferable location for several reasons:

- Aesthetic impact will be greater than similar impacts at the other candidate sites. In its analysis. While the environmental impacts of construction and operation would be similar to those described in Chapters 4 and 5, much of the existing infrastructure at the CCNPP site would have to be developed to access the new site. Additionally, large areas of land would be cleared, graded and modified to accommodate construction and operation. Chapters 4 and 5 describe construction, operation, and associated mitigation strategies that rely on existing infrastructure and other CCNPP specific factors to arrive at the predicted impacts. However, these infrastructure advantages would likely not be available at most of the potential greenfield sites in Maryland. Any aesthetic impacts to the greenfield site would thus be MODERATE to LARGE

- Socioeconomic impacts at the postulated greenfield site will generally be equal to or greater than those at the other candidate sites. It was assumed that the general socioeconomic impacts described in Section 4.5 and Section 5.8 would apply at the greenfield site. However, it is notable that in a rural and somewhat undeveloped area of Maryland, housing and transportation impacts would be greater that those postulated for the other sites. Agricultural lands and historically important sites may

Insert A (Section 9.3)

In 2004, Constellation Generation Group assessed the potential to add a new nuclear unit at existing nuclear unit sites (CCNPP, Nine Mile Point, and R.E. Ginna). The CCNPP and Nine Mile Point sites were then included in a NuStart Energy site selection study in 2005 with the objective of identifying two nuclear sites for siting a new reactor. The NuStart site selection committee assessed 12 potential nuclear sites offered by utility members using the EPRI Siting Guide. Although the CCNPP and Nine Mile Point sites were not the top two sites, the NuStart study ranked these sites within the top 5 candidate sites. The study also identified CCNPP strengths as having the most favored merchant power market, transmission infrastructure, and utility relation with the local community, and ranked the Maryland site above Nine Mile Point New York site on cumulative scoring.

The CCNPP site was selected as the proposed site by Constellation using the "special case" described in NUREG-1555, Section 9.3(III)(8), as described above based on the Constellation and NuStart studies. Potential alternative and candidate sites were selected as part of the initial site selection evaluation process as described in the following sections. Subsequent to the initial alternative site selection process described in the initial revision of this Environmental Report, one of the candidate (i.e., alternative) sites was withdrawn and a subsequent site selection evaluation was performed to identify a replacement candidate site. The following sections describe the initial site selection process, withdrawal of one of the candidate sites, and the subsequent site selection evaluation to identify a replacement candidate site.

Insert B1 (Section 9.3.1.1)

Due to the cost of acquiring existing generating facilities that are currently owned by competitors, locations already owned by Constellation within the (ROI) were the focus for candidate areas in the initial alternative site evaluation.

For the subsequent site selection evaluation, candidate areas were selected by screening the ROI (the States of New York and Maryland) using exclusionary criteria. Candidate areas refer to one or more areas within the ROI that remain after unsuitable areas have been removed. Screening of the ROI was performed at a high level with the purpose of quickly identifying areas within the ROI that would not be suitable for the siting of a nuclear power generating station.

The criteria used in the screening of the ROI areas are consistent to those identified in ESRP Section 9.3 (NRC, 2007) and the EPRI siting guide (EPRI, 2002), and include:

- Proximity to major population centers (that is, not located in an area with greater than or equal to 300 persons per square mile [ppsm]).
- Proximity of adequate transmission lines (that is, within approximately 30 miles (mi) [48.3 kilometer {km}) of 345- or 500-kV transmission lines). Per the EPR standard grid connection design, 345- or 500-kV transmission lines are needed.
- Lack of a suitable source for cooling water (that is, within 15 mi [24.10 km] of an adequate source for cooling water).
- Dedicated land (that is, not located within areas such as national and state parks, historic sites, and tribal lands).

Figures 9.3-1 and 9.3-2 show the application of the exclusionary criteria within the ROI for New York and Maryland, respectively.

<u>Insert B2 (Following Section 9.3.1.1)</u>

9.3.1.2 Potential Sites

<u>Initial Site Selection Evaluation</u>

The initial set of potential sites within the candidate areas (ROI) was determined as part of studies performed by Constellation and NuStart Energy as described above in Section 9.3. The initial evaluation focused on those locations already owned by Constellation as candidate areas within the ROI. To be considered as candidate sites, a location must meet the following criteria as outlined in NUREG-1555, (NRC, 1999), Section 9.3 (III)(4c):

- Consumptive use of water should not cause significant adverse effects on other users.
- There should not be any further endangerment of Federal, State, regional, local, and affected Native American tribal listed threatened, endangered, or candidate species.
- There should not be any potential significant impacts to spawning grounds or nursery areas of populations of important aquatic species on Federal, State, regional, local, and affected Native American tribal lists.
- Discharges of effluents into waterways should be in accordance with Federal, State, regional, local, and affected Native American tribal regulations and would not adversely impact efforts to meet water-quality objectives.
- There would be no preemption of or adverse impacts on land specially designated for environmental, recreational, or other special purposes.
- There would not be any potential significant impact on terrestrial and aquatic ecosystems, including wetlands, which are unique to the resource area.
- Population density and numbers conform to 10 CFR 100.
- There are no other significant issues that affect costs by more than 5% or that preclude the use of the site.

In addition to meeting all applicable regulations and guidelines, the following factors influenced the decision to review sites.

- The site would be suitable for the design parameters contemplated for the new plant design.
- The location would be compatible with the applicant's current system and transmission capabilities.
- The site's expected licensing and regulatory potential must minimize the schedule and financial risk for establishing new baseload generation.

Given the factors listed above, three existing nuclear sites and a non-nuclear (or brownfield) site were initially carried forward as candidate sites for further review. The three existing nuclear sites include the CCNPP site, the Nine Mile Point site, and the R.E. Ginna site. The Crane generating station was the non-nuclear site. Additionally, a generic greenfield site was considered.

The sites in New York were chosen because they are owned by Constellation (with ready access to the site and other information), are in relatively close proximity to the CCNPP site, and are within the applicant's candidate areas. Other nuclear sites within the candidate area were not evaluated because none of these sites are owned or controlled by Constellation Generation Group or its subsidiaries. The non-nuclear (brownfield) site initially chosen for further analysis was a coal burning power plant (Crane) that is currently owned and operated by Constellation Energy.

Purchase of, or access to, a competitor's nuclear site would be cost prohibitive and, therefore, would not be viable options for siting of a new reactor by the applicant. Furthermore, detailed information concerning competitor-owned plants is not readily available for analysis.

Subsequent Site Selection Evaluation

Subsequently to the initial identification of potential sites in the initial revision of this Environmental Report, it was concluded that the Crane site did not satisfy the exclusionary criteria related to distance from nearby population centers. The Crane site was withdrawn from consideration as a candidate site and a subsequent site selection study was preformed to identify a suitable replacement site. The subsequent site selection study conducted included a rigorous review of the candidate areas and potential sites within the ROI (Maryland and New York) with the objective of finding a replacement candidate site for further evaluation and also affirmed the selection of the Nine Mile Point and Ginna sites as candidate sites.

For the subsequent site selection evaluation, potential sites were selected by screening the candidate areas using an exclusionary criterion and refined discretionary criteria in order to identify potential geographic locations for the placement of the proposed nuclear power generating station. The criteria used to evaluate the potential sites were drawn from a larger, more comprehensive set of criteria identified in NUREG-1555, ESRP, Section 9.3 (NRC, 2007) and the EPRI siting guide (EPRI, 2002).

More than 4,000 remediation sites, 14 hydroelectric sites, 21 natural gas sites, 25 other power-generating stations (for example, coal, wood, and oil), and 5 nuclear sites within the ROI were screened for identification as potential sites. This list of sites was obtained from various sources, including the U.S. Department of Energy (DOE), Energy Information Administration (EIA) for nuclear power plant sites and major electrical plants in New York (EIA, 2008a) and Maryland (EIA, 2008b); and New York State Department of Environmental Conservation (NYDEC), Environmental Remediation Databases (NYSDEC, 2008) and the Maryland Department of the Environment (MDE), Maryland Brownfield, Voluntary Cleanup Program and State Remediation Sites database (MDE, 2008) for brownfield sites.

This list of sites was screened to determine which sites were located within the identified candidate areas. An exclusionary criterion for site size (420 total ac [170 ha]) was applied to the list of potential sites (i.e., those sites from the initial list of over 4000 sites that were located within the identified candidate areas) and those sites that met this criterion were considered for further evaluation and scoring using the potential site discretionary evaluation criteria listed below.

The potential site discretionary evaluation criteria include the following:

- Distance to cooling water supply: Based on the distance to the nearest cooling water supply.

- Flooding: Based on the presence or absence of floodplains near the site.
- Distance to population center: Distance to nearest population center (census tract with more than 300 people per square mile [116 people per square kilometers]).
- Regional population density: Population density within 10 mi (16.1 km) radius of site, based on data for census tracts.
- Ecology: Based on the number of federal and state, rare, threatened, and endangered species in the county (aquatic and terrestrial).
- Wetlands: Based on the presence or absence of wetlands near the site.
- Railroad access: Based on the distance to the nearest in-service rail line.
- Transmission access: Based on the distance to the nearest 500-kV line.
- Existing transmission corridor: Based on whether or not the site has existing transmission connections or whether additional land would potentially be impacted by new corridors.
- Additional land availability/land acquisition: Based on whether or not additional surrounding land (other than the minimum land needed for the EPR footprint) would need to be acquired and is expected to be available for sale for supporting the appurtenant structures, laydown and parking, etc. of the proposed facility. In addition, this criterion also takes into account the additional land needed to potentially meet the EAB requirements.
- Environmental remediation: Based on the site's potential need for environmental cleanup or remediation of hazardous materials.
- Expansion potential: Based on the availability of additional land surrounding the site to accommodate another nuclear power facility.
- Ownership criteria: Based on the site's ownership status.

Readily available reconnaissance-level information sources, which included publicly available data, information available from UniStar and Constellation files and personnel, and GoogleEarth™ images were used for scoring the criteria for each potential site. Each discretionary criterion was scored based on a point scale of suitability (from 1 to 5, with 5 representing the highest and most positive rating for each attribute/criterion and 1 representing the lowest and least positive rating for each attribute/criterion) using developed rating rational and evaluation metrics. GIS analysis was performed for the majority of the discretionary criteria, with the exception of ecology (threatened and endangered species), additional land acquisition, and environmental remediation.

The potential sites were ranked according to their raw scores and average scores. The raw score was based on the sum of all scores for the site, while the average score was based upon the sum of the scores divided by the number of discretionary criteria available. The final consensus scoring results are identified in Table 9.3-6.

The results of the screening identified potential sites in New York and Maryland that included Constellation-owned nuclear stations, another nuclear station, other electric power stations (coal and hydroelectric), suitable brownfield sites, and a generic greenfield site.

Figures 9.3-3 and 9.3-4 show the potential sites in New York and Maryland, respectively.

<u>Insert CC1</u>

During the initial site selection, the list of potential sites was further refined to a list of candidate sites. A generic greenfield site was among the original list of potential sites considered.

also be adversely affected as the property and necessary cooling water facilities are built. Noise levels are likely to increase during construction and operation. Education, recreation, and other public facilities would likely be adversely affected by the increase in worker population for construction and operation. Air quality will be temporarily affected by construction dust and diesel fuel emissions. On the other hand, tax benefits and increased employment for area residents would be beneficial. With these postulations in mind, it was concluded that socioeconomic impacts at the greenfield site would be MODERATE to LARGE, with an additional MODERATE beneficial impact due to increased tax bases and new employment

- Terrestrial and aquatic resources: Impacts to the terrestrial and aquatic resources at the greenfield site would be greater than the impact at the other candidate sites. Impacts to the terrestrial and aquatic resources were identified based on the descriptions of similar impacts to resources in Chapters 4 and 5. It was further assumed that no endangered or threatened species were present at the site, and that the impacts during construction would temporarily disturb most aquatic habitats, while permanently disturbing some forest and open areas. With these general assumptions in mind, it was concluded that the impacts from construction and operation at a greenfield site would be SMALL to LARGE, depending on the mitigation strategies used at the greenfield site.

- Land use impacts: Impacts to land use are expected to be greater than impacts at the other candidate sites. Given the assumption that the land use in the area would be largely recreational or agricultural, changes in the land use at the site would likely be permanent. Thus, impacts to land use are expected to be MODERATE to LARGE and more significant than developed sites.

- Air Quality Impacts: It was assumed that air quality at the greenfield site would be equal to the impacts of construction and operation at the proposed CCNPP site. During construction, air quality would be short term and include construction dust and diesel emissions. However, impacts would be expected to be SMALL and comparable to other candidate sites during operations.

- Cost of obtaining additional land: UniStar Nuclear Operating Services and Constellation Generation Group do not own an area with the necessary characteristics for siting a nuclear unit within the ROI, the land, or access to it (including any easements), would have to be obtained from one or more third parties. An undeveloped site would require 500 to 1,000 acres (200 to 400 hectares), including an exclusion area. Acquisition of this land would increase the cost of construction and could potentially result in adverse economic impact. In addition, it is likely that new transmission lines and corridors would be necessary to connect the new reactor to the existing transmission system. As such, impacts would not be limited to the immediate vicinity of the new reactor.

RAI 1011-3
INSERT CC2

In summary, the environmental impacts from construction and operation of a nuclear power plant at a greenfield site range from MODERATE to LARGE, and greater than the impacts at other candidate sites. Therefore, the use of a greenfield site is not carried forward as an Alternative site in this evaluation.}

9.3.2 PROPOSED AND ALTERNATIVE SITE EVALUATION

Former Thiokol site

{The alternative sites that are compared with the CCNPP site (the preferred site) include the ~~Crane Generating Station~~ Brownfield site, the Nine Mile Point Nuclear Power Plant site, and the R.E. Ginna Nuclear Power Plant site.

Insert CC2

During the subsequent site selection evaluation, the highest scoring potential sites included nuclear power generating stations, electric power generating stations (coal and hydroelectric), and brownfield sites. The replacement candidate site for the Crane site was selected from this list of potential sites by applying the following additional selection criteria:

- The previously selected Calvert Cliffs Nuclear Power Plant site was maintained as the proposed site and the previously selected candidate sites, other than the Crane site, were maintained as candidate sites (i.e., Nine Mile Point Nuclear Power Station and R. E. Ginna Nuclear Power Plant).
- Because the Maryland Public Service Commission (PSC) has identified the need to sustain a safe and reliable electric system in the state and reduce the state's reliance on imported electric power (MDPSC, 2006; see also Section 8.0 of the CCNPP3 Environmental Report Revision 3) and the withdrawn Crane site is in Maryland, potential sites in the state of Maryland were given preference over potential sites in the other candidate area (i.e., New York). This was also considered appropriate given that two of the previously selected candidate sites were already in New York.

As shown in the Table 9.3-6, the highest scoring potential sites in the State of Maryland included the Kent, Frederick, and Former Thiokol sites. The Kent site was not carried forward as a candidate site because of uncertainties pertaining to available land area at the time of the evaluation (i.e., the exclusionary criterion for potential sites) and because the distance to the nearest cooling water supply, a key discretionary criterion because of potential impacts to wetlands and terrestrial and aquatic ecology from construction of pipelines between the proposed site and cooling water supply and the significant cost associated with construction of large distances of pipelines, is between 10 and 20 mi (16.1 and 32.2 km). The Frederick site was not carried forward as a candidate site because of potential hazards of locating a nuclear power plant adjacent to an operating aluminum smelting facility located at the site. The Former Thiokol Site, a brownfield site in Maryland, was selected as a candidate site to replace the Crane site. No additional potential sites were selected as candidate sites because, in accordance with NUREG-1555, ESRP, Section 9.3, three to five alternative sites in addition to the proposed site are considered as an adequate number of candidate sites (NRC, 2007).

The selected candidate sites were judged to present the likelihood of having the least environmental impact while satisfying the requirements of an EPR nuclear plant site. Finally, the candidate sites are expected to be licensable, that is, able to obtain applicable NRC licenses and state and local permits.

The selected candidate sites include:
- Calvert Cliffs Nuclear Power Plant Unit 3
- Nine Mile Point Nuclear Power Plant Unit 3
- R.E. Ginna Nuclear Power Plant Unit 2
- Former Thiokol Site (brownfield site)

Figures 9.3-3 and 9.3-4 show the candidate sites in New York and Maryland, respectively.

RAI 1011-3
INSERT CC3

The alternatives sites were compared to the preferred site based on information about the existing nuclear plants and the surrounding area, as well as existing environmental studies and Final Environmental Impact Statements issued by the Atomic Energy Commission and/or the U.S. Nuclear Regulatory Commission. This comparison is preformed to determine whether or not any alternative sites are environmentally preferable to the proposed site.

Throughout this section, environmental impacts of the alternatives are assessed using the NRC three-level standard of significance – SMALL, MODERATE, or LARGE. This standard of significance was developed using Council on Environmental Quality guidelines set forth in the footnotes to Table B-1 of 10 CFR 51, Subpart A, Appendix B (~~NRC, 1984~~CFR, 2007):

- SMALL: Environmental effects are not detectable or are so minor they will neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE: Environmental effects are sufficient to alter noticeably but not to destabilize important attributes of the resource.
- LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

In order to analyze the effects of building a new nuclear plant at each of these locations, it was assumed the construction and operation practices described in Chapters 4 and 5 would generally be carried to each site. In this manner, it was possible to apply a consistent description of the impacts to each site. For example, in order to assess impacts to transportation infrastructure, a traffic impact study, prepared for construction and outage activities at {CCNPP}, was reviewed. The study findings were applied to each site to determine potential impacts from construction.

RAI 201
INSERT D

Former Thiokol

9.3.2.1 ~~Crane Generating Station~~ Brownfield Site

~~A brownfield is a site that has been previously developed and can be redeveloped for a more profitable use. The brownfield site chosen for analysis is the Crane Generating Station on the Chesapeake Bay in Baltimore County, Maryland. This site is currently owned and operated by Constellation Energy as a coal burning power plant.~~

9.3.2.1.1 Land Use

RAI 201
INSERT E

~~The Crane Generating Station is located in an area of mixed land use. The site area is 157 acres (63 hectares), which is much smaller than the area required for siting a nuclear plant, and both the site and the surrounding land have been designated as critical areas under the 1984 Chesapeake Bay Critical Area (CBCA) law. The adjacent land area is predominantly wetlands and is zoned for resource conservation.~~

~~Given the identified size of the proposed plant, additional land would need to be purchased for the siting of a new nuclear plant at this site. Additionally, it would be necessary to obtain some variances from zoning ordinances on surrounding land. The land currently owned by Constellation Energy Group is zoned appropriately for power generation; however, because the use of much of any newly purchased land would likely need to be changed to accommodate the new nuclear site, the impact on land use in this area would be MODERATE.~~

9.3.2.1.2 Air Quality

RAI 201
INSERT F

~~Baltimore County is designated in attainment for most air pollutants except ozone and fine particulate matter~~ ~~($PM_{2.5}$). Non-attainment for these two pollutants is a general problem that~~

INSERT CC3

Evaluation of the candidate sites involved a two-part sequential test to determine whether an alternative site is (1) environmentally preferable, and (2) thus obviously superior, to the proposed site.

The first stage of the test determines whether there are environmentally preferred sites among the alternative sites. During this first stage, the standard is one of "reasonableness," considering whether the applicant has performed the following:

- Identified reasonable alternative sites
- Evaluated the likely environmental impacts of construction and operation at these sites
- Used a logical means of comparing sites that led to the applicant's selection of the proposed site

The evaluation factors used in comparing the proposed site to the alternative sites to determine if there are environmentally preferred sites among the alternative sites are consistent to those presented in ESRP 9.3 (NRC, 2007) and include the following.

- Environmental
- Aesthetics
- Demography
- Ecology
- Geology, hydrology
- Socioeconomics
- Archaeological and historic preservation
- Environmental justice
- Transportation access
- Land use
- Water use
- Workforce availability, accessibility, and housing
- Access roads and railways
- Cooling system
- Intakes and discharges
- Transmission System

These evaluation factors were combined into functional evaluation elements. Readily available reconnaissance-level information sources, which included publicly available data, information available from UniStar and Constellation files and personnel, and GoogleEarth™ images, were used to evaluate, score, and rank the candidate sites. Additional information and clarification of map and literature data were supplemented with site visit data as needed.

Each criterion was assigned a weight relative to the other criteria. The criteria were weighted based on a 100 point scale using a logical and systematic process. Each criterion was scored based on a 10-point scale of suitability. A scoring of 10 corresponded to a location with no negative characteristics with respect to the criteria of interest. A mid-range scoring of 5 represented a neutral score and the point where no clear delineation existed between the sites. A score of 1 corresponded to a location with significant issues/challenges and/or significant costs/impacts with respect to the criteria of interest. Scores with amplifying remarks reflecting the overall suitability of each site were assigned based on the information collected.

Table 9.3-7 provides a summary of the functional evaluation elements and composite scores for each element for each candidate site. As shown in Table 9.3-7, none of the alternative sites were determined to be environmental preferable to the CCNPP proposed site. Therefore, the second step, i.e., to determine whether the environmentally preferable alternative site was obviously superior to the proposed site, was not required.

RAI 201

~~affects the northeastern U.S. and is not specific to Baltimore County. Closing the coal burning power plant at the Crane site and replacing this generating capacity with a nuclear plant would reduce the amount of particulate matter as well as the amount of greenhouse gases that are released into the atmosphere. It was concluded that the impact of reduced particulates and greenhouse gases on the general air quality in the northeastern U.S. would be SMALL, but the local impact may be MODERATE. In both cases, the overall impact of this transformation would be beneficial.}~~

9.3.2.1.3 Water

RAI 201

INSERT G

~~Baltimore County is designated in attainment for most air pollutants except ozone and fine particulate matter ($PM_{2.5}$). Non attainment for these two pollutants is a general problem that affects the northeastern U.S. and is not specific to Baltimore County. Closing the coal burning power plant at the Crane site and replacing this generating capacity with a nuclear plant would reduce the amount of particulate matter as well as the amount of greenhouse gases that are released into the atmosphere. It was concluded that the impact of reduced particulates and greenhouse gases on the general air quality in the northeastern U.S. would be SMALL, but the local impact may be MODERATE. In both cases, the overall impact of this transformation would be beneficial.~~

9.3.2.1.4 Terrestrial Ecology and Sensitive Species

RAI 201

INSERT H

~~The Crane site is located in Maryland's Piedmont Plateau Province. As is typical for this region, the area is characterized by rolling hills and steep stream valleys with hardwood and mixed pine-oak forests. Wetlands do occur on the site, but no Special State Concern wetlands, Natural Heritage Areas, agricultural preservation lands, or forest legacy lands are found in the vicinity.~~

~~Although no State or Federally listed species or sensitive habitats are located in the immediate vicinity of the site, the adjacent land area is predominantly wetlands and is zoned for resource conservation. Because the new nuclear plant would replace the existing coal plant, little or no additional area would need to be cleared and developed. The impacts to the terrestrial ecosystem at the site would therefore be SMALL and would predominantly occur during the conversion of the plant from coal to nuclear power. Construction Best Management Practices would be followed to minimize these impacts.~~

9.3.2.1.5 Aquatic Ecology and Sensitive Species

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RAI 1011-10

~~The Gunpowder River and Seneca Creek are tidal estuaries. The average tide at the site is less than 1.5 ft (46 cm). The submergent and emergent vegetation in these tidal wetlands is adapted to the fluctuating water levels at this location. As is common for estuaries, the fauna in this tidal habitat is very diverse and many sport and commercial fish and shellfish use the area for spawning and as a nursery. No State or Federally listed aquatic species occur in the area; however the tidal estuaries have been designated as Chesapeake Bay Critical Areas.~~

~~These areas are considered essential to the water quality and ecological health of the Chesapeake Bay. Because the site is already being used for power generation and construction Best Management Practices would be followed, the impacts of plant conversion on the aquatic ecology would be SMALL to MODERATE and temporary. These impacts would primarily be related to runoff and siltation. However, the impacts of operation would be much greater. The impact of impingement and entrainment from the cooling water intake system and the thermal impact that would result from cooling water discharge would likely be MODERATE or even LARGE despite permit restrictions and mitigation requirements.~~

ER Section 9.0

9.3.2.1.6 Socioeconomics

RAI 201

INSERT J

~~Baltimore County is a relatively populated area, and is the third most populated county in Maryland with a population of approximately 787,384. Other socioeconomic facts related to Baltimore County are as follows (USCB, 2007a) :~~

- ~~The county has experienced a 4.4% population increase since the 2000 census.~~
- ~~Median household income is $52,308 per year.~~
- ~~8.2% of the county's population lives below the poverty level.~~
- ~~The nearest large city is Baltimore, Maryland.~~
- ~~The mean value of owner-occupied housing units was $127,300.~~
- ~~There were 63,064 firms doing business in the county in 2002.~~

~~The Crane Generating Station site is currently being used for power generation, and it expected that the shift from coal to nuclear power would not initiate any substantial shifts in population or real estate, therefore, the effect of the proposed new facility on the population and demographics of Baltimore County, Maryland is expected to be SMALL.~~

9.3.2.1.7 Transportation

RAI 201

INSERT K

~~The site is located in a developed area of suburban Baltimore, Maryland. The site is characterized by commercial and residential development, highways, roads, and railroad tracks. The project site is located in relative close proximity to major roadways, including Highway 150, Interstate 95, and Interstate 695. Some modest traffic increase on Carroll Island Road, which is a rural, two-lane highway may be noticeable during construction.~~

~~A traffic study prepared for construction of the proposed Unit 3 at CCNPP predicts that construction traffic will peak above 1,450 vehicles per hour (vph). Heavy vehicle shipments and construction traffic will make up most of the traffic, assuming a peak construction workforce of about 3,950 workers (calculated at 1.3 drivers per vehicle). It is anticipated that Carroll Island Road may be adversely affected during construction, but the impacts would occur during morning and evening commutes to the plant. Impacts on that road would be temporary, and likely end after construction was finished. Other roadways will likely be able to sustain the increase in traffic.~~

~~There are several ways to mitigate the potential transportation impacts during construction such as developing a construction traffic management plan prior to construction to address potential impacts on local roadways. If necessary, coordinating with local planning authorities for the upgrading of local roads, intersections, and signals to handle increased traffic loads could be considered. Schedules during workforce shift changes and for the delivery of larger pieces of equipment or structures could be coordinated to limit impacts on local roads.~~

~~In addition the use of shared (e.g., carpooling) and multi-person transport (e.g., buses) during construction and/or operation of the facility could be encouraged. By implementing the appropriate measures, it is expected that there would be SMALL to MODERATE impacts on transportation during construction activities and SMALL impact during operation of the facility.~~

RAI 201

INSERT L

9.3.2.1.8 Historic, Cultural, and Archeological Resources.

~~No known archeological or historical resources are located in the immediate vicinity of the site. It is assumed that no impacts to these resources would occur during construction or operation of a nuclear facility at this site. Therefore, the impacts would be classified as SMALL.~~

9.3.2.1.9 Environmental Justice

RAI 201

INSERT M

~~Table 9.3-1 (USCB, 2007b) presents demographic information for Baltimore County, Maryland, and the U.S. These data demonstrate that the population of this area is similar in composition to the State of Maryland and to the U.S. as a whole. Although the Crane site is located in a largely urban area, the likelihood of minority communities being disproportionately and adversely affected by this plant is low. Furthermore, this site has been operating as a power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts at this site would be SMALL.~~

9.3.2.1.10 Transmission Corridors

RAI 201

INSERT N

~~The site has been in use for electrical generation for many years. Although it may be necessary to build new infrastructure to accommodate the new output for the plant, it is anticipated that existing corridors would be sufficient to accommodate construction. The plant site and surrounding corridors are generally developed or are limited from much further development by zoning and land use designations. In addition, the current transmission system could be used with few or no modifications. It is anticipated that the impacts due to transmission corridors would be SMALL.}~~

9.3.2.2 Evaluation of Existing Nuclear Sites

Collocating the new reactor is preferable to both the brownfield alternative, and the greenfield alternative. Collocation reduces the costs when compared to either greenfield or brownfield development because the new reactor will be able to take advantage of the infrastructure that serves the existing reactor(s). In addition to reducing costs, collocation negates the need for many of the preliminary analyses because these analyses have already been performed for the existing site license.

Preliminary analyses of site suitability, appropriate seismicity and geological setting, federal, state, and local regulatory restrictions, and many other significant issues have already been conducted for the existing unit(s). This further reduces both costs and uncertainties associated with construction and operation of the new unit. Discussion of resource commitments for the preferred alternative site is provided in Section 10.1 through Section 10.3.

A cost-benefit analysis for the preferred site is detailed in Section 10.4. The costs and resource commitments needed for construction and operation of the new facility would be similar regardless of the site at which the unit is collocated. The information presented in Section 10.1 through Section 10.4 is therefore applicable to the candidate sites described below.

9.3.2.2.1 {CCNPP (Preferred Location)

The CCNPP site is the preferred site for locating the new nuclear reactor. The CCNPP site is located in Maryland on the Chesapeake Bay. A detailed description of the CCNPP site and surroundings, as well as the impacts of construction and operation, is given in Chapter 2, Chapter 4, and Chapter 5. This information is summarized below.

INSERT D

The former Thiokol site is a 619-ac (250-ha) brownfield property located near Mechanicsville, Maryland, in St. Mary's County, Maryland.

INSERT E

The former Thiokol site is located in St. Mary's County, Maryland, less than 3 mi (4.8 km) south of the Patuxent River. The site is bordered by Maryland State Route 235 to the north and Friendship School Road to the west. Woodlands are located to the east and south. Washington D.C. is the closest major city and is located approximately 40 mi (64.3 km) north of the site.

RAI 1011-3 DELETE AND REPLACE WITH INSERT E2 (INSERT IS PROVIDED AFTER INSERT N)

The former Thiokol site is currently undeveloped and covered in vegetation including trees and shrubs. The surrounding area is a mix of suburban and agricultural development with a portion of the land being undeveloped. There are no population centers, parks, airports, or other major destinations located in the vicinity. Land to the east of the site is generally comprised of low-density residential development that includes residential subdivisions. Most of the land to the north of the site is also in residential development and has a lower density than lands to the east. Lands west of the site contain a mix of low-density residential development and agriculture. The areas south of the site are generally undeveloped but also contain some low-density residential development.

~~The site was formerly used for the manufacturing of munitions up until the late 1950s. In the early 1980s, buildings were removed from the site, timber was harvested, and the site was reforested. The property contains covenants that restrict residential development in two areas that are approximately 75 ac (30.3 ha) in size due to those areas being suspect of containing unexploded ordinances (UXOs). The site is currently being monitored by the Maryland Department of the Environment (MDE), Land Restoration Program (MDE, 2007), to determine the appropriate measures necessary to finish remediation of the site.~~

Overall land use impacts are expected to be SMALL to MODERATE due to the proximity of residential developments and lack of industrial and manufacturing facilities.

RAI 1011-3 INSERT E3

INSERT F

The former Thiokol site is located in St. Mary's County, Maryland. St. Mary's County is currently designated as being in attainment of all air pollutants regulated by the U.S. Environmental Protection Agency (EPA) (EPA, 2008). Any air emissions that will occur as a result of the operation of the proposed new facility will be low enough that they will not cause or contribute to a significant change in local or regional air quality levels at any location.

Construction activities at the site have the potential to temporarily impact the ambient air quality in the immediate vicinity of construction due to emissions from onsite construction equipment. These emissions are expected to be consistent with emissions from other construction projects of this magnitude. It is anticipated that there should be no significant impacts on air quality at offsite locations during the construction period due to the relatively long distance from the center of the site (where most construction and equipment laydown will occur) to the site boundaries. Overall air quality impacts to the surrounding area attributable to the construction of the proposed facility would be SMALL.

With the exception of some relatively small diesel-fueled emergency power generating equipment and fire pumps, operation of the proposed facility will not have any significant sources of emissions attributable to the combustion of fossil or other fuels. The proposed facility will contain a cooling tower that will emit water vapor and particulate matter to the atmosphere. Because of the exceptionally low level of emissions, operation activities are not expected to cause or contribute to a violation of any state or federal ambient air quality standards. There would be a small increase in regional and local air emissions as a result of increased vehicular traffic associated with workforce employed for plant operations. It is anticipated that overall air quality impacts associated with operation of the proposed facility will be SMALL.

INSERT G

The main source of water for the former Thiokol site would be the Patuxent River. The proposed nuclear facility would require a cooling water system and it would include a circulating water system (CWS) and a service water system. The CWS circulates cool water through the main condensers to condense steam after it passes through the turbine. The service water system circulates cooling water through heat exchangers that serve various plant components. The CWS for the proposed unit would be a closed-cycle system that uses a cooling tower. The proposed new unit would have a separate intake and discharge structures located offshore in the river, and a screenwell and pumphouse structure located onshore.

Hydrologic impacts associated with construction activities include alteration of the existing watershed surface; disturbance of the ground surface for stockpiles, material storage, and construction of temporary access roads; construction of water intake and discharge structures; construction of cofferdams and storm sewers; construction of piers, jetties, basins, or other structures that might alter shoreline processes; dredging operations; temporary dewatering activities; construction activities contributing to sediment runoff; changes in surface water drainage characteristics; decreases in surface water infiltration (increases of impervious surfaces); and increased erosion and sedimentation. Water will be used for construction activities. A specific quantity of water usage is not known at this time. However, proper mitigation and management methods implemented during construction will limit the potential water quantity and quality effects to surface water and groundwater.

Construction-related water use impacts will be minimized through the mplementation of best management practices (BMPs) including erosion, grading, and sediment control measures; stormwater control measures; spill prevention plan; and observance of federal, state, regional, tribal, and local regulations pertaining to nonpoint source discharges. Overall construction-related water impacts will be SMALL.

Ensuring permitted limits for water withdrawal and discharge are met through operational controls and monitoring would minimize the potential for adverse impacts to water availability and water quality. It is anticipated that there would be a site-specific water treatment system or the use of a municipal system, if available. Therefore, it is anticipated that overall water use impacts fromoperation activities would be SMALL.

INSERT H

This site is relatively flat area surrounded by deciduous forests. There are 11 animals and 32 plant species listed as threatened or endangered in St. Mary's County, Maryland (Maryland Department of Natural Resources, Division of Wildlife and Heritage, 2008). Because the area is heavily forested, there is a high potential for threatened or endangered terrestrial species to exist onsite.

Impacts on the terrestrial ecosystem associated with construction of the proposed facility include noise, clearing and grading, and potential collisions of birds with new structures. Construction of the proposed facility would result in direct mortality for certain wildlife and would reduce the available habitat area but would not adversely affect local or regional populations of wildlife species. Species that are mobile are likely to preferentially use less-disturbed habitats on adjacent lands. The terrestrial ecology impacts from construction of the water pipeline and transmission line corridors are anticipated to be MODERATE to LARGE but would be minimized by searching for sensitive species and complying with permit and mitigation requirements before beginning work. Because no land will be disturbed once construction is complete, the impacts of operation would be SMALL.

INSERT I

Construction-related impacts to the aquatic ecology would include temporary loss of habitat and short-term degradation of water quality in isolated areas due to inwater and shoreline construction of the cooling water intake structure (CWIS) and other appurtenant structures (such as blowdown and discharge pipelines).

National Wetland Inventory maps show palustrine forested wetlands associated with streams to the east and west of the Former Thiokol site (U.S. Fish and Wildlife, 2008). No wetlands are shown within the proposed construction area. Federal Emergency Management Agency (FEMA) floodplain maps show no flood zones within the study area (FEMA, 2008).

McIntosh Run, a large, non-tidal freshwater stream located within the 38,449-acre Breton Bay watershed system, is located downstream from the Former Thiokol Site. McIntosh Run in St. Mary's County contains one of only three populations of the endangered dwarf wedge mussel (*Alasmidonta heterodon*) in Maryland and is considered the most viable population of the three (St. Mary's County Board of Commissioners, 2005). The 22,000-acre McIntosh Run subwatershed also contains sensitive natural features and critical habitat for other rare, threatened, and endangered species, such as the Red Turtlehead (*Chelone abliqua*), an endangered plant species, and the Federally-threatened bald eagle (*Haliaeetus leucocephalus*). Additionally, the McIntosh Run subwatershed has been designated as a County conservation area as well as a State Natural Heritage Area (St. Mary's County Board of Commissioners, 2005).

The dwarf wedge mussel, a sensitive aquatic mollusk, is classified as a Federally and State endangered species (USFWS, 2006). Habitat loss is considered to be one of the major reasons for the decline of the dwarf wedge mussel. Its habitat requirements are very specific—a stable, silt-free stream bed and well-oxygenated water, free of pollutants and water temperature fluctuations (USFWS, 1993). Because McIntosh Run is downstream of the Former Thiokol Site, and is fed from a series of subwatersheds including the two onsite streams (Rich Neck Creek and Tom Swamp Run), McIntosh Run and the rare, threatened, and endangered species in McIntosh Run potentially could be affected by construction and operational impacts of a nuclear power plant on the Former Thiokol Site.

Should the Former Thiokol Site be selected for location of the proposed nuclear power plant, additional evaluation of the potential impacts of construction and operation of the nuclear power plant on the rare, threatened, and endangered species in the McIntosh Run subwatershed would be performed and mitigation measures identified, if necessary, to protect the rare, threatened, and endangered species.

While much of the supporting CWIS structure will be located onshore, a portion will extend a short distance into the waterway and will likely involve the dredging of sediment to allow for the construction of the concrete structure on the bottom of the river. The dredging of sediment during construction of the CWIS and pipeline will result in the temporary suspension and redeposition of the sediment, as well as the removal of those benthic organisms living in or on the removed sediment. It is anticipated that the suspended sediment will quickly redeposit in the immediate area. For a short period of time, the suspended sediment will create increased turbidity in the immediate area of the construction. Fish and motile crustaceans present in the area during construction activities will avoid the area during active construction or will actively feed on suspended organisms during dredging operations, and are unlikely to be adversely affected by the construction activities.

No construction effluents are anticipated from in-water construction activities. BMPs and compliance with permit requirements will be used to minimize runoff volumes and impacts. The use of a cofferdam to facilitate construction of the inwater portions of the CWIS will minimize releases of sediment. Prior to commencement of dredging, sediment in those areas proposed to be dredged will be sampled and analyzed to obtain detailed chemical characterizations according to the requirements of dredging permits; special sediment-handling requirements suggested by the sediment sampling results and required by the dredging permit will be followed.

CWIS and pipeline construction-related impacts on aquatic species are anticipated to be minor because the area of impacts is limited to the immediate vicinity of the construction activities. Because the potential impacts will be localized and given the short-term nature of the construction activities and the relatively short-term recovery periods for disturbed benthic species within and near the dredged area, no long-term effects on important species and their habitats are anticipated to occur. Therefore, the adverse aquatic ecology impacts associated with construction of the CWIS and other appurtenant structures (such as blowdown and discharge pipelines) are anticipated to be SMALL to MODERATE. The aquatic ecology impacts from construction of the water pipeline and transmission line corridors are anticipated to be MODERATE to LARGE but would be minimized by searching for sensitive species and complying with permit and mitigation requirements before beginning work.

Operation of the proposed new reactor is expected to have a SMALL impact on the aquatic ecology in the area.

INSERT J

The former Thiokol site is located within census tract (CT) 995600 block group (BG) 3, St. Mary's County, Maryland. In 2007 St. Mary's County had a population of approximately 100,378, a 14.1 percent increase from 2000. In 2000 and 2005 the population within CT 995600 BG 3 was 812 and 817, respectively. The population density for CT 995600 BG 3 in 2000 and 2005 was 125 ppsm and 134 ppsm, respectively. The population density of St. Mary's County in 2000 and 2005 was 139 ppsm and 152 ppsm, respectively. The 2005 and 2007 population data presented is projected and therefore an estimated value.

Census tract data from 2000 were reviewed to determine the average population density within a 20-mi (32.2-km) radius of the former Thiokol site. Based on these data, there are 149 ppsm within this area (U.S. Census Bureau, 2000). The 149 ppsm includes seasonal transient populations. When using population data from the year 2000 as a baseline, St. Mary's County is estimated to experience a population increase of 25.0 percent by 2010, 38.6 percent by 2015, and 51.7 percent by 2020 (Maryland State Data Center, 2007).

Employment projections within the area indicate a general upward trend in the availability of various construction jobs. The Maryland Occupational Projections for 2004 to 2014 for construction trades workers estimates an increase of 52,000 openings from 135,000 in 2004 to 163,000 in 2014. The unemployment rate in St. Mary's County was 3.4 percent and 3.2 percent for the southern Maryland area. St. Mary's County employs 38,000 people, of which 2,000 are in construction. The southern Maryland area employs

167,000 people, of which 8,600 are in construction jobs (MDLLR, 2008a). An increase of available jobs indicates additional competition in acquiring a workforce for the construction of the project.

The employer tax credits available include: federal, state, work opportunity, employment opportunity, welfare to work, enterprise zone, Maryland disability employment, and individuals with barriers to employment (MDLLR, 2008).

According to 2006 American Survey data, approximately 3,796 housing units are currently vacant, representing 9.5 percent of the total housing units within the county (U.S. Census Bureau, 2006).

The cooling tower plume from the proposed facility would likely be visible at a considerable distance. The proposed facility, however, is predominately wooded and therefore would have some viewshed protection. Overall impacts to the area's population from construction and operation of a new reactor would be SMALL.

INSERT K

Maryland State Route 235 / Three Notch Road (MD 235) runs along the northern border of the site. Access to the site must be from MD 235 because all other roads near the site are local residential roads. MD 235 is an important north/south road connecting many of the smaller communities in the county. It is the main transportation route in this area of the county. MD 245 / Hollywood Road is the closest east-west transportation route south of the site and MD 5 /Loveville Road is the closest east-west transportation route north of the site. Many of the local roads surrounding the site do not have good connections with other roads.

The closest airport is the St. Mary's County Airport located approximately 5 mi (8.0 km) south of the site off of MD 235. The site is less than 3 mi (4.8 km) from the Patuxent River but it has no immediate barge access. The site is approximately 17 mi (27.3 km) from the nearest active rail line.

It is anticipated that there will be traffic impacts on local roads during construction and operation activities. The development of a traffic management plan prior to construction would aid in identifying and mitigating potential traffic impacts. The following mitigation measures will be considered in the traffic management plan:

- Workforce shift changes and delivery options: Scheduling shift changes and the delivery of large items during off-peak hours could reduce potential impacts on local roads.
- Carpooling: The use of carpooling and providing transit services (buses) during construction and operation of the facility could be considered.

- Coordination with local planning authorities: If necessary, the upgrading of local roads, intersections, and signals to handle increased traffic loads could be considered.

Implementing the appropriate mitigation measures would result in SMALL to MODERATE impacts on transportation systems during construction activities and SMALL impacts during operation of the proposed facility.

INSERT L

The former Thiokol Site is located in Mechanicsville, St. Mary's County, Maryland. The county, the first established in Maryland, is located on a peninsula between the Patuxent and Potomac Rivers in southern Maryland. Mechanicsville, located in the northern portion of the county, is considered an unincorporated area of Maryland. St Mary's City, more than 20 mi SSW of the site, was settled by colonists from England in 1634. St. Mary's City was the provincial capitol of Maryland until 1695; the seat is now Leonardtown.

There are no NRHP-listed properties in Mechanicsville (NRHP, 2008a); there are 31 NRHP-listed properties in St. Mary's County (NRHP, 2008b). The Maryland Historical Trust (MHT) has files on 50 properties (which include individual buildings, sites, structures and districts) in Mechanicsville that were been recorded as part of their Historic Sites Survey program (MHT, 2008). Recordation of a site is not an indication that it is NRHP-eligible. A search using the terms [Maryland] [St. Mary's] in the National Archaeological Database (NADB) resulted in 246 matches. Several of these reports recorded Phase I, Phase II, and Phase III Archaeological surveys in the county. Only one report was specific to Mechanicsville.

The Maryland Department of the Environment (MDE, 2007b) report on the site states that all buildings were razed by Thiokol in the early 1980s. There was a preliminary site assessment report prepared in 1985. Due to a lack of substantial information regarding previous recordation of prehistoric, archaeological and historic architecture in the immediate vicinity of the Former Thiokol Site, it is suggested that both a survey and investigation is completed before construction activities begin. Consultation with SHPO would occur if any significant cultural resources were identified and appropriate mitigation measures would be negotiated prior to construction and operation. Impacts to cultural resources are likely to small, depending on the results of the cultural resource investigations.

The site is located close to a major north-south thoroughfare (MD State Route 235), which increases the potential of finding historic archaeological sites in the area. Additionally, this county contains some of the earliest settlements in the country, which is another indicator that historic archaeological sites may be present. Due to the removal of existing buildings in the 1950s, and subsequent soil removal in 1994 and 1998, as well as soil testing in 1999 and 2000 (MDE, 2007b), there is the low potential for finding archaeological and above ground resources in this area.

INSERT M

The demographic characteristics surrounding the former Thiokol site were evaluated to determine the potential for environmental justice issues based on disproportionately high and adverse impacts to minority or low-income population. Demographic information used for this study was obtained from the 2000 U.S. Census. Demographics of the adjoining CTs/BGs on and around the site within the county were examined and compared with the demographics of St. Mary's County and the State of Maryland. Table 9.3-1 presents this demographic information.

The former Thiokol site is located in CT 995600 BG 3. Adjacent CTs include 995600 (BG 2 and 4), 995500 (BG 1 and 3), and 995700 (BG 4). CT 995600 BG 3 has a 6.3 percent minority population, which is lower than or comparable to all adjacent CTs within the county (995600 BG 2 [7.5 percent] and BG 4 [36.4 percent], 995500 BG 1 [15.3 percent] and BG 3 [19.8 percent], and 995700 BG 4 [4.5 percent]). The Hispanic population for the proposed action CT/BG is 0.7 percent and is comparable to the adjacent CTs and BGs, which range from 0.1 percent to 1.5 percent.

CT 995600 BG 3 (6.3 percent) has a lower percentage of minority residents compared to St. Mary's County (18.4 percent) and the State of Maryland (36.0 percent). The Hispanic population of CT 995600 BG 1 (0.7 percent) is lower than St. Mary's County (2.0 percent) and the State of Maryland (4.3 percent).

In 2000 the median household income for St. Mary's County was $54,706, compared to an average of $52,868 for the State of Maryland (U.S. Census Bureau, 2000).

CT 995600 BG 3 has 21.7 percent of its population below the poverty level, which is higher than the adjacent CT 995600 BG 2 (2.7 percent) and BG 4 (2.3 percent), CT 995500 BG 1 (6.0 percent) and BG 3 (20.0 percent), and CT 995700 BG 1 (6.0 percent). The percent of population classified as below the poverty level in CT 995600 BG 3 (21.7 percent) is higher than that in St Mary's County (7.2 percent) and the State of Maryland (8.5 percent).

Based on the data presented in Table 9.3-1, no disproportionately high percentage of minority residents would be directly impacted by construction and operation of the proposed project. The proposed project site does have a higher poverty population in comparison to the surroundings CTs/BGs, St. Mary's County, and the State of Maryland. The poverty level at the proposed site, however, is not disproportionately higher when compared to the State of Maryland. The economic benefits of the facility to the county would likely also benefit minority and low-income populations to some degree, either directly by services from the increased tax revenue.

The proposed facility would be a positive economic stimulus to St. Mary's County and the local economy. Any adverse human health and environmental consequences from the proposed facility would not be borne disproportionately by minority or low-income groups. Therefore, it is anticipated that environmental justice impacts would be SMALL.

INSERT N

The former Thiokol site was not used for power generation and has no existing power transmission lines or corridors. New transmission corridors would be necessary to connect with existing or proposed transmission lines. Specific monitoring requirements for new transmission lines and corridors and associated switchyards would be designed to satisfy conditions of applicable federal, state, and local permits, to minimize adverse environmental impacts, and to ensure that organisms are protected against transmission line alterations.

Most transmission corridors would pass through land that is primarily agricultural and forest land. New transmission corridors would result in some ecological impacts from potential surface water and wetlands crossings. The areas are mostly rural and remote with low population densities. The effect of these corridors on land usage is minimal; farmlands that have corridors passing through them generally continue to be used as farmland. Because new right-of-ways would need to be constructed to accommodate the new transmission lines, it is anticipated that construction impacts from the development of new transmission corridors would be MODERATE to LARGE due to the commitment of land and construction impacts on ecological resources.

Operational activities within the transmission corridors might include visual inspection and appropriate maintenance of transmission line ROWs. Maintenance activities might include reclearing vegetation, tree trimming/removal, and encroachment licensing/removal. For maintenance purposes, wooded sections of the ROW would be recleared to the full width through mechanical clearing, hand cutting, or herbicide application. Overall operation transmission impacts are anticipated to be SMALL.

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The site was formerly used ~~for the~~ as a manufacturing and testing facility for detonators and initiators for military ordnance in the early to mid-1950s (Apex Environmental, Inc., 1999)~~of munitions up until the late 1950s~~. In the early 1980s, buildings were removed from the site, timber was harvested, and the site was reforested. As a precautionary measure, t~~T~~he property contains covenants that restrict residential~~ development~~, educational, and day care use and development in two areas that ~~are~~total approximately 75 ac (30.3 ha) in size ~~due to those areas being suspect of containing~~ and encompass the former manufacturing, testing, and potential burial sites of unexploded ord~~i~~nance~~s~~ (UXO~~s~~). ~~The site~~ A Phase II Environmental Site Assessment was submitted to and is currently ~~being monitored~~ under review by the Maryland Department of the Environment (MDE), Land Restoration Program (GeoTrans, Inc., 2008). The report recommended no additional soil and shallow groundwater sampling and indicates that a Remedial Action Plan will be prepared to remove soil from one location with elevated levels of total petroleum hydrocarbon. (GeoTrans, Inc., 2008) ~~MDE, 2007), to determine the appropriate measures necessary to finish remediation of the site.~~

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Surveys and remediation activities conducted at the former Thiokol site between 1992 and 2000 to locate and subsequently remove unexploded ordnance (UXO) are summarized as follows.

In the early 1990s, the history of the property was researched through reviews of historical files, maps, drawings, and aerial photographs, and interviews with former employees of the munitions manufacturing companies that formerly operated at the site in the 1950s. A title search and property survey were also completed in order to construct a map of the site showing former building locations, which were located primarily in the northwest portion of the property, and suspect UXO burial sites. As part of the same project in the early 1990s, all surface debris and UXO were surveyed by experienced Explosive Ordnance Disposal (EOD) personnel. All domestic trash and non-hazardous debris were surveyed and transported offsite for disposal. The entire property was then surveyed using geophysical methods to locate any buried debris, with the survey readings more concentrated in suspect areas, such as former building locations, suspect onsite burial sites, or other disturbed areas. More intensive surveys and investigations were conducted at approximately 96 locations, including locations identified through the geophysical surveys, historical records search, and former building sites. (G&E Engineering, Inc., 1995) Of the 96 locations investigated, 25 locations were determined to contain UXO (Apex Environmental, Inc., 2000). The remaining area of the property was determined to be free of UXO based on the geophysical survey results, historical records search, and absence of any indication of industrial, disposal, or treatment activities. Approximately 1,360 pounds of reactive components were collected, stored, and detonated onsite in accordance with a permit received for the open detonation. Four-hundred fifty-six tons of soil from the open detonation area exhibiting lead concentrations above background levels were removed and properly disposed. Areas affected by the investigation and detonation activities were restored (G&E Engineering, Inc., 1995)

Additional UXO investigation and clearance were completed in 1999 and 2000 in response to MDE concerns regarding the potential for the continued presence of UXO at 7 locations following previous remediation activities. U.S. Department of Defense guidelines for UXO clearance in residential and non-residential areas were followed. Inspections and UXO clearance were completed at 10 locations (additional locations beyond the 7 locations of concern to the MDE were inspected and cleared based on planned future development activities). These 10 locations involved 22.4 acres in the northern portion the property. With the exception of one of the locations, all of the locations investigated and cleared were within the two Special Reserve Areas identified in the property's restrictive covenants. UXO items totaling 82 pounds, with a cumulative net explosive weight of 11 pounds, were removed and disposed offsite. Excavated soil from these 10 locations was mechanically sifted for presence of UXO. A total of 218 tons of soil, which contained an estimated 3.5 to 10.4 pounds of UXO with a net explosive weight of 2.2 to 6.5 pounds, were also removed and disposed offsite. The sites were restored upon completion of the final clearance activities and Site Certification Letters were prepared for each of the sites. (Apex Environmental, Inc., 2000)

9.3.2.2.1.1 Land Use

Land use in the area surrounding the CCNPP site is predominantly rural. Hunting is common in the region surrounding the plant because large areas are rural and forested. Less than 5% of the county land uses are classified as commercial or industrial. Calvert County has open space and land preservation plans in place that direct commercial development toward town centers in order to preserve the rural character. The impacts to land use at this site would be expected to be SMALL because the new reactor would be placed near existing nuclear.

9.3.2.2.1.2 Air Quality

Calvert County is in attainment with all National Ambient Air Quality Standards except for ozone. Because of its proximity to Washington, DC, the county is classified as a serious non-attainment zone for ozone. Moreover, because the CCNPP site is located in a serious non-attainment zone for ozone and has the potential to emit greater than 50 tons per year for both volatile organic compounds and nitrogen oxides, the facility is classified as a major source of these substances). Based on the design of the new nuclear unit and the actions that will be taken to comply with permit requirements for emissions, it is expected that siting the unit at this location would have a SMALL impact on air quality.

9.3.2.2.1.3 Water

The CCNPP site is located on the western shore of the Chesapeake Bay, which is an estuary approximately 200 mi (320 km) long and up to 35 mi (56 km) wide.

Makeup water for the plant would be drawn from Chesapeake Bay as discussed in Chapters 4 and 5. The impacts to water resources are expected to be SMALL and would be less than or similar to impacts due to the existing reactors at the site. Groundwater at the site occurs at depths near 30 ft (9 m) and flows toward the Chesapeake Bay. The artesian aquifer from which water is drawn during contruction is approximately 550 ft (167 m) below ground surface and approximately 100 ft (30 m) thick. This aquifer underlies much of Maryland. Current groundwater use at the site for existing operational and domestic use does not noticeably alter offsite groundwater characteristics.

Operational fresh water needs will be provided by desalination of Chesapeake Bay water, so there will be no impacts on groundwater.

Additional groundwater withdrawals required for constructing the new reactor are not expected to destabilize offsite groundwater resources. Due to the large size of both the surface water and groundwater resources and the current rural nature of the area and resultant low usage of these resources, impacts to water resources at the site from construction and operation of the new reactor unit are anticipated to be SMALL.

9.3.2.2.1.4 Terrestrial Ecology and Sensitive Species

The CCNPP site is largely forested and situated among other large forested tracts. Together these tracts form one contiguous and predominantly undeveloped forested area. The State of Maryland prepared a Wildlife Management Plan for the CCNPP site in 1987, and Baltimore Gas and Electric updated the plan in 1993 to include several habitat enhancement projects. The Wildlife Habitat Council has certified and registered the CCNPP site as a valuable corporate wildlife habitat.

The federally listed threatened puritan tiger beetle *(Cicindela puritana)* and the northeastern beach tiger beetle *(Cicindela dorsaliscan)* can be found at the base of the cliffs on the CCNPP site along the beach south of the barge dock. The federally listed threatened bald eagle has active nests on the CCNPP site. The Maryland Natural Heritage Program lists species that are rare to uncommon, and lists one terrestrial species, a showy goldenrod *(Solidago speciosa)* as present at the site.

No significant impacts to the terrestrial ecosystems would be expected once construction of the new reactor is complete. Therefore, the impacts of construction may be MODERATE; however, the impacts of operation would be SMALL.

9.3.2.2.1.5 Aquatic Ecology and Sensitive Species

The area of the Chesapeake Bay where the CCNPP site is located is in the mesohaline zone, which is characterized by moderate salinity. Recreationally and commercially important shellfish and finfish found in large numbers in the vicinity of the plant during pre-operational surveys included the eastern oyster (Crassostrea virginica), blue crab (Callinectes sapidus), striped bass (Morone saxatilis), and weakfish (Cynoscion regalis). One aquatic state-listed endangered species, the shortnose sturgeon (Acipenser brevirostrum), is known to inhabit the Chesapeake Bay. However, impingement studies conducted at the CCNPP site area over the past 30 years have never collected a shortnose sturgeon.

Federal and state agencies are working to reintroduce the Atlantic sturgeon (Acipenser oxyrhynchus), a species that the Maryland Natural Heritage Program lists as rare, into the Chesapeake Bay. There is no record of this species at the CCNPP site.

Construction impacts would be primarily due to runoff and siltation and will be controlled by best management practices and compliance with permit requirements. Because no sensitive species are known to occur in the vicinity and the new reactor is expected to have a similar impact to the existing reactor, construction and operation of the new reactor at this site would have a SMALL impact on the aquatic ecology in the Chesapeake Bay.

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9.3.2.2.1.6 Socioeconomics

The estimated population of Calvert County in 2005 was nearly 88,000 people. Other socioeconomic facts related to Baltimore County are as follows (USCB, 2007a):

- Calvert County experienced an 18% population increase from the 2000 census population of nearly 75,000 people.
- The median household income is slightly higher than $70,000 per year.
- Approximately 5% of the county's population lives below the poverty level.
- The nearest large city is Washington, D.C.

By the year 2010, the estimated population within 10 mi (16 km) of the CCNPP site is estimated to be approximately 63,000 people. By 2040, the population estimate for the same area is increased to approximately 124,000 people. Estimates for population growth within a 50 mi (80 km) radius of the plant are 4,757,810 for the year 2010, with a drop to 4,719,000 for the year 2040. Calvert County also has a large transient seasonal population. These people are attracted to the county's recreational opportunities such as the area parks and marinas. The seasonal population is estimated to increase the county population by nearly 25% (BGE, 1998).

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The Calvert Cliffs site is located within CT 861001 BG 1, Calvert County, Maryland. In 2007 Calvert County had a population of approximately 88,223, an 18 percent increase from 2000. In 2000 and 2005 the population within CT 861001 BG 1 was 1131 and 1401, respectively. The population density for CT 861001 BG 1 in 2000 and 2005 was 119 ppsm and 147 ppsm, respectively. The population density of Calvert County in 2000 and 2005 was 343 ppsm and 407 ppsm, respectively. The 2005 and 2007 population data presented was projected and therefore an estimated value.

Census tract data from 2000 were reviewed to determine the average population density within a 20-mi (32.2-km) radius of the Calvert Cliffs site. Based on these data, there are 141 ppsm within this area (USCB, 2000a). The 141 ppsm includes seasonal transient populations. When using population data from the year 2000 as a baseline, Calvert County is estimated to experience a population increase of 28.0 percent by 2010, 32.3 percent by 2015, and 36.5 percent by 2020 (MSDC, 2007).

Employment projections within the area indicate a general upward trend in the availability of various construction jobs (MDLLR, 2008b). Bechtel and the Building and Construction Trades Department of the AFL-CIO union announced they plan to reach an agreement by the end of 2008 on wages and benefits for workers who would be employed to construct a potential third reactor at the site. Construction on the proposed Unit 3 at Calvert Cliffs would create roughly 4,000 jobs for pipe fitters, welders, electricians and other skilled union members (Bechtel, 2008).

The Maryland Occupational Projections from 2004 to 2014 for construction trades workers estimates an increase of 52,000 openings from 135,000 in 2004 to 163,000 in 2014. Calvert County employs 21,000 people of which 2,400 are in construction jobs. The southern Maryland area employs 167,000 people of which 8600 are in construction jobs. An increase of available jobs indicates additional competition in acquiring a workforce for the construction of the project. Average annual unemployment rates in Calvert County and the Southern Maryland area are at 3.2 percent (MDLLR, 2008b).

The employer tax credits available include: federal, state, work opportunity, employment opportunity, welfare to work, enterprise zone, Maryland disability employment, and individuals with barriers to employment (MDLLR, 2008).

According to 2006 American Survey data, approximately 1,822 housing units are currently vacant, representing 5.7 percent of the total housing units within the county (USCB, 2006a). It is assumed that many of the direct and indirect jobs created by the project would require a largely migrating workforce. In addition, infrastructure is currently in place for the existing CCNPP.

Although construction and operation of a new reactor would create both temporary and permanent jobs, the percent of the population employed by the new plant, and therefore the effect of the new reactor on the area's population, is expected to be SMALL.

9.3.2.2.1.7 Transportation

Calvert County has one main four-lane road (Maryland State Highway 2/4) bisecting the County north to south with smaller roads running like veins from the main road to the water on each side. Very few of the smaller roads off Maryland State Highway 2/4 connect with each other; therefore, this highway services the bulk of the traffic for the length of the County. This highway runs adjacent to the CCNPP site and provides the only access to the site.

A traffic study prepared for construction at CCNPP predicts that construction traffic will peak above 1,450 vehicles per hour (Vph). Heavy vehicle shipments and construction traffic will make up most of the traffic, assuming a peak construction workforce of about 3,950 workers (calculated at 1.3 drivers per vehicle). It is anticipated that Calvert Beach Road and Nursery Road will be most heavily affected, but the impacts would occur during morning and evening commutes to the plant. Impacts on that road would be temporary, and likely end after construction was finished. Other roadways will likely be able to sustain the increase in traffic.

There are several ways to mitigate the potential transportation impacts during construction such as developing a construction traffic management plan prior to construction to address potential impacts on local roadways. If necessary, coordinating with local planning authorities for the upgrading of local roads, intersections, and signals to handle increased traffic loads could be considered.

Schedules during workforce shift changes and for the delivery of larger pieces of equipment or structures could be coordinated to limit impacts on local roads. In addition the use of shared (e.g., carpooling) and multi-person transport (e.g., buses) during construction and/or operation of the facility could be encouraged. By implementing the appropriate measures, it is expected that there would be SMALL to MODERATE impacts on transportation during construction activities and SMALL impact during operation of the facility.

9.3.2.2.1.8 Historic, Cultural, and Archeological Resources

There are eight historic sites within a 5 mi (8.0 km) radius of CCNPP site listed on the National Register of Historic Places. As described in Sections II.D and XII.E of the Final Environmental Statement for CCNPP Units 1 and 2, two historic dwellings located on the original Calvert Cliffs site were evaluated by the Maryland Historical Trust and found to be too derelict to be nominated for inclusion on the National Register (BGE, 1998). However, photographs and some architectural elements of the structures were salvaged and are displayed in the Visitors Center (a remodeled old tobacco barn) onsite.

During 1992 and 1993, archeological surveys were conducted along a proposed South Circuit transmission line and right-of-way. As a result, two archeological sites were examined extensively during an evaluatory testing phase. One prehistoric site was found to retain sufficient subsurface integrity to be considered eligible for inclusion on the National Register of Historic Places. The impact areas of the site were evaluated extensively, and towers were located in areas that would not affect any intact subsurface deposits (BGE, 1998).

From the air, the principal visual features of the CCNPP site region are the Chesapeake Bay, the Patuxent River, and countryside that is generally wooded. The distance across the Chesapeake Bay in the vicinity of CCNPP site is approximately 6 mi (10 km) and, from the shore, the far shore is a dark line on the horizon; the view up-Bay or down-Bay is water to the horizon. From the Chesapeake Bay, the shoreline is wooded with widely spaced small housing developments and marinas. The CCNPP site has a 1,500 ft (457 m) wide developed area approximately in the middle of 6 mi (9.7 km) of undeveloped, wooded shoreline featuring 100 ft (30 m) cliffs. These scenic resources have remained unchanged since the construction of CCNPP Units 1 and 2.

Scenic resources inland have changed since the construction of CCNPP Units 1 and 2 due to area population growth. This growth has resulted in housing, commercial, and road development supplanting agricultural and wooded areas. However, Maryland State Highway 2/4, which transects the area, is a scenic highway, affording views of gently rolling, wooded countryside with interspersed development and occasional agricultural areas. It is anticipated that historic and cultural impacts would be SMALL given the secluded location of the CCNPP site and that appropriate mitigation will occur with the State Historic Preservation Officer prior to and during construction of the facility.

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9.3.2.2.1.9 Environmental Justice

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~~Table 9.3-2 presents demographic information for Calvert County, Maryland, and the U.S. These data demonstrate that the population of this area is similar in composition to the State of Maryland and to the U.S. as a whole. Although the CCNPP site is located in a largely rural area, the likelihood of minority communities being disproportionately and adversely affected by this plant is low. Furthermore, this site has been operating as a nuclear power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts would be SMALL.~~

9.3.2.2.1.10 Transmission Corridors

The existing CCNPP transmission facilities consist of three separate three-phase, 500 kV transmission lines. Two circuits deliver power to the Waugh Chapel substation and a third line connects to the Chalk Point generating station.

Transmission corridors and towers would be situated (if possible) in existing right-of-way to avoid critical or sensitive habitats/species as much as possible. Specific monitoring requirements for new transmission lines and corridors, and associated switchyards will be designed to meet conditions of applicable Federal, State, and Local permits, to minimize adverse environmental impacts, and to ensure that organisms are protected against transmission line alterations. Due to the rural nature of the areas that would be transected by these transmission lines, any impacts are expected to be SMALL in nature.}

9.3.2.2.2 {Nine Mile Point

The Nine Mile Point (NMP) nuclear plant is located in Scriba, New York, in Oswego County. The site is adjacent to the J.A. Fitzpatrick nuclear plant. Currently, NMP consists of two boiling water reactor units with a combined net capacity of approximately 1,750 MW(e). The site, on the southeastern shore of Lake Ontario, encompasses approximately 900 acres (364 hectares) with about a mile of shoreline. Approximately 188 acres (70 hectares) are used for power generation and support facilities, while the remaining area is largely undeveloped (NMPNS, 2004).

9.3.2.2.2.1 Land Use

Oswego County has developed a comprehensive growth management plan that sets standards for growth and development. However, land use planning and zoning are primarily the responsibility of individual municipalities within the county, and there are no county-wide measures to limit residential growth. Land use within a 1 mi (1.6 km) radius of NMP is

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The demographic characteristics surrounding the proposed site were evaluated to determine the potential for environmental justice issues based on disproportionately high and adverse impacts to minority or low-income population. Demographic information used for this study was obtained from the 2000 U.S. Census. Demographics of the adjoining CTs/ BGs on and around the site within the county were examined and compared with the demographics of Calvert County and the State of Maryland. Table 9.3-2 presents this demographic information.

The Calvert Cliffs site is located in CT 861001 BG 1. Adjacent CTs include 860802 (BG 3), 860900 (BG 1 and 2), and 861002 (BGs 1 and 2). CT 861001 BG 1 has a 9.5 percent minority population, which is lower than all adjacent CTs within the county (860802 [9.6 percent], 860900 BG 1 [28.8 percent] and BG 2 [19.5 percent], 861002 BG 1 [17.7 percent] and BG 2 [14.1 percent]). The Hispanic population for the proposed action CT/BG is 2.5 percent and is comparable to the adjacent CTs and BGs, which range from 0.6 percent to 2.8 percent.

CT 861001 BG 1 (9.5 percent) has a lower percentage of minority residents compared to Calvert County (16.1 percent) and the State of Maryland (36.0 percent). The Hispanic population of CT 861001 BG 1 (2.5 percent) is slightly higher but comparable to the Calvert County (1.5 percent) and lower than the State of Maryland (4.3 percent).

CT 861001 BG 1 has 0 percent of its population below the poverty level, which is lower than all adjacent CTs and BGs. The percent of population classified as below the poverty level in CT 861001 BG 1 (0 percent) is lower than Calvert County (4.4 percent) and the State of Maryland (8.5 percent).

In 2000 the median household income for Calvert County was $65,945, compared to an average of $52,868 for the State of Maryland (USCB, 2000b). Based on the data presented in Table 9.3-2, no disproportionately high percentage of minority or low low-income residents would be directly impacted by construction and operation of the proposed project. Also, the economic benefits of the facility to the county would likely also benefit the minority and low-income populations to some degree, either directly by offering new jobs or indirectly through secondary job creation and increased services from the increased tax revenue.

The proposed facility would be a positive economic stimulus to Calvert County and the local economy. Any adverse human health and environmental consequences from the proposed facility would not be borne disproportionately by minority or low-income groups. Furthermore, this site has been operating as a nuclear power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts would be SMALL.

designated as either industrial or as a Valued Natural Resource, so residential growth within this area is limited.

In addition to the adjacent J.A. Fitzpatrick nuclear plant, there is a natural gas-fueled power plants approximately 2 mi (3.2 km) from NMP. There are also several state and national parks and natural areas in the vicinity of NMP (NMPNS, 2004). The impacts to land use at this site would be expected to be SMALL because the new reactor would be placed near existing nuclear facilities in an area that is currently zoned appropriately for power generation.

9.3.2.2.2.2 Air Quality

NMP is not located in an area designated as a maintenance or nonattainment area for any air pollutants by the U.S. Environmental Protection Agency (NMPNS, 2004). Localized emissions sources include commercial, residential, and transportation sources. Emissions are low enough at the existing NMP facilities to be exempt from any permit requirements (NRC, 2006a). Based on the design of the new reactor and the actions that will be taken to comply with permit requirements for emissions, it is expected that siting the unit at this location would have a SMALL impact on air quality.

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9.3.2.2.2.3 Water

~~NMP is not located in an area designated as a maintenance or nonattainment area for any air pollutants by the U.S. Environmental Protection Agency (NMPNS, 2004). Localized emissions sources include commercial, residential, and transportation sources. Emissions are low enough at the existing NMP facilities to be exempt from any permit requirements (NRC, 2006a). Based on the design of the new reactor and the actions that will be taken to comply with permit requirements for emissions, it is expected that siting the unit at this location would have a SMALL impact on air quality.~~

9.3.2.2.2.4 Terrestrial Ecology and Sensitive Species

The predominant land cover at the NMP site is woodlands. Federal and State designated wetlands (including shrub wetlands, bogs, emergent marshes, and forested wetlands) and inactive agricultural lands also occur on the site. Flora and fauna found on or near the site are typical of disturbed areas in the coastal communities of the region.

The area is part of the Atlantic Flyway, so bird numbers and species vary seasonally as birds migrate through or return to breed. There are no designated critical terrestrial habitats for endangered species in the vicinity of the NMP site; however, three areas in the vicinity of the NMP site or the transmission line corridor are considered to be significant habitats by the New York State Department of Environmental Conservation (NYSDEC) (NYSDEC, 2007).

The impacts of construction would be MODERATE, but would be minimized by searching for sensitive species and complying with permit and mitigation requirements before beginning work. Because no land will be disturbed once construction is complete, the impacts of operation would be SMALL.

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9.3.2.2.2.5 Aquatic Ecology and Sensitive Species

There are no Federally-listed threatened or endangered aquatic species in the vicinity of the NMP site. The potential for occurrence of the state-endangered deepwater sculpin (*Myoxocephalus thompsoni*) exists in the NMP site vicinity in Lake Ontario; however, it is a deepwater species (NYSDEC, 2007). No state-listed endangered aquatic species, including the deepwater sculpin, has been collected in the extensive lake sampling and impingement

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Lake Ontario is the smallest of the Great Lakes. The lake is 193 mi (310 km) long, 53 mi (85 km) wide, has a surface area of approximately 7,340 mi2 (19,010 km2). The average depth is 283 ft (86 m) with a maximum depth of 802 ft (244m). The Niagara River supplies approximately 80 percent of the water that flows into Lake Ontario, while the rest comes from small tributaries and runoff from precipitation. The lake drains through the St. Lawrence River, and water retention time is estimated to be approximately 8 years (NMP, 2004).

The cooling water system for the proposed new unit would include a CWS and a service water system. The CWS circulates cool water through the main condensers to condense steam after it passes through the turbine. The service water system circulates cooling water through heat exchangers that serve various plant components. It is anticipated that the proposed new unit would have a CWS and service water system similar to the existing Nine Mile Point Nuclear Plant Unit 2. The service water system for Unit 2 is a once-through system. The CWS for Unit 2 is a closed-cycle system that uses a cooling tower, and some of the discharge from the service water system is added to the CWS to make up for losses due to evaporation and drift from the cooling tower. The proposed new unit would have a separate intake and discharge structures located offshore in Lake Ontario, and a screenwell and pumphouse structure located onshore.

Hydrologic impacts associated with construction activities include alteration of the existing watershed surface; disturbance of the ground surface for stockpiles, material storage, and construction of temporary access roads; construction of water intake and discharge structures; construction of cofferdams and storm sewers; construction of piers, jetties, basins, or other structures that might alter shoreline processes; dredging operations; temporary dewatering activities; construction activities contributing to sediment runoff; changes in surface water drainage characteristics; decreases in surface water infiltration (increases of impervious surfaces); and increased erosion and sedimentation. Water will be used for construction activities. A specific quantity of water usage is not known at this time. However, proper mitigation and management methods implemented during construction will limit the potential water quantity and quality effects to surface water and groundwater.

Construction-related water use impacts will be minimized through the implementation of BMPs including erosion, grading, and sediment control measures; stormwater control measures; spill prevention plan; and observance of federal, state, regional, tribal, and local regulations pertaining to non-point source discharges. Overall construction-related water impacts will be SMALL.

The main source of water for the proposed new unit at NMP would be Lake Ontario. As mentioned above, given the volume of water contained in Lake Ontario, surface water supply is adequate for plant needs, and addition of a new unit at the site would not cause a significant impact to water resources. In addition, NMP is not a direct user of groundwater and there are no plans for direct groundwater use in the future (NMP, 2004).

The impacts associated with operating the proposed new unit's CWS and intake and discharge systems would be similar those associated with the existing NMP Unit 2. Impacts associated with operating NMP Unit 2 CWS and intake and discharge systems are described in detail in both the Nine Mile Point License Renewal document (NMP, 2004) and the Nine Mile Point Nuclear Station GEIS (NRC, 2006a) and include: thermal discharge is in compliance with applicable permit requirements; the plant operates in accordance with applicable local, state, and federal discharge limitations; there are no impacts of scouring caused by discharged cooling water; no impacts of discharge of chlorine or other biocides; no impacts of discharges of sanitary wastes; no impacts of discharges of other metals in wastewater; there are no impacts of altered current patterns at the intake and discharge; there are no impacts of altered thermal stratification of the lake; there are no impacts of temperature effects on sediment transport capacity; there are no impacts of thermal plume barriers to migrating fish and no impacts of stimulation of nuisance organisms. Finally, there would be no impacts of impingement and entrainment of fish and shellfish in early life stages because of the use of a cooling tower based system.

Ensuring permitted limits for water withdrawal and discharge are met through operational controls and monitoring would minimize the potential for adverse impacts to water availability and water quality. It is anticipated that there would be a site-specific water treatment system or the use of a municipal system, if available. Therefore, it is anticipated that overall water use impacts from operation activities would be SMALL.

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Construction-related impacts to the aquatic ecology would include loss of wetlands and temporary loss of habitat and short-term degradation of water quality in isolated areas due to in-water and shoreline construction of the CWIS and other appurtenant structures (such as blowdown and discharge pipelines).

While much of the supporting CWIS structure will be located onshore, a portion will extend a short distance into the waterway and will likely involve the dredging of sediment to allow for the construction of the concrete structure on the bottom of the lake. The blowdown and discharge pipeline would extend approximately 2,000 ft (61 m) into the lake. The dredging of sediment during construction of the CWIS and pipeline will result in the temporary suspension and re-deposition of the sediment, as well as the removal of those benthic organisms living in or on the removed sediment. It is anticipated that the suspended sediment will quickly redeposit in the immediate area. For a short period of time, the suspended sediment will create increased turbidity in the immediate area of the construction. Fish and motile crustaceans present in the area during construction activities will avoid the area during active construction or will actively feed on suspended organisms during dredging operations, and are unlikely to be adversely affected by the construction activities.

No construction effluents are anticipated from in-water construction activities. BMPs and compliance with permit requirements will be used to minimize runoff volumes and impacts. The use of a cofferdam to facilitate construction of the inwater portions of the CWIS will minimize releases of sediment. Prior to commencement of dredging, sediment in those areas proposed to be dredged will be sampled and analyzed to obtain detailed chemical characterizations according to the requirements of dredging permits; special sediment-handling requirements suggested by the sediment sampling results and required by the dredging permit will be followed.

CWIS and pipeline construction-related impacts on aquatic species are anticipated to be minor because the area of impacts is limited to the immediate vicinity of the construction activities. Because the potential impacts will be localized and given the short-term nature of the construction activities and the relatively short-term recovery periods for disturbed benthic species within and near the dredged area, no long-term effects on important species and their habitats are anticipated to occur. Therefore, the adverse aquatic ecology impacts associated with construction of the CWIS and other appurtenant structures (such as blowdown and discharge pipelines) are anticipated to be SMALL to MODERATE.

Because no sensitive species are known to occur in the vicinity, and operation of the proposed new reactor is expected to have a similar impact on aquatic resources as the operation of the existing reactor, operating a new reactor at NMP would have a SMALL impact on the aquatic ecology in the area.

monitoring efforts at the NMP site or the nearby J.A. Fitzpatrick nuclear plant and Oswego Steam Station (NMPNS, 2004).

Construction impacts would be primarily due to runoff and siltation and will be controlled by best management practices and compliance with permit requirements. Because no sensitive species are known to occur in the vicinity and the new reactor is expected to have a similar impact to the existing reactor, siting a new reactor at NMP would have a SMALL impact on the aquatic ecology in the area.

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9.3.2.2.2.6 Socioeconomics

The estimated population of Oswego County in 2005 was slightly more than 123,000 people. Other socioeconomic facts related to Oswego County are as follows:

- According to the U.S. Census Bureau, the number of people living in Oswego County in 2005 was up only 1,000 people from the 2000 census.
- The median household income is about $38,000.
- 13% of the population lives below the poverty level (USCB, 2007b).
- The closest large city to the NMP site is Syracuse, New York, which falls within the plant's 50 mi (80 km) radius. An estimated 914,668 people live within 50 mi (80 km) of NMP; however, only approximately 109,440 live within 20 mi (32 km) (NMPNS, 2004).
- Small seasonal fluctuations in regional population occur because of the number of colleges and recreational facilities in the area (NMPNS, 2004).

The number of jobs created by the construction and operation of a second nuclear reactor at NMP are insignificant in comparison with the number of jobs currently available in the area. Therefore, the construction and operation of a new reactor would have a SMALL impact on the area's population.

9.3.2.2.2.7 Transportation

Land access to NMP is Lake Road (County Route 1A), a two-lane paved roadway that is formed east of the intersection of County Route 1A and Lakeview Road, approximately 1 mi (1.6 km) from the NMP site. County Road 1 is another major throughway that intersects with both County Route 1A and Lakeview Road in the vicinity of the site. It is likely that the proposed work force (construction and operation) would use these routes to gain access to the site.

A traffic study prepared for construction at CCNPP predicts that construction traffic will peak above 1,450 vehicles per hour (Vph) at key intersections. Heavy vehicle shipments and construction traffic will make up most of the traffic, assuming a peak construction workforce of about 3,950 workers (calculated at 1.3 drivers per vehicle). It is anticipated that all of the roads would be heavily affected, but the impacts would occur during morning and evening commutes to the plant. Impacts on roadways would be temporary, and likely end after construction was finished.

There are several ways to mitigate the potential transportation impacts during construction such as developing a construction traffic management plan prior to construction to address potential impacts on local roadways. If necessary, coordinating with local planning authorities

INSERT Q

The Nine Mile Point site is located within CT 21502, BG 1, Oswego County, New York. In 2007 Oswego County had a population of approximately 121,454, a 0.8 percent decrease from 2000. In 2000 and 2005 the population within CT 21501 BG 1 was 7,331 and 7,678, respectively. The population density for CT 21501 BG 1 in 2000 and 2005 was 180 ppsm and 188 ppsm, respectively. The population density of Oswego County in 2000 and 2005 was 121 ppsm and 125 ppsm, respectively. The 2005 and 2007 population data presented was projected and therefore an estimated value.

Census tract data from 2000 were reviewed to determine the average population density within a 20-mi (32.2-km) radius of the Nine Mile Point site. Based on these data, there are 104 ppsm within this area (USCB, 2000c). The 104 ppsm includes seasonal transient populations. When using population data from the year 2000 as a baseline, Oswego County is estimated to experience a population decrease of 0.08 percent by 2010, 1.1 percent by 2015, and 2.7 percent by 2020 (Cornell, 2008).

Currently there is a 6.4 percent unemployment rate in Oswego County and a 4.3 percent unemployment rate in the Central New York region. Of the 53,000 Oswego County residents employed in 2000, 7,000 were in construction. Onondaga County which contains the largest city in the area, Syracuse, had 222,000 residents employed of which 14,000 were in construction (NYLB, 2008a). A combination of slow population growth, increasing numbers of baby boomers retiring, and fewer young people entering the local job market have contributed to a tightening labor supply in Central New York. If these trends continue, local employers will have great difficulty filling positions, which could hamper future job growth. In response, the region's employers are aggressively advertising to fill vacancies at various skill levels (NYSDL, 2008a).

In addition to lower taxes, New York offers a variety of incentives to companies expanding or relocating in the Empire State. These include:

- Investment Tax Credit (ITC). Businesses that create new jobs and make new investments in production property and equipment may qualify for tax credits of up to 10 percent of their eligible investment. New businesses may elect to receive a refund of certain credits, and all unused credits can be carried forward for 15 years.

- Research and Development Tax Credit. Investments in research and development facilities are eligible for a 9 percent corporate tax credit. Additional credits are available to encourage the creation and expansion of emerging technology businesses, including a 3-year job creation credit of $1000 dollars per employee and a capital credit for investments in emerging technologies.

- Sales Tax Exemptions. New York State offers exemptions for purchases of production machinery and equipment, research and development property, and fuels/utilities used in manufacturing and R&D. Other exemptions may be available through local Industrial Development Agencies (IDA.)

- Real Property Tax Abatement. To encourage development, expansion, and improvement of commercial property, a 10-year property tax abatement is available to offset increased assessments due to improvements to business and commercial property.

- No Personal Property Tax. Unlike many other states, which tax both real property and personal property, property taxes in New York State are imposed on real property only. Personal property, whether tangible or intangible, is exempt from state and local taxes.

- Economic Development Zone/Empire Zone Tax Credits. New York State has designated 72 zones as Economic Development Zones/Empire Zones (EZs), which offer a host of benefits. These include discounts on electricity, enhanced tax credits for investment and job creation, and additional sales and property tax exemptions (NYLB, 2008c).

Based on 2006 census data, approximately 7,507 housing units are currently vacant, representing 14 percent of the total housing units within the county (USCB, 2006b).

for the upgrading of local roads, intersections, and signals to handle increased traffic loads could be considered.

Schedules during workforce shift changes and for the delivery of larger pieces of equipment or structures could be coordinated to limit impacts on local roads. In addition the use of shared (e.g., carpooling) and multi-person transport (e.g., buses) during construction and/or operation of the facility could be encouraged. By implementing the appropriate measures, it is expected that there would be SMALL to MODERATE impacts on transportation during construction activities and SMALL impact during operation of the facility.

9.3.2.2.2.8 Historic, Cultural, and Archeological Resources

No significant historic, cultural, or archeological resources have been found at the NMP site during previous site surveys or previous construction activities. The State Historic Preservation Officer lists no known historic sites at NMP; however, portions of the site have high potential for discovery of archeological resources (NRC, 2006a). Investigation would be required before siting a new reactor at this location.

Consultation with the State Historic Preservation Officer would occur if any significant historic, cultural, or archeological resources were identified and any appropriate mitigation measures put in place prior to construction and operation. Therefore, it is expected that the impacts of constructing and operating an additional reactor at this site would be SMALL.

RAI 210

9.3.2.2.2.9 Environmental Justice

INSERT R

~~Table 9.3-3 (USCB, 2007b) presents demographic information for Oswego County, New York, and the U.S. These data demonstrate that the population of this area is similar in composition to the state of New York and to the U.S. as a whole. Therefore, minority and low-income communities would not be disproportionately affected. Furthermore, this site has been operating as a power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts would be SMALL.~~

RAI 215

9.3.2.2.2.10 Transmission Corridors

INSERT W

~~This site is capable of supporting the required 345 kV transmission lines, but will require upgrades to the switchgear. However, the tie in is currently congested with limited transmission corridor space. Further evaluation would be required to determine the need for additional transmission corridors, but existing right of ways would be used for any necessary upgrades, so impacts are expected to be SMALL from the development of new transmission corridors.}~~

9.3.2.2.3 {R. E. Ginna

The R.E. Ginna Nuclear Power Plant (Ginna) site is located in Ontario, in the northwest corner of Wayne County, New York. Like NMP, Ginna is situated on the south shore of Lake Ontario and includes about 1.5 mi (2.4 km) of shoreline. The site encompasses 488 acres (197 hectares), approximately half of which is currently leased for agricultural uses. The power station and accompanying support facilities occupy an additional quarter of the area. The remaining quarter is left largely undisturbed. The existing facility consists of a single unit, pressurized light water reactor, with a net capacity of 490 MW(e) (NRC, 2004).

9.3.2.2.3.1 Land Use

Agriculture plays a large and important role in Wayne County. The majority of the land surrounding the Ginna site is used for growing apples, cherries, grapes, and field crops.. The

INSERT R

The demographic characteristics surrounding the proposed site at Nine Mile Point were evaluated to determine the potential for environmental justice issues based on disproportionately high and adverse impacts to minority or low-income population. Demographic information used for this study was obtained from the 2000 U.S. Census. Demographics of the adjoining CTs/BGs on and around the site within the county were examined and compared with the demographics of Oswego County and the State of New York. Table 9.3-3 presents this demographic information.

The Nine Mile Point site is located in CT 21502 BG 1. Adjacent CTs include 21502 (BG 2), 21501 (BG 1 and 2), and 21605 (BG 1). CT 21502 BG 1 has a 1.9 percent minority population, which is lower or comparable to all adjacent CTs within the county (21502 BG 2 [3.4 percent], 21501 BG 1 [1.1 percent] and BG 2 [2.1 percent], and 21605 BG 1 [4.6 percent]). The Hispanic population for the proposed action CT/BG is 1.0 percent and is comparable to the adjacent CTs and BGs, which range from 0.6 percent to 4.0 percent.

CT 21501 BG 1 (1.9 percent) has a lower percentage of minority residents compared to Oswego County (2.8 percent) and the State of New York (31.2 percent). The Hispanic population of CT 21501 BG 1 (1.0 percent) is lower than Oswego County (1.3 percent) and the State of New York (15.1 percent).

CT 21502 BG 1 has 14.3 percent of its population below the poverty level, which is lower than the adjacent CT 21502 BG 2 (15.1 percent) and CT 21605 BG 1 (17.5 percent), and slightly higher than CT 21501 BG 1 (13.1 percent) and BG 2 (9.4 percent). The percent of the population classified as below the poverty level in CT 21502 BG 1 (14.3 percent) is higher than Oswego County (8.6 percent) and lower than that in the State of New York (14.6 percent).

In 2000 the median household income for Oswego County was $36,598 compared to an average of $43,393 for the State of New York (USCB, 2000d). Based on the data presented in Table 9.3-3, no disproportionately high percentage of minority or low-income residents would be directly impacted by construction and operation of the proposed facility. The economic benefits of the facility to the county would likely also benefit the minority and low-income populations to some degree, either directly by offering new jobs or indirectly through secondary job creation and increased services from the increased tax revenue.

The proposed facility would be a positive economic stimulus to Oswego County and the local economy. Any adverse human health and environmental consequences from the proposed facility would not be borne disproportionately by minority or low-income groups. Furthermore, this site has been operating as a nuclear power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts would be SMALL.

INSERT W

The proposed new unit at NMP would utilize, to the extent possible, existing NMP transmission facilities to minimize environmental impacts. This site is capable of supporting the required 345-kV transmission lines, but will require upgrades to the switchgear. However, the tie-in is currently congested with limited transmission corridor space. Further evaluation would be required to determine the need for additional transmission corridors. If required, new transmission corridors and towers would be situated (if possible) in existing ROWs to avoid critical or sensitive habitats/species as much as possible. It is anticipated that transmission corridors might need to be widened in some cases to support new lines. Specific monitoring requirements for new transmission lines and corridors and associated switchyards would be designed to satisfy conditions of applicable federal, state, and local permits, to minimize adverse environmental impacts, and to ensure that organisms are protected against transmission line alterations.

Most transmission corridors would pass through land that is primarily agricultural and forest land. Widening transmission corridors would result in some ecological impacts. The areas are mostly rural and remote with low population densities. The effect of these corridors on land usage is minimal; farmlands that have corridors passing through them generally continue to be used as farmland.

Operational activities within the transmission corridors might include visual inspection and appropriate maintenance of transmission line ROWs. Maintenance activities might include reclearing vegetation, tree trimming/removal, and encroachment licensing/removal. For maintenance purposes, wooded sections of the ROW would be recleared to the full width through mechanical clearing, hand cutting, or herbicide application. Overall construction and operation transmission impacts are anticipated to be SMALL.

Ginna site and the transmission right-of-ways are zoned industrial, and the majority of the surrounding land is zoned for large lot residential use. Nearby Monroe County is home to Rochester and is much more urbanized than Wayne County. None of the Wayne County towns along the Lake Ontario shoreline have overly restrictive growth ordinances, so it is likely that building will continue to increase in these areas in the foreseeable future. Despite this expected growth, the impacts to land use at this site would still be expected to be SMALL because the new reactor would be placed near existing nuclear facilities on land currently appropriately zoned for power generation.

RAI 220 → INSERT AA

9.3.2.2.3.2 Air Quality

Air quality in the Ginna region exceeds national standards for all measured parameters. There are no nearby areas designated as areas of nonattainment or maintenance. Emissions from plant activities are below state and federal thresholds; therefore operations at Ginna do not require any air quality permits. Based on the design of the new reactor and the actions that will be taken to comply with permit requirements for emissions, it is expected that siting the unit at this location would have a SMALL impact on air quality.

RAI 220 → INSERT BB

9.3.2.2.3.3 Water

The features of Lake Ontario are described in the previous section. In addition to Lake Ontario, surface water features at the Ginna site include Mill Creek, which enters the site from the south, and Deer Creek, which enters the site from the west. Mill Creek has a continuous yield, while Deer Creek dries up during the summer months. Ginna does not use groundwater resources for plant operations or domestic purposes.

RAI 217 → INSERT X

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Impacts from construction of a new reactor at the Ginna site would be SMALL to MODERATE and would depend on the location of the new reactor relative to the streams. Because of the size of the surface water body and the expected compliance with any permit requirements, anticipated operational impacts of a new reactor unit on the surface and groundwater at this location would be SMALL.

RAI 220 → INSERT DD

9.3.2.2.3.4 Terrestrial Ecology and Sensitive Habitat

The Ginna site is surrounded by a variety of habitat types, such as mature woodlands, meadows, and abandoned farm fields, all typical of central and western New York. There is no State or Federal regulated wetlands at Ginna, and no federally-listed threatened or endangered terrestrial breeding species are known to occur at the site. Occasionally, bald eagles will be observed in the vicinity, but the nearest known nesting site is approximately 55 mi (88 km) away (NYSDEC, 2007).

Of the 3 reptile species, 13 bird species, 4 mammal species, and 8 plant species listed by the State of New York as threatened, endangered, rare, or otherwise of concern, none are known to occur at the Ginna site (NYSDEC, 2005). Surveys for sensitive species would be conducted before constructing a new reactor at the Ginna site and permit and mitigation requirements fulfilled before beginning work. Impacts to the terrestrial ecology at the Ginna site would be MODERATE during the construction of a new reactor. Because no land will be disturbed once construction is complete, operational impacts would be SMALL.

RAI 219 → INSERT Y

RAI 220 → INSERT DD

9.3.2.2.3.5 Aquatic Ecology and Sensitive Habitat

Although the Ginna site is situated on the shore of Lake Ontario, there are no aquatic species federally-listed as threatened or endangered in the vicinity of the site. Two state-listed aquatic species are known to occur within Wayne County - the pugnose shiner (*Notropis anogenus*) and

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As stated in Subsection 9.3.2.2.3, sufficient land area is available at Ginna to support an additional unit; therefore, impacts associated with construction of the new unit would be anticipated to be SMALL in relation to operation of the existing Ginna nuclear power plant. Appropriate controls and monitoring during operation of the new unit would minimize any cumulative impacts associated with the ongoing operation at Ginna. Therefore, overall cumulative land use impacts would be anticipated to be SMALL.

INSERT BB

The public and occupational radiological doses resulting from operation of Ginna are well below regulatory limits. The radiological exposure limits for protection of the public and for occupational exposures have been developed assuming longterm exposures, and therefore incorporate cumulative impacts. The Annual Radioactive Effluent Release Report, covering the period from January 1, 2006 through December 31, 2006, indicates all gaseous and liquid effluents discharged during the reporting period were in compliance with the limits of the R. E. Ginna Technical Specifications as defined in the Offsite Dose Calculation Manual (ODCM) (Constellation, LLC, 2007). Per NUREG 1437 (NRC, 2004), the cumulative radiological impacts of continued operation of Ginna will be SMALL, additional mitigation is not warranted, and the NRC would regulate any reasonably foreseeable future actions in the vicinity of Ginna that could contribute to cumulative radiological impacts. Since operation of the new unit at Ginna and the existing unit would be in compliance with applicable regulatory dose limits, cumulative radiological impacts would be SMALL.

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Lake Ontario is the smallest of the Great Lakes. The lake is 193 mi (310 km) long, 53 mi (85 km) wide, has a surface area of approximately 7,340 square miles (mi2) (19,010 km2). The average depth is 283 ft (86m) with a maximum depth of 802 ft (244m). The Niagara River supplies approximately 80 percent of the water that flows into Lake Ontario, while the rest comes from small tributaries and runoff from precipitation. The lake drains through the St. Lawrence River, and water retention time is estimated to be approximately 8 years. In addition to Lake Ontario, surface water features at the Ginna site include Mill Creek, which enters the site from the south, and Deer Creek, which enters the site from the west. Mill Creek has a continuous yield, while Deer Creek dries up during the summer months. Ginna does not use groundwater resources for plant operations or domestic purposes (RG&E, 2002).

The cooling water system for the proposed new unit would include a CWS and a service water system. The CWS circulates cool water through the main condensers to condense steam after it passes through the turbine. The service water system circulates cooling water through heat exchangers that serve various plant components. The proposed new unit would have a once-through service water system and a closed-cycle CWS system that uses a cooling tower. Some of the discharge from the service water system will be added to the CWS to make up for losses due to evaporation and drift from the cooling tower. The proposed new unit would have a separate intake and discharge structures located offshore in Lake Ontario, and a screenwell and pumphouse structure located onshore.

Hydrologic impacts associated with construction activities include alteration of the existing watershed surface; disturbance of the ground surface for stockpiles, material storage, and construction of temporary access roads; construction of water intake and discharge structures; construction of cofferdams and storm sewers; construction of piers, jetties, basins, or other structures that might alter shoreline processes; dredging operations; temporary dewatering activities; construction activities contributing to sediment runoff; changes in surface water drainage characteristics; decreases in surface water infiltration (increases of impervious surfaces); and increased erosion and sedimentation. Water will be used for construction activities. A specific quantity of water usage is not known at this time. However, proper mitigation and management methods implemented during construction will limit the potential water quantity and quality effects to surface water and groundwater.

Construction-related water use impacts will be minimized through the implementation of BMPs including erosion, grading, and sediment control measures; stormwater control measures; spill prevention plan; and observance of federal, state, regional, tribal, and local regulations pertaining to nonpoint source discharges. Overall construction-related water impacts will be SMALL.

The main source of water for the proposed new unit at Ginna would be Lake Ontario. As mentioned above, given the volume of water contained in Lake Ontario, surface water supply is adequate for plant needs, and addition of a new unit at the site would not cause a significant impact to water resources (RG&E, 2002). In addition, Ginna is not a direct user of groundwater and there are no plans for direct groundwater use in the future (NRC, 2004).

The impacts associated with operating the proposed new unit's CWS and intake and discharge systems would be similar to those impacts associated with the existing Ginna Nuclear Power Plant, which are described in detail in the both the R.E. Ginna License Renewal document (RG&E, 2002) and the R. E. Ginna Nuclear Station GEIS (NRC, 2004) with one main difference: while the exiting unit uses a once-through condenser cooling system, the proposed new unit will be a closed – cycle system which will have less of an impact to the impingement and entrainment of fish and shellfish Lake Ontario. Impacts discussed in the R.E. Ginna license renewal document and the GEIS indicate that the thermal discharge is in compliance with applicable permit requirements; the plant operates in accordance with applicable local, state, and federal discharge limitations; there are no impacts of scouring caused by discharged cooling water; no impacts of discharge of chlorine or other biocides; no impacts of discharges of sanitary wastes; no impacts of discharges of other metals in wastewater; there are no impacts of altered current patterns at the intake and discharge; there are no impacts of altered thermal stratification of the lake; there are no impacts of temperature effects on sediment transport capacity; there are no impacts of thermal plume barriers to migrating fish and no impacts of stimulation of nuisance organisms. Finally, there would be no impacts of impingement and entrainment of fish and shellfish in early life stages since the proposed new unit would use a cooling tower based system.

Ensuring permitted limits for water withdrawal and discharge are met through operational controls and monitoring would minimize the potential for adverse impacts to water availability and water quality. It is anticipated that there would be a site-specific water treatment system or the use of a municipal system, if available. Therefore, it is anticipated that overall water use impacts from operation activities would be SMALL.

Cumulative water impacts were addressed for the continued operation of the existing Ginna nuclear station in the NUREG 1437, Supplement 14 (NRC, 2004). It was determined that there would be a SMALL cumulative impacts on water use, water quality and groundwater withdrawals since there are no groundwater withdrawals at Ginna and there are none anticipated in the future; and water use and water quality impacts associated with the intake of water from, and the discharge of water to, Lake Ontario would be continue to be regulated by the State of New York and other agencies. Water use (intake and discharge) for the proposed new reactor unit at Ginna would also be regulated by applicable state and other agencies. Therefore, cumulative water impacts would be SMALL.

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Cumulative water impacts were addressed for the continued operation of the existing Ginna nuclear station in the NUREG 1437, Supplement 14 (NRC, 2004). It was determined that there would be a SMALL cumulative impacts on water use, water quality and groundwater withdrawals since there are no groundwater withdrawals at Ginna and there are none anticipated in the future; and water use and water quality impacts associated with the intake of water from, and the discharge of water to, Lake Ontario would be continue to be regulated by the State of New York and other agencies. Water use (intake and discharge) for the proposed new reactor unit at Ginna would also be regulated by applicable state and other agencies. Therefore, cumulative water impacts would be SMALL.

INSERT DD

Cumulative impacts to threatened or endangered species were addressed for the continued operation of the existing Ginna nuclear station in NUREG 1437, Supplement 14 (NRC, 2004). It was determined that that the cumulative impacts to threatened or endangered mitigation would not be warranted primarily because none are known to occur near the Ginna site. The addition of another unit at the Ginna site would not impact threatened or endangered species at the site for the reason identified above.

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Construction-related impacts to the aquatic ecology would include loss of wetlands and temporary loss of habitat and short-term degradation of water quality in isolated areas due to in-water and shoreline construction of the CWIS and other appurtenant structures (such as blowdown and discharge pipelines).

While much of the supporting CWIS structure will be located onshore, a portion will extend a short distance into the waterway and will likely involve the dredging of sediment to allow for the construction of the concrete structure on the bottom of the lake. The blowdown and discharge pipeline would extend into the lake. The dredging of sediment during construction of the CWIS and pipeline will result in the temporary suspension and redeposition of the sediment, as well as the removal of those benthic organisms living in or on the removed sediment. It is anticipated that the suspended sediment will quickly redeposit in the immediate area. For a short period of time, the suspended sediment will create increased turbidity in the immediate area of the construction. Fish and motile crustaceans present in the area during construction activities will avoid the area during active construction or will actively feed on suspended organisms during dredging operations, and are unlikely to be adversely affected by the construction activities.

No construction effluents are anticipated from in-water construction activities. BMPs and compliance with permit requirements will be used to minimize runoff volumes and impacts. The use of a cofferdam to facilitate construction of the inwater portions of the CWIS will minimize releases of sediment. Prior to commencement of dredging, sediment in those areas proposed to be dredged will be sampled and analyzed to obtain detailed chemical characterizations according to the requirements of dredging permits; special sediment-handling requirements suggested by the sediment sampling results and required by the dredging permit will be followed.

CWIS and pipeline construction-related impacts on aquatic species are anticipated to be minor because the area of impacts is limited to the immediate vicinity of the construction activities. Because the potential impacts will be localized and given the short-term nature of the construction activities and the relatively short-term recovery periods for disturbed benthic species within and near the dredged area, no long-term effects on important species and their habitats are anticipated to occur.

Construction activities would have a SMALL TO MODERATE impact on the aquatic ecology at the Ginna site depending on the proximity of the new reactor to onsite streams and the impacts associated with construction of the CWIS and other appurtenant structures (such as blowdown and discharge pipelines).

Operating a new reactor at Ginna would have a SMALL impact on the aquatic ecology in the area since no sensitive species are known to occur in the vicinity, and operation of the proposed new reactor is expected to have a similar impact on aquatic resources as the existing reactor.

Cumulative impacts to threatened or endangered species were addressed for the continued operation of the existing Ginna nuclear station in NUREG 1437, Supplement 14 (NRC, 2004). It was determined that that the cumulative impacts to threatened or endangered species due to continued operation of the Ginna site would be SMALL and that additional mitigation would not be warranted primarily because none are known to occur near the Ginna site. The addition of another unit at the Ginna site would not impact threatened or endangered species at the site for the reason identified above.

the lake sturgeon (*Acipenser fulvescens*). The pugnose shiner is not known to exist near the Ginna site. A single lake sturgeon was netted several years ago approximately 6 mi (10 km) from the Ginna site.

Construction impacts would be primarily due to runoff and siltation and will be controlled by best management practices and compliance with permit requirements. Because no sensitive ~~species~~ are known to occur in the vicinity and the new reactor is expected to have a similar impact to the existing reactor. Depending on the proximity of the new reactor to the streams onsite, construction activities would have a SMALL TO MODERATE impact on the aquatic ecology at the Ginna site. Operational impacts would be anticipated to be SMALL.

RAI 210

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9.3.2.2.3.6 Socioeconomics

The estimated population of Wayne County in 2005 was just under 94,000 people. Other socioeconomic facts related to Wayne County are as follows (USCB, 2007c):

- The population within 20 mi (32 km) of the Ginna site is approximately 564,000.
- An estimated 1.25 million people live within 50 mi (80 km).
- Rochester, in Monroe County, is the largest city within 50 mi (80 km) of the Ginna site, with a population of 219,773 people.
- There is a Tribal Designated Statistical Area for the Cayuga Nation within 50 mi (80 km) of the facility.
- The estimated 2005 population for Wayne County was nearly the same as the 2000 population.
- The median household income is approximately $44,000
- 10% of the population lives below the poverty level.
- The summertime population near the site increases very slightly because of the proximity to recreational opportunities on Lake Ontario.

It is expected that no significant increase in employment will take place due to the construction or operation of the new reactor, therefore, the impacts to the area's population from construction and operation of a new reactor would be SMALL.

9.3.2.2.3.7 Transportation

There are 13 counties wholly or partially within the 50 mi (80 km) radius of the Ginna site. The 13 county area is served by a network of interstate freeways including Interstate 90 (I-90), I-390, I-490, and I-81. In addition to interstate freeways, the region's transportation network includes the Greater Rochester International Airport in southwest Rochester and a train network. The Port of Rochester, at the mouth of the Genesee River, is also available to a limited number of cargo ships and passenger ferries.

The main east-west transportation routes providing access to the Ginna site are County Route 101 (Lake Road) and NYS Route 104. Lake Road, a two-lane road, provides direct access to Ginna along much of the southern border of the site. NYS Route 104, the predominant east-west corridor near the plant, runs parallel to Lake Road, approximately 3.6 mi (5.8 km)

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The Ginna site is located within CT 20101 BG 1, Wayne County, New York. In 2007, Wayne County had a population of approximately 91,291, a 2.6 percent decrease from 2000. In 2000 and 2005, the population within CT 20101 BG 1 was 4,712 and 5,045, respectively. The population density for CT 21501 BG 1 in 2000 and 2005 is 217 ppsm and 233 ppsm, respectively. The population density of Wayne County in 2000 and 2005 was 155 ppsm and 158 ppsm, respectively. The 2005 and 2007 population data presented is projected and therefore an estimated value.

Census tract data from 2000 were reviewed to determine the average population density within a 20-mi (32.2-km) radius of the Ginna site. Based on these data, there are 284 ppsm within this area (USCB, 2000e). The 284 ppsm includes seasonal transient populations. When using population data from the year 2000 as a baseline, Wayne County is estimated to experience a population decrease of 0.6 percent by 2010, 0.9 percent by 2015, and 1.9 percent by 2020 (Cornell, 2008).

Currently the unemployment rate in Wayne County is 5.4 percent. Of the 47,000 people employed in Wayne County, 4,500 are in construction (NYLB, 2008b). The economy of the Finger Lakes region is presently in transition. The local economic base, which was once dependent upon a few large manufacturing firms, has become much more diverse in recent years. A mix of small manufacturers and firms in a variety of service-producing industries are adding jobs, a trend that will likely continue. Among the region's most important economic assets are its post-secondary educational institutions (NYSDL, 2008b).

In addition to lower taxes, New York offers a variety of incentives to companies expanding or relocating in the Empire State. These include:

- Investment Tax Credit (ITC). Businesses that create new jobs and make newinvestments in production property and equipment may qualify for tax credits of up to 10 percent of their eligible investment. New businesses may elect to receive a refund of certain credits, and all unused credits can be carried forward for 15 years.

- Research and Development Tax Credit. Investments in research and development facilities are eligible for a 9% corporate tax credit. Additional credits are available to encourage the creation and expansion of emerging technology businesses, including a 3-year job creation credit of $1,000 dollars per employee and a capital credit for investments in emerging technologies.

- Sales Tax Exemptions. New York State offers exemptions for purchases of production machinery and equipment, research and development property, and fuels/utilities used in manufacturing and R&D. Other exemptions may be available through local Industrial Development Agencies (IDA.)

- Real Property Tax Abatement. To encourage development, expansion, and improvement of commercial property, a 10-year property tax abatement is available to offset increased assessments due to improvements to business and commercial property.

- No Personal Property Tax. Unlike many other states, which tax both real property and personal property, property taxes in New York State are imposed on real property only. Personal property, whether tangible or intangible, is exempt from state and local taxes.

- Economic Development Zone/Empire Zone Tax Credits. New York State has designated 72 zones as Economic Development Zones/Empire Zones (EZs), which offer a host of benefits. These include discounts on electricity, enhanced tax credits for investment and job creation, and additional sales and property tax exemptions (NYLB, 2008c).

Based on 2006 census data, approximately 3,845 housing units are currently vacant, representing 9.6 percent of the total housing units within the county (USCB, 2006c).

south of Ginna. Ontario Center Road in the town of Ontario runs north-south, connecting NYS Route 104 to Lake Road immediately south of Ginna. Several other secondary roads run north-south providing access to Lake Road from NYS Route 104.

Employees commuting from Monroe County and other points west of the Ginna site are likely to use NYS Route 104, Route 441, or Route 286 to access Lake Road. Employees commuting from the south and east are likely to use north-south corridors NYS Route 21 and Route 350 to reach NYS Route 104, and then use Ontario Center Road to Lake Road.

A traffic study prepared for construction at the CCNPP site predicts that construction traffic will peak above 1,450 vehicles per hour (Vph) at key intersections. Heavy vehicle shipments and construction traffic will make up most of the traffic, assuming a peak construction workforce of about 3,950 workers (calculated at 1.3 drivers per vehicle). It is anticipated that roadways will be equally affected by the increased traffic, but the impacts would occur during morning and evening commutes to the plant. Impacts on these roadways would be temporary, and likely end after construction was finished.

There are several ways to mitigate the potential transportation impacts during construction such as developing a construction traffic management plan prior to construction to address potential impacts on local roadways. If necessary, coordinating with local planning authorities for the upgrading of local roads, intersections, and signals to handle increased traffic loads could be considered.

Schedules during workforce shift changes and for the delivery of larger pieces of equipment or structures could be coordinated to limit impacts on local roads. In addition the use of shared (e.g., carpooling) and multi-person transport (e.g., buses) during construction and/or operation of the facility could be encouraged.

By implementing the appropriate measures, it is expected that there would be SMALL to MODERATE impacts on transportation during construction activities and SMALL impact during operation of the facility.

9.3.2.2.3.8 Historic, Cultural, and Archeological Resources

The area surrounding the Ginna site was historically occupied by Native American tribes. No significant Native American artifacts or evidence of villages has been found or identified on or in close proximity to Ginna. In addition, no archeological sites are known to exist in the vicinity of the plant. However, because archeological sites have been found along the creeks and lakeshore, the New York State Preservation Office considers the area surrounding Ginna an archeologically sensitive area (NRC, 2004).

It is reasonable to expect that, because no historic sites are known to occur at Ginna, impacts to historical, cultural, and archeological resources construction and operation of an additional reactor unit at this site would be SMALL, but investigations of the site would be needed before siting a new reactor at this location.

RAI 210

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9.3.2.2.3.9 Environmental Justice

~~Table 9.3-4 (USCB, 2007c) presents demographic information for Wayne County, New York, and the U.S. These data demonstrate that the population of this area is similar in composition to the state of New York and to the U.S. as a whole. Although the area is somewhat urbanized, there is no indication that minority or low income populations would be more adversely affected by a second plant at the Ginna site than the general population. Furthermore, this site has been~~

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The demographic characteristics surrounding the proposed R. E. Ginna site were evaluated to determine the potential for environmental justice issues based on disproportionately high and adverse impacts to minority or low-income population. Demographic information used for this study was obtained from the 2000 U.S. Census. Demographics of the adjoining CTs/BGs on and around the site within the county were examined and compared with the demographics of Wayne County and the State of New York. Table 9.3-4 presents this demographic information.

The Ginna site is located in CT 20101 BG 1. Adjacent CTs include 20102 (BG 2), 20401 (BG 2), and 20402 (BG 1). CT 20101 BG 1 has a 2.7 percent minority population, which is lower than all adjacent CTs within the county (20102 BG 1 [4.3 percent], 20401 BG 2 [4.0 percent], and 20402 BG 1 [8.6 percent]). The Hispanic population for the proposed action CT/BG is 1.3 percent and is comparable to the adjacent CTs and BGs, which range from 1.2 percent to 2.5 percent.

CT 20101 BG 1 (2.7 percent) has a lower percentage of minority residents compared to Wayne County (6.2 percent) and the State of New York (31.2 percent). The Hispanic population of CT 20101 BG 1 (1.3 percent) is lower than Wayne County (1.3 percent) and the State of New York (15.1 percent).

CT 20101 BG 1 has 2.5 percent of its population below the poverty level, which is lower than all of the adjacent CTs/BGs. The percent of population classified as below the poverty level in CT 20101 BG 1 (2.5 percent) is lower than that in Wayne County (14.0 percent) and the State of New York (14.6 percent).

In 2000, the median household income for Wayne County was $44,157, compared to an average of $43,393 for the State of New York (USCB, 2000f).

Based on the data presented in Table 9.3-4, no disproportionately high percentage of minority or low-income residents would be directly impacted by construction and operation of the proposed facility. The economic benefits of the facility to the county would likely also benefit the minority populations to some degree, either directly by offering new jobs or indirectly through secondary job creation and increased services from the increased tax revenue.

The proposed facility would be a positive economic stimulus to Wayne County and the local economy. Any adverse human health and environmental consequences from the proposed facility would not be borne disproportionately by minority or low-income groups. Furthermore, this site has been operating as a nuclear power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts would be SMALL.

~~operating as a power generating facility for a number of years. Therefore, it is anticipated that environmental justice impacts would be SMALL.~~

9.3.2.2.3.10 Transmission Corridors

RAI 219

Currently, no right of way capable of supporting the necessary 345 kV transmission lines exists. No current right-of-way exists for transmission expansion. The nearest 345 kV substation is near the NYS Thruway, approximately 20 mi (32 km) from the plant. The tie in with the existing 345 kV transmission corridor would require 20 mi (32 km) of new transmission lines and right-of-way. Because new right-of-ways would need to be constructed to accommodate the new transmission lines, it is anticipated that impacts from the development of new transmission corridors would be MODERATE.}

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9.3.3 SUMMARY AND CONCLUSIONS

The advantages of the {CCNPP} site over the alternative sites are summarized as follows:

- {The postulated consumptive use of water by a new unit at the CCNPP site would be no greater than water use at the alternative sites.
- The CCNPP site contains habitat suitable for three Federally-listed threatened species: the bald eagle and two tiger beetle species. Four bald eagle nests are present on the site, although all may not be active. One nest is in the construction footprint and would be impacted by the development. The suitable beach habitat for the tiger beetles is south of the barge dock and would not be impacted by the development. Therefore, impacts of development of a new unit at the proposed site on endangered species are not greater than impacts postulated for the alternative sites after the proposed mitigation measures are considered.
- The CCNPP site does not contain spawning grounds for any threatened or endangered species. Thus, the impacts on spawning areas are not greater than impacts at the alternative sites.
- The CCNPP site impact review does not postulate effluent discharge beyond the limits of existing National Pollutant Discharge Elimination System permits or regulations. Based on the information available for the alternative sites, the impacts from effluent discharge at the proposed site would be no greater than impacts at the alternative sites.
- The siting of the new unit at the CCNPP site would require the pre-emption of lands currently zoned farm and forest district, and light industrial for construction and operation. Therefore, land impacts at the proposed site would be greater than the impacts at the alternative sites.
- The potential impacts of a new nuclear facility on terrestrial and aquatic environments at the CCNPP site would be no greater than the impacts at the alternative sites.
- The CCNPP site is in a generally rural setting and has a population density that meets the population criteria of 10 CFR Part 100.

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- The CCNPP site does not require decommissioning or dismantlement of an existing facility~~, as would be required for the Crane Generating Station.~~

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Most transmission corridors would pass through land that is primarily agricultural and forest land and would result in some ecological impacts. The areas are mostly rural and remote with low population densities. The effect of these corridors on land usage is minimal; farmlands that have corridors passing through them generally continue to be used as farmland. Specific monitoring requirements for new transmission lines and corridors and associated switchyards would be designed to satisfy conditions of applicable federal, state, and local permits, to minimize adverse environmental impacts. Because new right-of-ways would need to be constructed to accommodate the new transmission lines, it is anticipated that construction impacts from the development of new transmission corridors would be MODERATE due to the commitment of land and construction impacts on ecological resources.

Operational activities within the transmission corridors might include visual inspection and appropriate maintenance of transmission line ROWs. Maintenance activities might include reclearing vegetation, tree trimming/removal, and encroachment licensing/removal. For maintenance purposes, wooded sections of the ROW would be recleared to the full width through mechanical clearing, hand cutting, or herbicide application. Overall operation transmission impacts are anticipated to be SMALL.

As summarized in Table 9.3-5 no alternative sites are environmentally preferable, and therefore cannot be considered obviously superior, to the CCNPP site. Development of a greenfield or brownfield site would offer no advantages and would increase both the cost of the new facility and the severity of impacts. Collocation of the new reactor unit at an existing site would allow existing infrastructure and transmission lines to be used.

Alternative nuclear sites offer no environmental advantages over the preferred site. Although the CCNPP site offers no distinct environmental advantages over the NMP site, the CCNPP site is more centrally located to serve the southwest portion of the PJM region. The existing facility currently operates under an NRC license, and the proposed location has already been found acceptable under the requirements for that license. Further, operational experience at the CCNPP site has shown that the environmental impacts are SMALL, and operation of a new unit at the site should have essentially the same environmental impacts.}

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9.3.4 REFERENCES

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Table 9.3-1—{Profile of Demographic Characteristics - Baltimore County, Maryland}

(Page 1 of 1)

Geographic Area	RACE						
	One Race						Two or More Races
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	
Baltimore County	534,409 69.6%	183,984 24.0%	918 0.1%	30,307 3.9%	415 0.1%	7,121 0.9%	10,443 1.4%
Maryland	3,356,489 61.5%	1,564,914 28.7%	16,711 0.3%	258,529 4.7%	2,554 0.0%	168,909 3.1%	93,212 1.7%
U.S.	215,333,394 74.4%	34,962,569 12.1%	2,357,544 0.8%	12,471,815 4.3%	397,030 0.1%	17,298,601 6.0%	5,557,184 1.9%

Table 9.3-2—{Profile of Demographic Characteristics – Calvert County, Maryland}
(Page 1 of 1)

Geographic Area	RACE						
	One Race						Two or More Races
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	
Calvert County	72,898 83.6%	11,328 13.0%	129 0.1%	1,092 1.3%	0 0.0%	1,077 1.2%	691 0.8%
Maryland	3,356,489 61.5%	1,564,914 28.7%	16,711 0.3%	258,529 4.7%	2,554 0.0%	168,909 3.1%	93,212 1.7%
U.S.	215,333,394 74.4%	34,962,569 12.1%	2,357,544 0.8%	12,471,815 4.3%	397,030 0.1%	17,298,601 6.0%	5,557,184 1.9%

Table 9.3-3—{Profile of Demographic Characteristics - Oswego County, New York}

(Page 1 of 1)

Geographic Area	RACE						
	One Race						Two or More Races
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	
Oswego County	115,102 97.1%	714 0.6%	46 0.0%	775 0.7%	0 0.0%	322 0.3%	1,601 1.4%
New York	12,508,643 67.1%	2,858,062 15.3%	67,460 0.4%	1,246,567 6.7%	6,123 0.0%	1,684,562 9.0%	283,858 1.5%
U.S.	215,333,394 74.4%	34,962,569 12.1%	2,357,544 0.8%	12,471,815 4.3%	397,030 0.1%	17,298,601 6.0%	5,557,184 1.9%

Table 9.3-4—{Profile of Demographic Characteristics – Wayne County, New York}
(Page 1 of 1)

Geographic Area	RACE						
	One Race						Two or More Races
	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	
Wayne County	85,795 93.3%	2,995 3.3%	212 0.2%	285 0.3%	0 0.0%	1,378 1.5%	1,289 1.4%
New York	12,508,643 67.1%	2,858,062 15.3%	67,460 0.4%	1,246,567 6.7%	6,123 0.0%	1,684,562 9.0%	283,858 1.5%
U.S.	215,333,394 74.4%	34,962,569 12.1%	2,357,544 0.8%	12,471,815 4.3%	397,030 0.1%	17,298,601 6.0%	5,557,184 1.9%

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Table 9.3-5—{Summary Comparison of Candidate ~~and Potential~~ Sites}
(Page 1 of 1)

RAI 201 Insert "Former Thiokol"

Location	CCNPP	NMP	Ginna	~~Greenfield~~	~~Crane~~ Brownfield
Land use	Small	Small	Small	~~Moderate to Large~~	Moderate
Air Quality	Small	Small	Small	~~Small~~	~~Beneficial~~ Small ~~to Moderate~~
Water	Small	Small	Small to Moderate	~~Small to Large~~	~~Moderate to Large~~
Terrestrial Ecology	Moderate	Moderate	Moderate	~~Moderate to Large~~	~~Small~~
Aquatic Ecology	Small	Small	Small to Moderate	~~Small to Large~~	~~Small~~ to Large
Socioeconomics	Small	Small	Small	~~Moderate to Large~~	Small ~~to Moderate~~
Historic, Cultural, and Archeological Resources	Small	Small	Small	~~Not Evaluated~~	Small
Environmental Justice	Small	Small	Small	~~Not Evaluated~~	Small
Transmission Corridors	Small	Small	Moderate	~~Not Evaluated~~	~~Small~~
Transportation	Small to Moderate	Small to Moderate	Small to Moderate	~~Not Evaluated~~	Small to Moderate
Is this Site a Candidate Site (Yes or No)	Yes	Yes	Yes	~~Yes~~	Yes
Is this Candidate Site a good Alternative Site to the Proposed Site	Yes	Yes	Yes	~~No~~	Yes
Is the Site Obviously Superior?	Preferred alternative	No	No	~~No~~	No
Is the Site Environmentally Preferable?	Preferred alternative	No	No	~~No~~	No

RAI 201 Insert "Small to"

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RAI 1011-3 INSERT TABLES 9.3-6 AND 9.3-7

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9.3-6

Table 9.3-6 Evaluation of Potential Sites
(Page 1 of 1)

Site	State	County	Water Source	Exclusionary Criterion: Available Land (420 Acres)	Discretionary Criteria: Distance to Cooling Water Supply	Flooding	Distance to Population Center	Regional Population Density	Ecology	Wetlands	Railroad Access	Distance to Transmission Access	Existing Transmission Corridor	Additional Land Acquisition	Expansion Potential	Ownership	Environmental	Raw Score	Average Score	Comments
Nine Mile Point Nuclear Power Station	NY	Oswego County	Lake Ontario	Yes	5	1	1	4	4	4	3	5	5	5	5	5	5	52	4.00	Candidate Site previously identified
Calvert Cliffs Nuclear Power Plant	MD	Calvert	Chesapeake Bay	Yes	5	1	1	5	3	4	1	5	5	5	5	5	5	50	3.85	Potential Site previously identified
Schoharie	NY	Schoharie County	East Branch Delaware River	Yes	3	1	4	5	5	3	1	5	5	3	5	1	5	46	3.54	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Kent	MD	Kent	Chesapeake Bay	Available land not confirmed	2	5	3	5	4	5	5	4	3	3	1	3	3	46	3.54	Site not carried forward as a candidate site because: 1) the uncertainty of available land of 420 acres and 2) the distance to the nearest cooling water supply.
Niagara	NY	Niagara	Lake Ontario	Yes	5	1	3	5	3	4	3	4	5	3	5	1	3	45	3.46	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
James A. FitzPatrick Nuclear Power Station	NY	Oswego	Lake Ontario	Yes	5	1	1	4	4	1	3	5	5	3	5	1	5	43	3.31	Site not considered for further evaluation as a Candidate Site because the site is owned and operated by a direct competitor to Constellation in the energy market. In addition, the Nine Mile Point Nuclear Power Station is adjacent to the James A. Fitzpatrick Nuclear Station and provides a candidate site in the same immediate vicinity.
Frederick	MD	Frederick	Potomac River	Yes	4	1	1	4	4	5	5	5	3	3	1	3	3	42	3.23	Site not carried forward as a Candidate Site because of potential hazards associated with an operating aluminum smelting facility located at the site.
R.E. Ginna Nuclear Power Plant	NY	Wayne	Lake Ontario	Yes	5	1	1	4	3	2	3	2	1	3	5	5	5	40	3.08	Candidate Site previously identified
St. Lawrence 1	NY	St. Lawrence	St. Lawrence River	Yes	5	1	2	5	2	4	1	5	1	3	5	1	5	40	3.08	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Former Thiokol Site	MD	St. Mary's	Paxtuxent River	Yes	4	1	2	5	4	5	1	3	1	5	3	3	3	40	3.08	Site carried forward as Candidate Site
Albany	NY	Albany	Mohawk River-Erie Canal	Yes	3	1	1	1	2	4	5	4	3	5	5	3	3	40	3.08	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Tompkins	NY	Tompkins	Cayuga Lake	Yes	5	5	2	5	3	5	3	1	1	3	3	1	3	40	3.08	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
St. Lawrence 2	NY	St. Lawrence	St. Lawrence River	Yes	5	1	1	5	2	5	1	4	1	3	5	3	3	39	3.00	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Charles	MD	Charles	Chesapeake Bay	Yes	5	1	2	5	1	2	5	4	1	3	3	1	3	36	2.77	
Dorchester	MD	Dorchester	Chesapeake Bay	Yes	3	1	3	5	1	1	1	5	5	3	3	1	3	35	2.69	
Hartford	MD	Harford	Susquehanna River	Yes	5	1	1	4	1	1	5	4	1	3	3	1	5	35	2.69	
St. Lawrence 3	NY	St. Lawrence	St. Lawrence River	Yes	2	3	2	5	2	2	1	3	1	3	5	3	3	35	2.69	

RAI 1011-3
INSERT TABLE
9.3-7

Table 9.3-7 Candidate Site Evaluation
(Page 1 of 1)

Functional Evaluation Element[1]	Calvert Cliffs Nuclear Power Plant Proposed Unit 3	Nine Mile Point Nuclear Power Plant Proposed Unit 3	R.E. Ginna Nuclear Power Plant Proposed Unit 2	Former Thiokol Site
Construction/Operational Requirements				
Land Area Composite	52	52	52	37
Transportation Composite	28	29	29	20
Construction Impact Mitigation Composite	29	31	31	22
Transmission Grid and Power Market Composite	36	28	18	15
Heat Sink (Water) Composite	23	23	23	11
Geology/Seismology Composite	28	32	32	26
Climate and Meteorology Composite	15	15	15	13
Socioeconomic				
Local Infrastructure/ Support and Workforce Composite	37	36	36	36
Health and Safety				
Operations/Transportation and Security/Emergency Planning Composite	22	22	22	16
Environmental (Federal, State, and Local Requirements and Permits)				
Special Areas/Resources and Permits Composite	34	35	36	26
Grand Total (Raw Composite/Weighted Average) Score	304/6.86	303/6.86	294/6.63	222/4.82

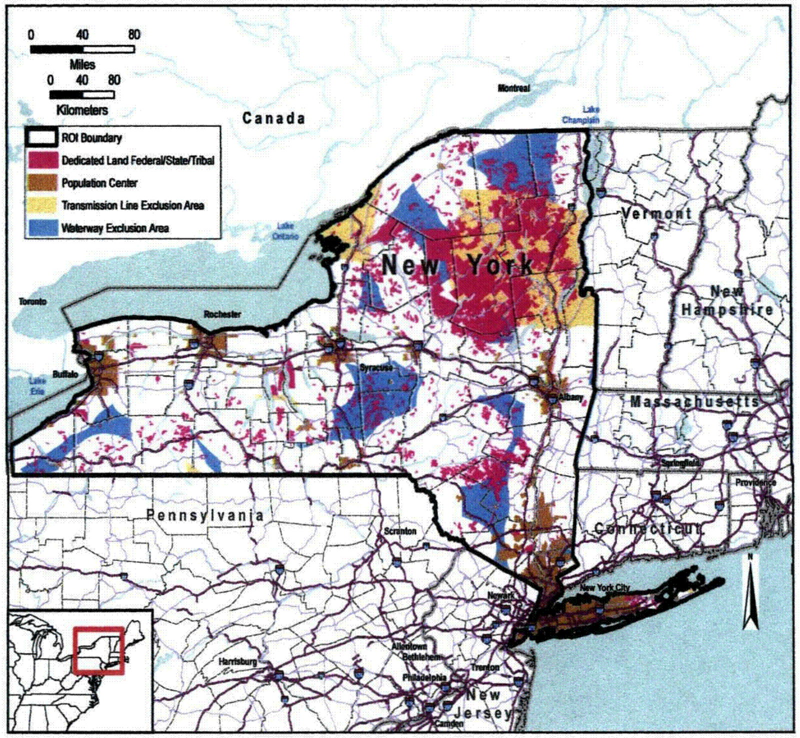
[1] Functional evaluation elements are composites of subcriteria.

Sources: International Code Council, 2006; American Society of Civil Engineers (ASCE), 2005; New York State Geologic Survey, 2008; EPRI, 2005; UniStar Nuclear Development, LLC, 2008; Maryland Geological Survey, 1981

RAI 198

—

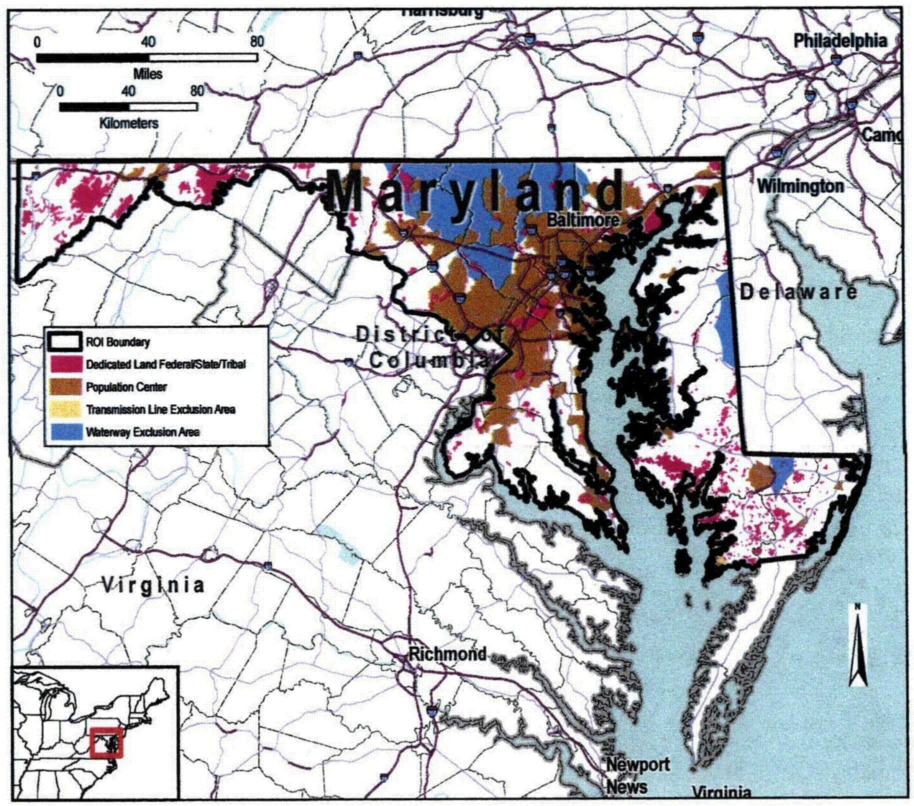
~~(New)~~ Figure 9.3-1~~:~~ Candidate Area Exclusionary Criteria and Region of Interest – New York



RAI 198

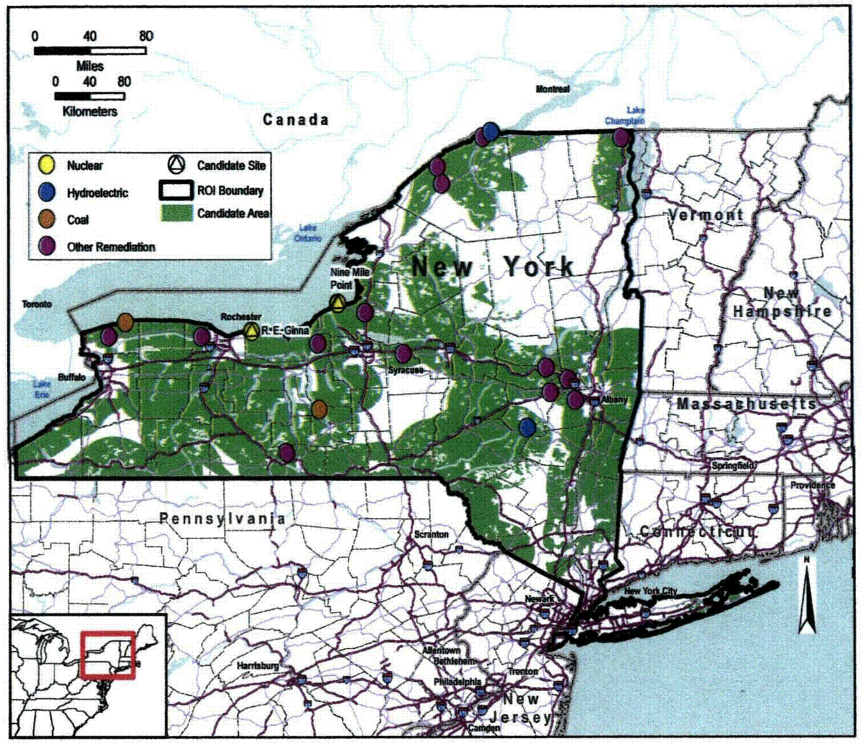
—

~~(New)~~ **Figure 9.3-2~~:~~ – Candidate Area Exclusionary Criteria and Region of Interest – Maryland**



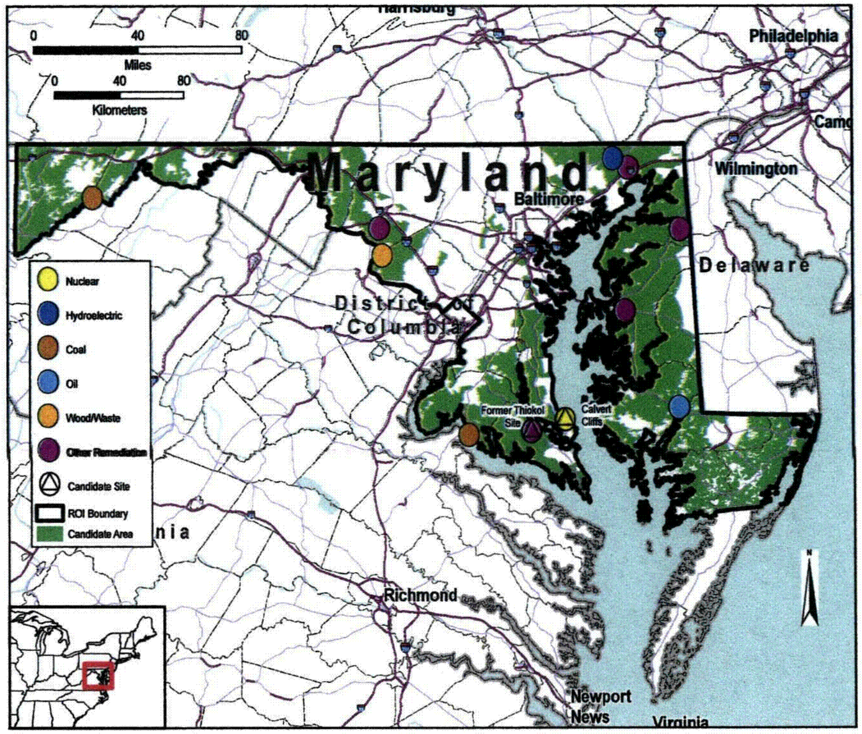
RAI 198

~~(New)~~ Figure 9.3-3~~:~~ – Potential and Candidate Sites – New York



RAI 198

~~(New)~~ Figure 9.3-4~~:~~ — Potential and Candidate Sites – Maryland



RAI Number: 1011-3

ESRP 9.3 - 3

The August 18, 2008 RAI responses 198 and 199 identify criteria used to screen for candidate areas, potential sites, and candidate sites. However, it does not provide the actual evaluation used including the ratings for the sites being screened. Provide the actual ratings by criteria for the site selection process used to screen for candidate areas and potential sites and used to select the candidate sites. Describe in detail the full process including the scores of the 13 potential sites evaluated in the screening to candidate sites.

UniStar Response:

The August 18, 2008 responses to RAIs 198 and 199 describe the process used to select a replacement site for a previously identified Crane site that was withdrawn as a candidate site in response to RAI 201 (August 18, 2008). At the time of the initial site selection, the Crane site was the brownfield site evaluated as a candidate site along with the existing Constellation nuclear sites. Subsequently, UniStar determined that the Crane site did not satisfy the candidate area exclusionary criterion related to distance from nearby population centers. As a result of the withdrawal of the Crane site, a subsequent site selection study was performed to identify a suitable replacement candidate site. The subsequent site selection evaluation was described in the responses to RAI 198 and RAI 199 and involved conducting a rigorous review of the candidate areas and potential sites within the ROI (Maryland and New York) with the objective of finding a replacement candidate site for further evaluation. This subsequent evaluation resulted in the selection of the Former Thiokol site as a replacement candidate site for the Crane site and also affirmed the selection of the Nine Mile Point and R.E. Ginna sites as candidate sites.

As stated in the response to RAI 198, the process used to identify candidate areas involved application of exclusionary criteria to the Region of Interest. There are no ratings by criteria that were used to screen for the candidate areas—areas either passed or failed the exclusionary criteria.

As stated in the response to RAI 198, more than 4,000 remediation sites, 14 hydroelectric sites, 21 natural gas sites, 25 other power-generating stations (for example, coal, wood, and oil), and 5 nuclear sites within the ROI were screened for identification as potential sites. This list of sites was obtained from various sources, including the U.S. Department of Energy (DOE), Energy Information Administration (EIA) for nuclear power plant sites and major electrical plants in New York (EIA, 2008a) and Maryland (EIA, 2008b); and New York State Department of Environmental Conservation (NYDEC), Environmental Remediation Databases (NYSDEC, 2008) and the Maryland Department of the Environment (MDE), Maryland Brownfield, Voluntary Cleanup Program and State Remediation Sites database (MDE, 2008) for brownfield sites.

This list of sites was screened to determine which sites were located within the identified candidate areas. The potential site evaluation criteria and process described in the response to RAI 198 were then applied. The exclusionary criterion for site size (420 total ac [170 ha]) was applied to the list of potential sites (i.e., those sites from the initial list of over 4000 sites that were located within the identified candidate areas) and those sites that met this criterion were considered for further evaluation and scoring using the potential site discretionary evaluation criteria provided in response to RAI 198 and listed below.

The potential site discretionary evaluation criteria include the following:

- Distance to cooling water supply: Based on the distance to the nearest cooling water supply.
- Flooding: Based on the presence or absence of floodplains near the site.
- Distance to population center: Distance to nearest population center (census tract with more than 300 people per square mile [116 people per square kilometers]).
- Regional population density: Population density within 10 mi (16.1 km) radius of site, based on data for census tracts.
- Ecology: Based on the number of federal and state, rare, threatened, and endangered species in the county (aquatic and terrestrial).
- Wetlands: Based on the presence or absence of wetlands near the site.
- Railroad access: Based on the distance to the nearest in-service rail line.
- Transmission access: Based on the distance to the nearest 500-kV line.
- Existing transmission corridor: Based on whether or not the site has existing transmission connections or whether additional land would potentially be impacted by new corridors.
- Additional land availability/land acquisition: Based on whether or not additional surrounding land (other than the minimum land needed for the EPR footprint) would need to be acquired and is expected to be available for sale for supporting the appurtenant structures, laydown and parking, etc. of the proposed facility. In addition, this criterion also takes into account the additional land needed to potentially meet the EAB requirements.
- Environmental remediation: Based on the site's potential need for environmental cleanup or remediation of hazardous materials.
- Expansion potential: Based on the availability of additional land surrounding the site to accommodate another nuclear power facility.
- Ownership criteria: Based on the site's ownership status.

Readily available reconnaissance-level information sources, which included publicly available data, information available from UniStar and Constellation files and personnel, and GoogleEarth™ images were used for scoring the criteria for each potential site. Each discretionary criterion was scored based on a point scale of suitability (from 1 to 5, with 5 representing the highest and most positive rating for each attribute/criterion and 1 representing the lowest and least positive rating for each attribute/criterion) using developed rating rational and evaluation metrics. GIS analysis was performed for the majority of the discretionary criteria, with the exception of ecology (threatened and endangered species), additional land acquisition, and environmental remediation.

The potential sites were ranked according to their raw scores and average scores. The raw score was based on the sum of all scores for the site, while the average score was based upon the sum of the scores divided by the number of discretionary criteria available. The final consensus scoring results are identified in Table 9.3-6.

The highest scoring potential sites included nuclear power generating stations, electric power generating stations (coal and hydroelectric), and brownfield sites. The replacement candidate site was selected from this list of potential sites by applying the following additional selection criteria:

- The previously selected Calvert Cliffs Nuclear Power Plant site was maintained as the proposed site and the previously selected candidate sites other than the Crane site were maintained as candidate sites (i.e., Nine Mile Point Nuclear Power Station and R. E. Ginna Nuclear Power Plant).

- Because the Maryland Public Service Commission (PSC) has identified the need to sustain a safe and reliable electric system in the state and reduce the state's reliance on imported electric power (MDPSC, 2006; see also Section 8.0 of the CCNPP3 Environmental Report Revision 3) and the withdrawn Crane site is in Maryland, potential sites in the state of Maryland were given preference over potential sites in the other candidate area (i.e., New York). This was also considered appropriate given that two of the previously selected candidate sites were already in New York.

A generic greenfield site was also evaluated as a potential site, although not ranked and rated in the Table 9.3-6. The environmental impacts from construction and operation of a nuclear power plant at a greenfield site are greater than the impacts at other potential sites. Therefore, the use of a greenfield site was not carried forward as a candidate site for further evaluation.

As shown in the Table 9.3-6, the highest scoring potential sites in the State of Maryland included the Kent, Frederick, and Former Thiokol sites. The Kent site was not carried forward as a candidate site because of uncertainties pertaining to available land area at the time of the evaluation (i.e., the exclusionary criterion for potential sites) and because the distance to the nearest cooling water supply, a key discretionary criterion because of potential impacts to wetlands and terrestrial and aquatic ecology from construction of pipelines between the proposed site and cooling water supply and the significant cost associated with construction of large distances of pipelines, is between 10 and 20 mi (16.1 and 32.2 km). The Frederick site was not carried forward as a candidate site because of potential hazards of locating a nuclear power plant adjacent to an operating aluminum smelting facility located at the site. The Former Thiokol Site, a brownfield site in Maryland, was selected as a candidate site to replace the Crane site. No additional potential sites were selected as candidate sites because, in accordance with NUREG-1555, ESRP, Section 9.3, three to five alternative sites in addition to the proposed site are considered as an adequate number of candidate sites (NRC, 2007).

The potential sites that were chosen for further evaluation as candidate sites include:

- Calvert Cliffs Nuclear Power Plant Unit 3
- Nine Mile Point Nuclear Power Plant Unit 3
- R.E. Ginna Nuclear Power Plant Unit 2
- Former Thiokol Site (brownfield site)

After the candidate sites were identified, the next step in the siting process was a screening and evaluation of the candidate sites that involved a two-part sequential test to determine whether an alternative site is environmentally preferable, and thus obviously superior, to the proposed site. For this site selection process, the alternative sites are those candidate sites that remain after the proposed site is selected (that is, candidate sites – proposed site = alternative sites). This identification corresponds to the guidance provided in ESRP 9.3 (NRC, 2007).

The first stage of the test determines whether there are environmentally preferred sites among the alternative sites. During this first stage, the standard is one of "reasonableness," considering whether the applicant has performed the following:

- Identified reasonable alternative sites
- Evaluated the likely environmental impacts of construction and operation at these sites
- Used a logical means of comparing sites that led to the applicant's selection of the proposed site

The evaluation factors used in comparing the proposed site to the alternative sites to determine if there are environmentally preferred sites among the alternative sites are consistent to those presented in ESRP 9.3 (NRC, 2007) and include the following.

- Environmental
- Aesthetics
- Demography
- Ecology
- Geology, hydrology
- Socioeconomics
- Archaeological and historic preservation
- Environmental justice
- Transportation access
- Land use
- Water use
- Workforce availability, accessibility, and housing
- Access roads and railways
- Cooling system
- Intakes and discharges
- Transmission System

These evaluation factors were combined into functional evaluation elements groups. Readily available reconnaissance-level information sources, which included publicly available data, information available from UniStar and Constellation files and personnel, and GoogleEarth™ images, were used to evaluate, score, and rank the candidate sites. Additional information and clarification of map and literature data were supplemented with site visit data as needed.

Each criterion was assigned a weight relative to the other criteria. The criteria were weighted based on a 100 point scale using a logical and systematic process. Each criterion was scored based on a 10-point scale of suitability. A score of 10 corresponded to a location with no negative characteristics with respect to the criteria of interest. A mid-range score of 5 represented a neutral score and the point where no clear delineation existed between the sites. A score of 1 corresponded to a location with significant issues/challenges and/or significant costs/impacts with respect to the criteria of interest. Scores with amplifying remarks reflecting the overall suitability of each site were assigned based on the information collected.

Table 9.3-7 provides a summary of the functional evaluation elements and raw composite scores for each element for each candidate site. As shown in Table 9.3-7, none of the alternative sites were determined to be environmental preferable to the CCNPP proposed site. Therefore, the second step, i.e., to determine whether the environmentally preferable alternative site was obviously superior to the proposed site, was not required.

COLA Impact:

The above response will be incorporated into the revised ER Sections 9.3.1.1 and 9.3.1.2 provided in the responses to RAI 198 and RAI 199 (August 18, 2008).

The following references will be added to ER Section 9.3.4 (in addition to those added in the responses to RAI 198 and RAI 199).

American Society of Civil Engineers (ASCE), 2005. "Minimum Design Loads for Buildings and Other Structures," Publication 7-05.

Electric Power Research Institute (EPRI), 2005. "Program on Technology Innovation: Assessment of Performance-Based Approach for Determining Seismic Ground Motions for New Plant Sites," Volume 2: Seismic Hazard Results at 29 Sites.

International Code Council, 2006. "International Building Code."

Maryland Geological Survey, 1981. "A Brief Description of the Geology of Maryland," Pamphlet prepared by Jonathan Edwards, Jr., Website: http://www.mgs.md.gov/esic/brochures/mdgeology.html, accessed June 25, 2008.

Maryland Public Services Commission (MDPSC), 2006. "Ten-Year Plan (2006-2015) of Electric Companies in Maryland," Maryland Public Service Commission, Prepared for the Maryland Department of Natural Resources, December 2006, Website: http://www.psc.state.md.us/psc/Reports/2006-10YrPlan.pdf, accessed April 11, 2007.

New York State Geologic Survey, 2008. "Overview of New York Geology," Educational Leaflet 33, Website: http://gretchen.geo.rpi.edu/roecker/nys/nys_edu.pamphlet.html, accessed June 25, 2008.

UniStar Nuclear Development, LLC, 2008. "Calvert Cliffs Unit 3 COLA Final Safety Analysis Report," Rev. 2. March 14, 2008.

U.S. Nuclear Regulatory Commission (NRC), 2007. NUREG-1555, "Environmental Standard Review Plan, Section 9.3: Site Selection Process," Revision 1. July 2007.

Table 9.3-6 Evaluation of Potential Sites
(Page 1 of 1)

Site	State	County	Water Source	Exclusionary Criterion: Available Land (420 Acres)	Discretionary Criteria: Distance to Cooling Water Supply	Flooding	Distance to Population Center	Regional Population Density	Ecology	Wetlands	Railroad Access	Distance to Transmission Access	Existing Transmission Corridor	Additional Land Acquisition	Expansion Potential	Ownership	Environmental	Raw Score	Average Score	Comments
Nine Mile Point Nuclear Power Station	NY	Oswego County	Lake Ontario	Yes	5	1	1	4	4	4	3	5	5	5	5	5	5	52	4.00	Candidate Site previously identified
Calvert Cliffs Nuclear Power Plant	MD	Calvert	Chesapeake Bay	Yes	5	1	1	5	3	4	1	5	5	5	5	5	5	50	3.85	Potential Site previously identified
Schoharie	NY	Schoharie County	East Branch Delaware River	Yes	3	1	4	5	5	3	1	5	5	3	5	1	5	46	3.54	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Kent	MD	Kent	Chesapeake Bay	Available land not confirmed	2	5	3	5	4	5	5	4	3	3	1	3	3	46	3.54	Site not carried forward as a candidate site because: 1) the uncertainty of available land of 420 acres and 2) the distance to the nearest cooling water supply.
Niagara	NY	Niagara	Lake Ontario	Yes	5	1	3	5	3	4	3	4	5	3	5	1	3	45	3.46	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
James A. FitzPatrick Nuclear Power Station	NY	Oswego	Lake Ontario	Yes	5	1	1	4	4	1	3	5	5	3	5	1	5	43	3.31	Site not considered for further evaluation as a Candidate Site because the site is owned and operated by a direct competitor to Constellation in the energy market. In addition, the Nine Mile Point Nuclear Power Station is adjacent to the James A. Fitzpatrick Nuclear Station and provides a candidate site in the same immediate vicinity.
Frederick	MD	Frederick	Potomac River	Yes	4	1	1	4	4	5	5	5	3	3	1	3	3	42	3.23	Site not carried forward as a Candidate Site because of potential hazards associated with an operating aluminum smelting facility located at the site.
R.E. Ginna Nuclear Power Plant	NY	Wayne	Lake Ontario	Yes	5	1	1	4	3	2	3	2	1	3	5	5	5	40	3.08	Candidate Site previously identified
St. Lawrence 1	NY	St. Lawrence	St. Lawrence River	Yes	5	1	2	5	2	4	1	5	1	3	5	1	5	40	3.08	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Former Thiokol Site	MD	St. Mary's	Paxtuxent River	Yes	4	1	2	5	4	5	1	3	1	5	3	3	3	40	3.08	Site carried forward as Candidate Site
Albany	NY	Albany	Mohawk River - Erie Canal	Yes	3	1	1	1	2	4	5	4	3	5	5	3	3	40	3.08	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Tompkins	NY	Tompkins	Cayuga Lake	Yes	5	5	2	5	3	5	3	1	1	3	3	1	3	40	3.08	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
St. Lawrence 2	NY	St. Lawrence	St. Lawrence River	Yes	5	1	1	5	2	5	1	4	1	3	5	3	3	39	3.00	Site not carried forward as a Candidate Site based on MD preferential selection criterion.
Charles	MD	Charles	Chesapeake Bay	Yes	5	1	2	5	1	2	5	4	1	3	3	1	3	36	2.77	
Dorchester	MD	Dorchester	Chesapeake Bay	Yes	3	1	3	5	1	1	1	5	5	3	3	1	3	35	2.69	
Hartford	MD	Harford	Susquehanna River	Yes	5	1	1	4	1	1	5	4	1	3	3	1	5	35	2.69	
St. Lawrence 3	NY	St. Lawrence	St. Lawrence River	Yes	2	3	2	5	2	2	1	3	1	3	5	3	3	35	2.69	

Table 9.3-7 Candidate Site Evaluation
(Page 1 of 1)

Functional Evaluation Element[1]	Calvert Cliffs Nuclear Power Plant Proposed Unit 3	Nine Mile Point Nuclear Power Plant Proposed Unit 3	R.E. Ginna Nuclear Power Plant Proposed Unit 2	Former Thiokol Site
Construction/Operational Requirements				
Land Area Composite	52	52	52	37
Transportation Composite	28	29	29	20
Construction Impact Mitigation Composite	29	31	31	22
Transmission Grid and Power Market Composite	36	28	18	15
Heat Sink (Water) Composite	23	23	23	11
Geology/Seismology Composite	28	32	32	26
Climate and Meteorology Composite	15	15	15	13
Socioeconomic				
Local Infrastructure/ Support and Workforce Composite	37	36	36	36
Health and Safety				
Operations/Transportation and Security/Emergency Planning Composite	22	22	22	16
Environmental (Federal, State, and Local Requirements and Permits)				
Special Areas/Resources and Permits Composite	34	35	36	26
Grand Total (Raw Composite/Weighted Average) Score	304/6.86	303/6.86	294/6.63	222/4.82

[1] Functional evaluation elements are composites of subcriteria.

Sources: International Code Council, 2006; American Society of Civil Engineers (ASCE), 2005; New York State Geologic Survey, 2008; EPRI, 2005; UniStar Nuclear Development, LLC, 2008; Maryland Geological Survey, 1981

COLA Impact:

No changes to the COLA are required.

RAI Number: 1011-4

<u>ESRP 9.3 - 4</u>

The proposed site may be determined from a list of candidate sites (screening process) or, as a special case, which includes selection of one at an existing nuclear power plant site. Was the Calvert Cliffs site selected based on the screening process or the ESRP 9.3 exception process for existing nuclear plant sites? Provide the analysis details that resulted in its selection.

UniStar Response:

The Calvert Cliffs site was selected based on the exception process. This is indicated in the introductory discussion in the Environmental Report Section 9.3, which states that the information provided in this section is consistent with the special case noted in NUREG-1555, Section 9.3(III)(8) (NRC, 1999).

The Calvert Cliffs and Nine Mile Point sites were included among a number of potential sites considered as part of a proprietary NuStart Energy site selection study for siting new reactor plants in 2005. The objective of the study was to identify two sites for preparation of combined operating license (COL) applications. The set of sites considered by the NuStart Site Selection Committee included sites volunteered for consideration by NuStart member companies (which included Constellation Energy), plus the Idaho National Laboratory (INL) and Savannah River Site (SRS) sites owned by DOE. The potential sites were evaluated by the NuStart committee by applying criteria adopted from the EPRI Siting Guide (existing site criteria). The criteria applied to this screening evaluation included:

- Seismic Evaluation
- Water Availability
- Demographic Changes
- Permitting / Licensing Status
- Emergency Planning
- Plans for Existing Units
- Exclusion Area
- Spent Fuel Storage
- Transmission Access
- Public Acceptance
- Power Pricing

Each site was assigned a rating of 1 to 5 (least suitable to most suitable) for each criterion based on existing data from publicly available sources and from plant licensing and operations data. The criteria were weighted using methodology consistent with methods specified in the EPRI guide. Additional review criteria were applied to the top 6 ranked sites as part of detailed site suitability evaluations. These additional review criteria were developed as a project-specific application of criteria specified in Chapter 3 of the EPRI Siting Guide. Weight factors for the criteria were developed to reflect the review committee's collective view of the relative importance of the criteria. The detailed criteria evaluations were conducted in criterion groups. The criterion groups were:

- Health & Safety

- Environmental
- Socioeconomics
- Engineering/Infrastructure
- Transmission
- Market
- Incentive & Owner

The ratings from the criteria were subjected to a review and vetting process and a composite rating for each site was determined.

The results of the NuStart siting review included two Constellation Energy owned sites (Calvert Cliffs and Nine Mile Point) in the top 5 sites, with the Calvert Cliffs site ranked ahead of the Nine Mile Point site.

Constellation Energy selected the Calvert Cliffs site as a proposed site for siting a new nuclear reactor plant as part of the UniStar Nuclear business plan. The alternate site evaluation described in the Environmental Report Section 9.3 identifies and describes the evaluation of a set of alternative locations for the proposed site and compares the suitability of these alternative sites with the suitability of the proposed site. The objective of that assessment was to verify that no site was "environmentally preferable" (and thus, no site is "obviously superior") for the siting of a new nuclear plant.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the response to RAI 1011-2.

RAI Number: 1011-5

ESRP 9.3 - 5

What was the screening process described in the responses to June 12, 2 008 RAIs 198 and 199, used to selec t NMP and Ginna as candidate sites?

UniStar Response:

As stated in the Environmental Report Section 9.3.1.1, Maryland and New York were selected as candidate areas based on a need for power in the region and the availability of existing nuclear and non-nuclear sites to which Constellation had access. The Calvert Cliffs site was selected as the proposed site using the "special case" described in NUREG-1555, Section 9.3(III) (8) (see response to RAI 1011-4, Alternate Sites 9.3-4). Consistent with Section 9.3.1.1 (as clarified in the response to RAI 1011-3 (Alternate Sites 9.3-3), locations already owned by Constellation within the (ROI) were the focus for candidate areas in the initial alternative site evaluation. The two additional existing nuclear sites already owned by Constellation (Nine Mile Point and Ginna), along with a brownfield and generic greenfield site, were ultimately evaluated as alternative sites to the proposed Calvert Cliffs site as a result of this initial evaluation.

At the time of the initial evaluation, the Crane site was the brownfield site evaluated as a candidate site along with the existing Constellation nuclear sites. Subsequently, UniStar determined that the Crane site did not satisfy the exclusionary criterion related to distance from nearby population centers. The Crane site was withdrawn from consideration as a candidate site as noted in the response to RAI 201 (August 18, 2008). As a result of the withdrawal of the Crane site, a subsequent site selection evaluation was performed to identify a suitable replacement candidate site. The subsequent site selection evaluation was described in the responses to RAI 198 and RAI 199 (August 18, 2008) and clarified in the response to RAI 1011-3 (Alternate Sites 9.3-3). This subsequent evaluation included conducting a rigorous review of the candidate areas and potential sites within the ROI (Maryland and New York) with the objective of finding a replacement candidate site for further evaluation. This subsequent evaluation resulted in the selection of the Former Thiokol site as a replacement candidate site for the Crane site and also affirmed the selection of the Nine Mile Point and Ginna sites as candidate sites.

See also the response to RAI 1011-3 (Alternate Sites 9.3-3).

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the response to RAI 1011-2 and the responses to RAI 198 and RAI 199 (August 18, 2008).

RAI Number: 1011-6

ESRP 9.3 - 6

Describe any difference in the alternative site selection processes that led UniS tar to add the former Thiokol site as an alternative site.

UniStar Response:

The Former Thiokol site was identified as an alternative site using the site selection process described in the August 18, 2008 responses to RAIs 198 and 199, and further clarified in the responses to RAI 1011-3 (Alternate Sites 9.3-3) and RAI 1011-5 (Alternate Sites 9.3-5).

COLA Impact:

No changes to the COLA are required.

RAI Number: 1011-7

ESRP 9.3 - 7

Provide a copy of the restrictive covenant that limits use of the Thiokol site

UniStar Response:

The restrictive covenant that limits use of the Thiokol site is the Declaration of Covenants by Cordant Technologies Inc. dated January 7, 1999, recorded in the St. Mary's County Circuit Court Land Records on January 8, 1999. A copy of the Declaration of Covenants is provided as Attachment 1.

COLA Impact:

No changes to the COLA are required.

ATTACHMENT 1
DECLARATION OF COVENANTS BY CORDANT TECHNOLOGIES INC.
JANUARY 7, 1999

LIBER 1371 FOLIO 338

DECLARATON OF COVENANTS

THIS DECLARATION OF COVENANTS made this 7th day of January, 1999, by Cordant Technologies Inc., a Delaware corporation, formerly known as Thiokol Chemical Corporation, (the "Declarant").

WHEREAS, Declarant is the successor in interest of the record owner of all that land located in the Sixth(6th) Election District of St. Mary's County, Maryland, containing 792.836 +/- acres of land, more or less, and acquired by Declarant by Deed from the Emilie Corporation, dated March 12, 1958, and recorded at Liber 73, Folio 419, among the Land Records of St. Mary's County, Maryland (the "Property"); and

IMP FD SURE $ 2.00
RECORDING FEE 20.00

WHEREAS, Declarant desires to subject certain portions of the Property to the covenants hereinafter set forth in order to insure that the Property will be improved and/or developed in an appropriate manner; and

TOTAL 22.00
Rest SM02 Rcpt # 24564

WHEREAS, those certain portions of the Property which shall be subject to the covenants hereinafter set forth are shown on Exhibit "A" attached hereto as Special Reserve Area #1, consisting of approximately 35.056+/- acres, and Special Reserve Area #2, consisting of approximately 32.293+/- acres, and as further described in Exhibit "B" attached hereto (the "Special Reserve Areas").

EWA TLC Blk # 151
Jan 08, 1999 03:47 PM

NOW, THEREFORE, Declarant hereby declares that the Special Reserve Areas shall be held, sold, conveyed, encumbered, leased, rented, used, occupied and improved subject to the following covenants, which are for the purposes of enhancing the desirability of the development and/or improvement of the Property and/or the Special Reserve Areas, declared and agreed to be in aid of a plan for improvement of the Property and/or the Special Reserve Areas, and which shall run with and bind the Special Reserve Areas and be binding on all parties having or acquiring any right, title or interest in the Special Reserve Areas or any portion thereof, their heirs, successors and assigns, and shall inure to the benefit of and be enforceable by the Declarant, its successors and assigns and any person or entity hereafter acquiring or owning any interest in the Special Reserve Areas or any portion thereof.

1. Declarant hereby declares that the Special Reserve Areas shall not be developed or used for any residential purpose and/or use, including but not limited to any form of single-family detached and/or single-family attached and/or multi-family dwelling unit(s) and any other type of residential dwelling unit(s) and/or use.

2. Declarant further declares that the Special Reserve Areas shall not be developed or used for any type of educational and/or day care facility, including but not limited to any form of public or private pre-school, nursery, elementary, secondary, trade and/or vocational school and/or any college and/or any university or any other type of education facility or use and/or day care facility or use.

SMA

3. Except as specifically set forth herein, this Declaration shall not be construed to otherwise restrict the lawful use or development of the Special Reserve Areas, including but not limited to not restricting the development or construction of roads, utilities and/or other infrastructure, or the dedication of development easements, or to restrict the lawful use of the remainder of the Property that is not included or contained within the Special Reserve Areas in any manner whatsoever.

4. Nothing in this Declaration shall be construed to prevent the applicable residential density(ies) otherwise permitted under the applicable zoning of the Special Reserve Areas to be transferred to, and/or utilized on, the remainder of the Property that is not included or contained within the Special Reserve Areas if otherwise permitted by any applicable zoning or other land use ordinances, regulations or laws.

5. The covenants contained in this Declaration shall be perpetual and shall run with and bind the Special Reserve Areas or any portion thereof and any owner(s) of all or any portion thereof, and their respective heirs, successors and assigns, forever. Each grantee accepting a deed, lease or other instrument conveying any interest in any portion of the Special Reserve Areas, whether or not the same incorporates or refers to this Declaration, shall be bound by the terms of this Declaration and shall incorporate this Declaration by reference in any deed, lease or other conveyance of any of his/her/its interest in all or any portion of the Special Reserve Areas.

6. Invalidation of any one of these conditions or restrictions by judgment or otherwise shall in no way affect any of the other provisions which shall remain in full force and effect.

7. If any of the covenants, conditions, restrictions, or other provisions of this Declaration shall be unlawfully void or voidable for violation of the rule against perpetuities, then such provisions shall continue only until twenty-one (21) years after the death of the last survivor of the now living descendants of Elizabeth II, Queen of England.

IN TESTIMONY whereof, Declarant has, on the day and year above set forth, caused these presents to be executed under seal to acknowledge and deliver these presents as its act and deed.

WITNESS/ATTEST:

DECLARANT:

CORDANT TECHNOLOGIES INC.
a Delaware corporation
formerly known as Thiokol Chemical Corporation

By: J E McNulty

Name: James E. McNulty

Title: Executive Vice President
Human Resources & Administration

Cordant Technologies Inc. CORPORATE SEAL 1926 DELAWARE

[JURAT FOLLOWS]

STATE OF Utah, **COUNTY OF** Salt Lake, to wit:

I HEREBY CERTIFY that on this 7th day of January, 1999 before me, the undersigned notary public, personally appeared James E. McNulty who acknowledged himself to be the Exec. V.P. of Cordant Technologies Inc., and that he has as such Exec. V.P., being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as such Exec. V.P.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Jeri A. Krueger
Notary Public

My commission expires: 6-20-2000

JERI A. KRUEGER
NOTARY PUBLIC • STATE of UTAH
215 W 1050 N
LAYTON UT 84041
COMM. EXP. 6-20-2000

121760

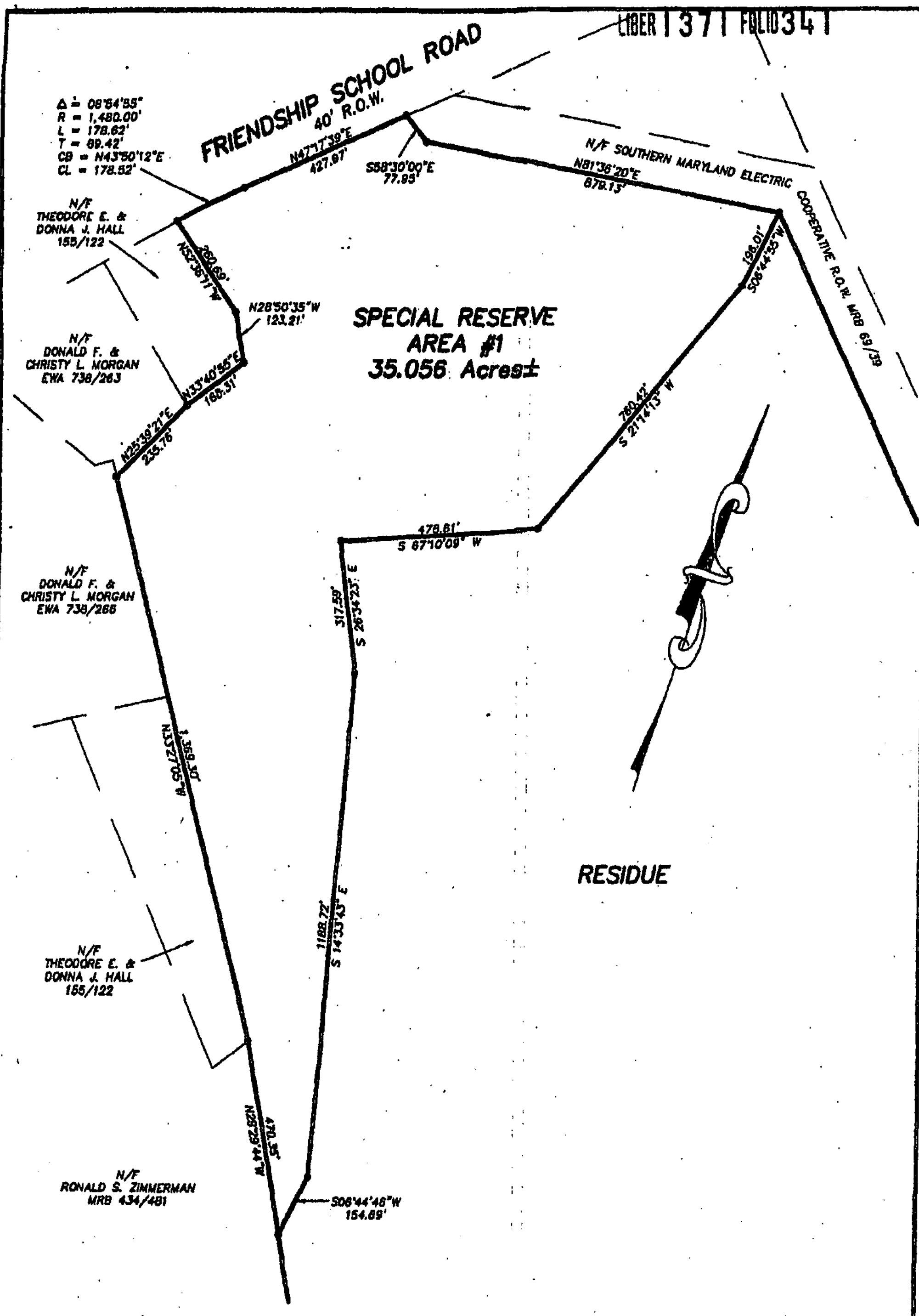


EXHIBIT "A" - Page 1 of 2

SIXTH ELECTION DISTRICT — ST. MARY'S COUNTY, MARYLAND

SCALE: 1" = 300'	DATE: JANUARY 1999	DRAWN BY: EWBJr
PREPARED FOR: CORDANT TECHNOLOGIES		PROJECT NUMBER: 98-NGO-2297

N·G&O ENGINEERING, INC.

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CONSTRUCTION MANAGEMENT • ENVIRONMENTAL

P.O. BOX 643 • LEONARDTOWN, MARYLAND 20650
301-475-8700 • FAX 301-475-8703

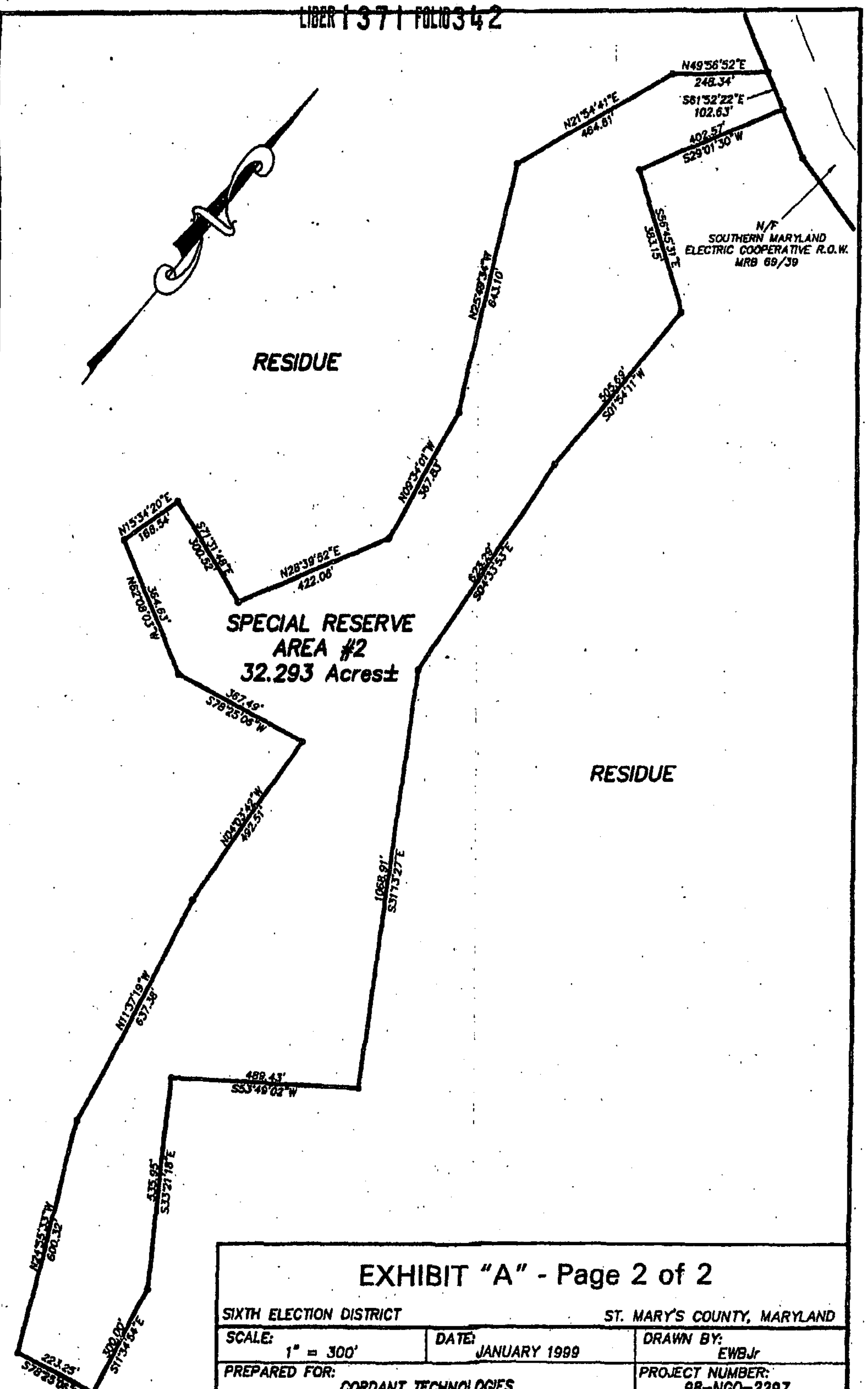

EXHIBIT "A" - Page 2 of 2

SIXTH ELECTION DISTRICT — ST. MARY'S COUNTY, MARYLAND

SCALE: 1" = 300'	DATE: JANUARY 1999	DRAWN BY: EWBJr
PREPARED FOR: CORDANT TECHNOLOGIES		PROJECT NUMBER: 98-NGO-2297

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301-475-8700 • FAX 301-475-8705

2297RP02

Exhibit "B"
Page 1 of 4
Special Reserve Area #1

01/04/99
Revised

Deed Description for 35.056 Acres of Land, more or less
Sixth Election District, St. Mary's County, Maryland

Beginning at a point on southeasterly right-of-way line of Friendship School Road, a 40' right-of-way, said point being the northwesterly corner of this tract of land herein described, thence, running with the right-of-way of Friendship School Road, along a curve to the right,

1) 1,480.00' radius, 178.62' arc length, 89.42' tangent, N 43-50-12 E chord bearing and 178.52' chord length to a point, thence,

2) N 47-17-39 E 427.97 feet to a point on the southerly side of that parcel of land now or formerly owned by Southern Maryland Electric Cooperative as recorded in Liber MRB 69 Folio 39 among the land records of St. Mary's County, Maryland, thence, running with the lands of Southern Maryland Electric Cooperative,

3) S 58-30-00 E 77.95 feet to a point, thence,

4) N 81-36-20 E 879.13 feet to a point, thence, leaving the lands of Southern Maryland Electric Cooperative and running through the lands of the Grantors herein,

5) S 06-44-55 W 196.01 feet to a point, thence,

6) S 21-14-13 W 760.42 feet to a point, thence,

7) S 67-10-09 W 478.61 feet to a point, thence,

8) S 26-34-23 E 317.59 feet to a point, thence,

9) S 14-33-43 E 1,188.72 feet to a point, thence,

10) S 06-44-46 W 154.69 feet to a point, thence,

11) N 29-29-44 W 470.35 feet to a point, thence,

12) N 33-27-05 W 1,369.30 feet to a point, thence,

13) N 25-39-21 E 235.76 feet to a point, thence,

14) N 33-40-55 E 168.31 feet to a point, thence,

15) N 28-50-35 W 123.21 feet to a point, thence,

Exhibit "B"
Page 2 of 4
Special Reserve Area #1

16) N 52-36-11 W 260.69 feet to the point of beginning. Containing 35.056 Acres of land, more or less.

Subject to any and all rights-of-way and/or easements of record.

Exhibit "B"
Page 3 of 4
Special Reserve Area #2

01/04/99

Deed Description for 32.293 Acres of Land, more or less
Sixth Election District, St. Mary's County, Maryland

Beginning at a point on the southerly side of that tract of land now or formerly owned by Southern Maryland Electric Cooperative, as recorded in Liber MRB 69 Folio 39, among the land records of St. Mary's County, Maryland, said point also being the northeasterly corner of the tract of land herein described, thence, running with the lands of Southern Maryland Electric Cooperative,

1) S 61-52-22 E 102.63 feet to a point, thence, leaving the lands of Southern Maryland Electric Cooperative and running through the lands of the Grantors herein, the following courses and distances:

2) S 29-01-30 W 402.57 feet to a point, thence,

3) S 56-45-31 E 383.15 feet to a point, thence,

4) S 01-54-11 W 505.69 feet to a point, thence,

5) S 04-33-53 E 623.29 feet to a point, thence,

6) S 31-13-27 E 1,068.91 feet to a point, thence,

7) S 53-49-02 W 489.43 feet to a point, thence,

8) S 33-21-18 E 535.95 feet to a point, thence,

9) S 11-34-54 E 300.00 feet to a point, thence,

10) S 78-25-06 W 223.25 feet to a point, thence,

11) N 24-55-33 W 600.32 feet to a point, thence,

12) N 11-37-19 W 637.38 feet to a point, thence,

13) N 04-03-42 W 492.51 feet to a point, thence,

14) S 78-25-06 W 367.49 feet to a point, thence,

15) N 62-08-03 W 364.63 feet to a point, thence,

16) N 15-34-20 E 168.54 feet to a point, thence,

Exhibit "B"

Special Reserve Area #2

17) S 71-31-48 E 300.52 feet to a point, thence,

18) N 28-39-52 E 422.06 feet to a point, thence,

19) N 09-34-01 W 367.83 feet to a point, thence,

20) N 25-49-34 W 643.10 feet to a point, thence,

21) N 21-54-41 E 464.61 feet to a point, thence,

22) N 49-56-52 E 248.34 feet to the point of beginning. Containing 32.293 Acres of land, more or less.

Subject to any and all rights-of-way and/or easements of record.

RAI Number: 1011-8

ESRP 9.3 - 9

Explain how the potential presence of unexploded ordnance was included in the site rating for the Thiokol site.

UniStar Response:

As identified in Section 9.3 of the ER, each of the potential sites was screened, evaluated and scored using fourteen criteria and their associated metric and scoring scale of suitability.

Environmental remediation was one such criterion that was used in the evaluation of the potential sites. The environmental remediation metric used to evaluate each of the potential sites was based on each site's anticipated need for environmental remediation or cleanup of hazardous materials, including chemical, radiological, and unexploded ordnance (UXO), due to known historic or current land uses. Each potential site was scored and ranked using a 5-point scoring scale of suitability. A score of 5 corresponded to a site that was anticipated to not require environmental remediation, such as an existing nuclear facility or a greenfield site. A score of 3 corresponded to a site where it was unknown or unclear whether the site might require environmental remediation, such as a brownfield site with limited available information regarding former hazardous materials manufacture/use or an oil/coal-fired power generating facility. A score of 1 corresponded to a site that was known or expected to require environmental remediation, such as a landfill or a brownfield site with known environmental remediation requirements.

Based on the available historical information for the Former Thiokol Site regarding the former presence of UXO and because of the multiple remediation activities and surveys that had been completed at the site, the site was conservatively assigned a score of 3 for the environmental remediation criterion. The site was assigned a score of 3 even though a score of 5 could have been justified based on the remediation and surveys that had been conducted at the site in the past.

COLA Impact:

No changes to the COLA are required.

RAI Number: 1011-9

ESRP 9.3 - 10

Describe the actions previously taken to locate and remove the unexploded ordnance from the Thiokol site.

UniStar Response:

Surveys and remediation activities conducted at the former Thiokol site between 1992 and 2000 to locate and subsequently remove unexploded ordnance (UXO) are summarized as follows.

In the early 1990s, the history of the property was researched through reviews of historical files, maps, drawings, and aerial photographs, and interviews with former employees of the munitions manufacturing companies that formerly operated at the site in the 1950s. A title search and property survey were also completed in order to construct a map of the site showing former building locations, which were located primarily in the northwest portion of the property, and suspect UXO burial sites. As part of the same project in the early 1990s, all surface debris and UXO were surveyed by experienced Explosive Ordnance Disposal (EOD) personnel. All domestic trash and non-hazardous debris were surveyed and transported offsite for disposal. The entire property was then surveyed using geophysical methods to locate any buried debris, with the survey readings more concentrated in suspect areas, such as former building locations, suspect onsite burial sites, or other disturbed areas. More intensive surveys and investigations were conducted at approximately 96 locations, including locations identified through the geophysical surveys, historical records search, and former building sites. (G&E Engineering, Inc., 1995) Of the 96 locations investigated, 25 locations were determined to contain UXO (Apex Environmental, Inc., 2000). The remaining area of the property was determined to be free of UXO based on the geophysical survey results, historical records search, and absence of any indication of industrial, disposal, or treatment activities. Approximately 1,360 pounds of reactive components were collected, stored, and detonated onsite in accordance with a permit received for the open detonation. Four-hundred fifty-six tons of soil from the open detonation area exhibiting lead concentrations above background levels were removed and properly disposed. Areas affected by the investigation and detonation activities were restored (G&E Engineering, Inc., 1995)

Additional UXO investigation and clearance were completed in 1999 and 2000 in response to MDE concerns regarding the potential for the continued presence of UXO at 7 locations following previous remediation activities. U.S. Department of Defense guidelines for UXO clearance in residential and non-residential areas were followed. Inspections and UXO clearance were completed at 10 locations (additional locations beyond the 7 locations of concern to the MDE were inspected and cleared based on planned future development activities). These 10 locations involved 22.4 acres in the northern portion the property. With the exception of one of the locations, all of the locations investigated and cleared were within the two Special Reserve Areas identified in the property's restrictive covenants. UXO items totaling 82 pounds, with a cumulative net explosive weight of 11 pounds, were removed and disposed offsite. Excavated soil from these 10 locations was mechanically sifted for presence of UXO. A total of 218 tons of soil, which contained an estimated 3.5 to 10.4 pounds of UXO with a net explosive weight of 2.2 to 6.5 pounds, were also removed and disposed offsite. The sites were restored upon completion of the final clearance activities and Site Certification Letters were prepared for each of the sites (Apex Environmental, Inc., 2000).

Twelve geophysical anomalies from the previous geophysical survey located primarily in the southern portion of the site were also investigated. The anomalies were determined to primarily be associated with non-UXO metal trash from a previous farmstead on the property. No UXO was identified in association with any of the 12 geophysical anomalies investigated.

COLA Impact:

The CCNPP Unit 3 Environmental Report will be updated to incorporate the response to this RAI question in a future COLA revision, as shown in the attached markups.

CCNPP3 ER Rev 3 Markups – Reference RAI 1011-9

Add to ER Section 9.3.2.1.1 following the modified third paragraph:

Surveys and remediation activities conducted at the former Thiokol site between 1992 and 2000 to locate and subsequently remove unexploded ordnance (UXO) are summarized as follows.

In the early 1990s, the history of the property was researched through reviews of historical files, maps, drawings, and aerial photographs, and interviews with former employees of the munitions manufacturing companies that formerly operated at the site in the 1950s. A title search and property survey were also completed in order to construct a map of the site showing former building locations, which were located primarily in the northwest portion of the property, and suspect UXO burial sites. As part of the same project in the early 1990s, all surface debris and UXO were surveyed by experienced Explosive Ordnance Disposal (EOD) personnel. All domestic trash and non-hazardous debris were surveyed and transported offsite for disposal. The entire property was then surveyed using geophysical methods to locate any buried debris, with the survey readings more concentrated in suspect areas, such as former building locations, suspect onsite burial sites, or other disturbed areas. More intensive surveys and investigations were conducted at approximately 96 locations, including locations identified through the geophysical surveys, historical records search, and former building sites. (G&E Engineering, Inc., 1995) Of the 96 locations investigated, 25 locations were determined to contain UXO (Apex Environmental, Inc., 2000). The remaining area of the property was determined to be free of UXO based on the geophysical survey results, historical records search, and absence of any indication of industrial, disposal, or treatment activities. Approximately 1,360 pounds of reactive components were collected, stored, and detonated onsite in accordance with a permit received for the open detonation. Four-hundred fifty-six tons of soil from the open detonation area exhibiting lead concentrations above background levels were removed and properly disposed. Areas affected by the investigation and detonation activities were restored (G&E Engineering, Inc., 1995)

Additional UXO investigation and clearance were completed in 1999 and 2000 in response to Maryland Department of the Environment (MDE) concerns regarding the potential for the continued presence of UXO at 7 locations following previous remediation activities. U.S. Department of Defense guidelines for UXO clearance in residential and non-residential areas were followed. Inspections and UXO clearance were completed at 10 locations (additional locations beyond the 7 locations of concern to the MDE were inspected and cleared based on planned future development activities). These 10 locations involved 22.4 acres in the northern portion the property. With the exception of one of the locations, all of the locations investigated and cleared were within the two Special Reserve Areas identified in the property's restrictive covenants. UXO items totaling 82 pounds, with a cumulative net explosive weight of 11 pounds, were removed and disposed offsite. Excavated soil from these 10 locations was mechanically sifted for presence of UXO. A total of 218 tons of soil, which contained an estimated 3.5 to 10.4 pounds of UXO with a net explosive weight of 2.2 to 6.5 pounds, were also removed and disposed offsite. The sites were restored upon completion of the final clearance activities and Site Certification Letters were prepared for each of the sites. (Apex Environmental, Inc., 2000)

Twelve geophysical anomalies from the previous geophysical survey located primarily in the southern portion of the site were also investigated. The anomalies were determined to primarily be associated with non-UXO metal trash from a previous farmstead on the property. No UXO was identified in association with any of the 12 geophysical anomalies investigated. (Apex Environmental, Inc., 2000).

The third paragraph of ER Section 9.3.2.1.1 as provided in response to RAI 201 (August 18, 2008) will be modified as follows.

The site was formerly used ~~for the~~ as a manufacturing and testing facility for detonators and initiators for military ordnance in the early to mid-1950s (Apex Environmental, Inc., 1999)~~of munitions up until the late 1950s~~. In the early 1980s, buildings were removed from the site, timber was harvested, and the site was reforested. As a precautionary measure, t~~T~~he property contains covenants that restrict residential ~~development~~, educational, and day care use and development in two areas that ~~are~~total approximately 75 ac (30.3 ha) in size ~~due to those areas being suspect of containing~~ and encompass the former manufacturing, testing, and potential burial sites of unexploded ord~~i~~nance~~s~~ (UXO~~s~~). ~~The site~~ A Phase II Environmental Site Assessment was submitted to and is currently ~~being monitored~~ under review by the Maryland Department of the Environment (MDE), Land Restoration Program (GeoTrans, Inc., 2008). The report recommended no additional soil and shallow groundwater sampling and indicates that a Remedial Action Plan will be prepared to remove soil from one location with elevated levels of total petroleum hydrocarbon. (GeoTrans, Inc., 2008) ~~MDE, 2007), to determine the appropriate measures necessary to finish remediation of the site.~~

The following references will be added to ER Section 9.3.4.

Apex Environmental, Inc., 2000. Final Report, Unexploded Ordnance (UXO) Investigation and Clearance Operation, St. Mary's County Site, Route 235 and Friendship School Road, St. Mary's County, Maryland, Apex Job No.: 10345.003, Prepared for Mr. Kenneth Ford, Cordant Technologies, Inc., 15 West South Temple, Suite 1600, Salt Lake City, Utah 84111, June 30, 2000.

G&E Engineering, Inc., 1995. Thiokol Property Site Investigation and Cleanup, St. Mary's County, Maryland, Prepared for Thiokol Corporation, Ogden, Utah. June 1995.

GeoTrans, Inc., 2008. Phase II Environmental Site Assessment. Former Thiokol Property, Old Three Notch Road, Mechanicsville, Maryland 20659, Prepared for Mr. Robert Brough, RLA, Facchina Group, LLC. October 2008.