

ClinchRiverESPHFNPEm Resource

From: Schiele, Raymond Joseph <rjschiele@tva.gov>
Sent: Tuesday, July 11, 2017 4:09 PM
To: Dozier, Tamsen
Subject: [External_Sender] FW: CNL-17-088
Attachments: CNL-17-088 CRN Suppl Info for Environmental Audit.pdf

Here is letter CNL-17-008 as we discussed. Let me know when we can set up a call for the CR -07 discussion.

Thanks

From: Scott, Roger Dwane
Sent: Tuesday, July 11, 2017 4:05 PM
To: Schiele, Raymond Joseph
Subject: CNL-17-088

Hearing Identifier: ClinchRiver_ESP_HF_NonPublic
Email Number: 325

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From: Schiele, Raymond Joseph

Created By: rjschiele@tva.gov

Recipients:
"Dozier, Tamsen" <Tamsen.Dozier@nrc.gov>
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Tennessee Valley Authority, 1101 Market Street, Chattanooga, TN 37402

CNL-17-088

July 7, 2017

10 CFR 52, Subpart A

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

Clinch River Nuclear Site
NRC Docket No. 52-047

Subject: Submittal of Supplemental Information Related to the Environmental Audit in
Support of Early Site Permit Application for Clinch River Nuclear Site

- References:
1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016 (Accession No. ML16139A752)
 2. NRC Memorandum, "April 17 - 28, 2017, Audit of Clinch River Nuclear Site Early Permit Application - Hydrology and Health Physics Analyses," dated April 11, 2017 (Accession No. ML17069A045)
 3. NRC Audit Plan, "Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application," dated May 7, 2017 (Accession No. ML17088A728)

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between April 17, 2017 and April 27, 2017, the NRC conducted an audit of the hydrology and health physics analyses information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the Bechtel Power Corporation (Bechtel) offices in Reston, VA, the NRC deferred some of the hydrology audit information needs (Items 01e, 23, 25b, 31, and 37) to discussions during the environmental audit to coincide with the availability of some of the NRC reviewers.

Between May 15, 2017 and May 31, 2017, the NRC conducted an audit of the environmental information contained in the CRN Site ESPA (Reference 3). During the face-to-face portion of the audit held at the TVA Knoxville, TN offices, the NRC requested that TVA provide supplemental information in support of the environmental audit.

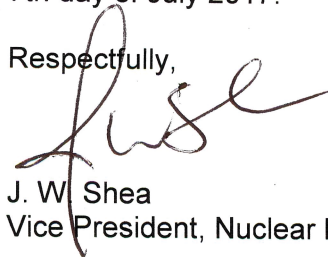
Enclosure 1 to this letter provides a table listing the environmental audit information needs for which TVA has agreed to provide supplemental information. Enclosures 2 through 8 contain supplemental information addressing audit information needs, arranged by topic area. Supplemental information addressing the remaining environmental audit information needs will be provided by separate letter, as indicated in the Enclosure 1 table. The supplemental information for environmental audit information need HY-GW-13 will address information needs 01e, 23, and 25b (deferred from the hydrology audit), and the supplemental information provided for environmental audit information need HY-GW-15 will address information needs 31 and 37 (deferred from the hydrology audit).

Enclosures 2, 4, 6, and 8 contain Environmental Report (ER) markups, as required to support the information needs. The ER markups will be incorporated in a future revision of the early site permit application.

There are no new regulatory commitments associated with this submittal. If any additional information is needed, please contact Dan Stout at (423) 751-7642.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 7th day of July 2017.

Respectfully,



J. W. Shea
Vice President, Nuclear Regulatory Affairs & Support Services

Enclosures:

1. Supplemental Information Associated with Environmental Audit Information Needs
2. Aquatic Ecology Supplemental Information
3. Alternative Site Supplemental Information
4. Hydrology - Groundwater Supplemental Information
5. Land Use Supplemental Information
6. Radiological Health Supplemental Information
7. Site Overview/Plant Description Supplemental Information (Attachment 1 on 5 CDs)
8. Terrestrial Ecology Supplemental Information (Attachment 1 on 1 CD)

cc (see page 3)

U.S. Nuclear Regulatory Commission
CNL-17-088
Page 3
July 7, 2017

cc (with enclosure):

T. Dozier, Project Manager, Division of New Reactor Licensing, USNRC

cc (without enclosure):

V. McCree, Executive Director of Operations, USNRC
C. Haney, Regional Administrator, Region II, USNRC
M. Johnson, Deputy Executive Director for Reactor and Preparedness Programs,
USNRC
V. Ordaz, Acting Director, Office of New Reactors, USNRC
A. Fetter, Project Manager, Division of New Reactor Licensing, USNRC
J. Donohue, Branch Chief, Division of New Reactor Licensing, USNRC
M. Sutton, Project Manager, Division of New Reactor Licensing, USNRC
P. Vokoun, Project Manager, Division of New Reactor Licensing, USNRC
M. M. McIntosh, Regulatory Specialist, Eastern Regulatory Field Office,
Nashville District, USACE

ENCLOSURE 1

Supplemental Information Associated with Environmental Audit Information Needs

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between April 17, 2017 and April 27, 2017, the NRC conducted an audit of the hydrology and health physics analyses information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the Bechtel Power Corporation (Bechtel) offices in Reston, VA, the NRC deferred some of the hydrology audit information needs (Items 01e, 23, 25b, 31, and 37) to discussions during the environmental audit to coincide with the availability of some of the NRC reviewers. Between May 15, 2017 and May 31, 2017, the NRC conducted an audit of the environmental information contained in the CRN Site ESPA (Reference 3). During the face-to-face portion of the audit held at the TVA Knoxville, TN offices, the NRC requested that TVA provide supplemental information in support of the environmental audit.

This enclosure contains a table listing the environmental audit information needs for which TVA has agreed to provide supplemental information. The table below indicates which enclosure contains the supplemental information that addresses the audit information needs, arranged by topic area. Supplemental information addressing the remaining environmental audit information needs will be provided by separate letter, as indicated in the table. The supplemental information for environmental audit information need HY-GW-13 will address information needs 01e, 23, and 25b (deferred from the hydrology audit), and the supplemental information provided for environmental audit information need HY-GW-15 will address information needs 31 and 37 (deferred from the hydrology audit).

The table below also indicates where supplemental information provided for an audit information need includes Environmental Report (ER) markups. The ER markups provided in Enclosures 2, 4, 6, and 8 will be incorporated in a future revision of the ESPA.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016 (Accession No. ML16139A752)
2. NRC Memorandum, "April 17 - 28, 2017, Audit of Clinch River Nuclear Site Early Permit Application - Hydrology and Health Physics Analyses," dated April 11, 2017 (Accession No. ML17069A045)
3. NRC Audit Plan, "Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application," dated May 7, 2017 (Accession No. ML17088A728)

ENCLOSURE 1

Supplemental Information Associated with Environmental Audit Information Needs

IN Number	Enclosure	Associated ER Markups	Planned Letter
AE-02	2	NA	This letter
AE-04	2	6.5.2.3	This letter
ALT-01	3	NA	This letter
HY-GW-14	4	2.3.2.2.2	This letter
LU-01	5	NA	This letter
LU-06	5	NA	This letter
LU-07	5	NA	This letter
LU-08	5	NA	This letter
RH-03	6	4.5, 4.5.2.1, 4.5.5	This letter
RH-04	6	4.5.3.1, 4.5.4.1, 4.5.4.2, Tables 4.5-1, 4.5-2	This letter
STO-06	7	NA	This letter
TE-01	8	NA	This letter
TE-04	8	NA	This letter
TE-13	8	Table 4.3-1	This letter
TE-21	8	NA	This letter
TE-22	8	NA	This letter
AE-03	NA	NA	Letter #2
CR-01b	NA	NA	Letter #2
CR-02	NA	NA	Letter #2
CR-04	NA	NA	Letter #2
CR-05a	NA	NA	Letter #2
CR-05b	NA	NA	Letter #2
CR-06	NA	NA	Letter #2
CR-07	NA	NA	Letter #2
HY-SW-02	NA	NA	Letter #2
HY-SW-06	NA	NA	Letter #2
HY-SW-08	NA	NA	Letter #2
HY-SW-09	NA	NA	Letter #2
HY-SW-10	NA	NA	Letter #2
HY-SW-12	NA	NA	Letter #2
HY-SW-14	NA	NA	Letter #2
HY-SW-16	NA	NA	Letter #2
HY-SW-17	NA	NA	Letter #2
LU-02	NA	NA	Letter #2
LU-04	NA	NA	Letter #2
NR-01	NA	NA	Letter #2
STO-01	NA	NA	Letter #2
STO-02	NA	NA	Letter #2
STO-03	NA	NA	Letter #2
STO-04	NA	NA	Letter #2
STO-05	NA	NA	Letter #2
STO-07	NA	NA	Letter #2
STO-08	NA	NA	Letter #2

ENCLOSURE 1

Supplemental Information Associated with Environmental Audit Information Needs

IN Number	Enclosure	Associated ER Markups	Planned Letter
STO-09	NA	NA	Letter #2
STO-11	NA	NA	Letter #2
STO-13	NA	NA	Letter #2
TR-01	NA	NA	Letter #2
TR-03/TR-04	NA	NA	Letter #2
TR-05	NA	NA	Letter #2
TR-06	NA	NA	Letter #2
TR-07	NA	NA	Letter #2
TR-08	NA	NA	Letter #2
TR-09	NA	NA	Letter #2
TR-10	NA	NA	Letter #2
TR-11	NA	NA	Letter #2
TR-16	NA	NA	Letter #2
HY-GW-02	NA	NA	Letter #3
HY-GW-13*	NA	NA	Letter #3
HY-GW-15**	NA	NA	Letter #4

Notes:

* The supplemental information provided for Information Need (IN) HY-GW-13 will also address the information required to address deferred Hydrology Audit Information Needs 01e, 23, and 25b.

** The supplemental information provided for IN HY-GW-15 will also address the information required to address deferred Hydrology Audit Information Needs 31 and 37.

ENCLOSURE 2

Aquatic Ecology Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report (ER) information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with ER Section 6.5, "Ecology Monitoring," to reflect the information that TVA provided during the NRC audit.

This enclosure provides the requested supplemental information, including updates to portions of ER Section 6.5. Specifically, this enclosure provides supplemental information associated with audit information needs Aquatic Ecology (AE-02 and AE-04). Supplemental information associated with audit information need AE-03 will be provided in a separate submittal, as indicated in Enclosure 1. The ER markup will be incorporated in a future revision of the ESPA.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016
2. Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application, dated May 7, 2017

Supplemental Information associated with NRC Information Need Aquatic Ecology (AE-02):

During the audit, the NRC requested information regarding the TVA transmission projects planning and implementation process; specifically, information regarding implementation of the TVA process to avoid impact or limit disturbances to aquatic bodies as a result of transmission work.

The TVA process is documented in the Transmission & Power Supply Project Process procedure. The process consists of five stages: Planning, Scoping, Engineering, Construction, and Project Closure. Supplemental information provided for audit information need Land Use (LU-06) provides details for each of these stages (See Enclosure 5). The Engineering stage further develops the conceptual design developed during scoping into a detailed design reflecting all documentation changes required to construct and test the new feature or modification to existing features. During the Engineering stage the environmental staff coordinates with engineering staff to analyze any potential impacts to aquatic resources and avoid or minimize impacts to the aquatic resources through redesign.

Supplemental Information associated with NRC Information Need Aquatic Ecology (AE-04):

During the audit, the NRC requested clarification regarding TVA's aquatic monitoring plans as discussed in ER Subsection 6.5.2.3. ER Subsection 6.5.2.3 discusses plans for field studies following construction in order to collect at least one year of pre-operational data for comparison to the baseline data. Following discussions with the NRC staff at the audit, TVA concluded that conducting the field studies for comparison to baseline data would not be necessary. Instead, additional aquatic monitoring would be conducted as required by State and Federal agencies. ER Subsection 6.5.2.3 is being revised to reflect this change.

ENCLOSURE 2

Aquatic Ecology Supplemental Information

ER Subsection 6.5.2.3 is being revised as indicated. Strikethroughs indicate text to be deleted. Underlines indicate text to be added.

6.5.2.3 Preoperational and Operational Monitoring

Potential impacts to aquatic ecology from facility operation are discussed in Subsections 4.3.2, 5.3.1, 5.3.2, 5.3.3, 5.3.4.1, 5.6.1, and 5.6.2. NUREG-1555 notes that for aquatic ecology monitoring “any necessary preoperational monitoring will ordinarily be defined in the NPDES permit” and “any necessary operational monitoring will be covered under the relevant NPDES permit.” TVA does not currently have an NPDES permit for the CRN Site. TVA expects to finalize the operational monitoring plan during the NPDES permitting process. An NPDES permit for the SMR likely would include a requirement for toxicity monitoring on at least an annual basis. The requirements for cooling water intakes under Clean Water Act (CWA) Section 316(b), for the purpose of minimizing adverse impacts from entrainment and impingement of organisms, also are implemented through the NPDES permitting process. As a new facility, the CR SMR Project would have to meet CWA Section 316(b) Phase I requirements for its cooling water intake.

~~TVA would repeat field studies following construction in order to collect at least 1 yr of preoperational and/or operational data (including aquatic monitoring) for comparison to the baseline data. The activities included in a preoperational/operational aquatic monitoring program likely would be a subset of the site preparation field studies.~~ TVA plans to conduct aquatic monitoring as determined by interactions with Federal and State agencies.

As a facility designed and operated in compliance with State Water Quality Standards for temperature, the CR SMR project is unlikely to be required by TDEC to conduct significant new biological monitoring in the vicinity of the CRN Site. In the event TVA pursues a variance from those criteria under CWA Section 316(a), additional preoperational and/or operational monitoring would be addressed as part of that permitting process. Surveys and monitoring would be designed to allow statistical analysis comparing the communities present in the Clinch River before construction and operation to those present after the CR SMR Project is online.

ENCLOSURE 3

Alternative Site Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report (ER) information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with ER Subsection 9.3, "Alternative Sites," to reflect the information that TVA provided during the audit.

This enclosure provides the supplemental information associated with audit information needs Alternative Sites (ALT-01).

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016 (Accession No. ML16139A752)
2. NRC Audit Plan, "Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application," dated May 7, 2017 (Accession No. ML17088A728)

Supplemental Information associated with NRC Information Need Alternative Sites (ALT-01):

During the alternative sites discussion at the audit, the NRC requested that TVA provide supplemental information to clarify two items with respect to information need ALT-01. The first item deals with the topographical evaluation criteria and ratings, as presented in the TVA Site Selection Report, Revision 2, Subsection C.4.3.1, "Topography Criteria."

The topography evaluation criteria provide measures to rate the proposed sites according to relative costs associated with site grading and earth-moving required to prepare the site for construction of a nuclear power plant. The rating criteria (minimal, moderate and severe relief) are based on the amount of topographic relief currently found at the site. During the audit, it was identified that the value of "250 feet" was used in more than one rating criterion. The evaluation approach discussion in TVA Site Selection Report, Subsection C.4.3.1, has been corrected to use greater than or equal to 100 feet and less than 250 feet as the rating criterion for moderate relief, and greater than or equal to 250 feet as the rating criterion for severe relief.

TVA Site Selection Report, Subsection C.4.3.1, Discussion/Results subheading, presents a summary of topography variation within and between the candidate areas. This summary has been corrected to indicate that topography variation within and between the candidate areas, and the costs associated with the topography adjustment range, is relatively low to severe.

The Site 10 evaluation description, as presented in the Discussion/Results subheading, was inconsistent with the evaluation approach and ratings. However, Site 10 was correctly given a rating of 1, because it has a severe topographic relief of approximately 250 feet. Therefore, the evaluation description has been corrected to reflect that Site 10 is in an area of severe topographic relief with severe costs associated with site preparation. These clarifications do not affect the ER, because Site 10 was correctly evaluated using a rating of 1.

ENCLOSURE 3

Alternative Site Supplemental Information

The second item requiring clarification deals with the minimum size requirement used in the selection of potential alternative sites at the Redstone Arsenal. The selected Redstone Arsenal sites were at or around the minimum size requirement of 120 acres. NRC requested that TVA provide supplemental information that clarifies TVA's plans for addressing the requirements for additional laydown areas and parking during construction and outages.

The 120-acre siting requirement that was applied to Redstone Arsenal during site selection was based on the bounding value for minimum acreage required for operation of a small modular reactor (SMR) facility. If a site with the minimum acreage is chosen for construction of a SMR facility, additional offsite space would be required for laydown and parking during construction and, potentially, during outages. At Redstone Arsenal, there is an abundance of existing developable land that could be used for these activities, within the established restrictions. Therefore, TVA would coordinate with Redstone Arsenal for access to these additional areas during construction and outage periods.

ENCLOSURE 4

Hydrology - Groundwater Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report (ER) information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with ER Section 2.3, "Water," to reflect the information that TVA provided during the audit.

This enclosure provides the requested supplemental information including updates to portions of ER Subsection 2.3.2.2.2, as discussed during the audit. Specifically, this enclosure provides supplemental information associated with audit information need Hydrology - Ground Water (HY-GW-14). Supplemental information associated with audit information needs HY-GW-02, HY-GW-13, and HY-GW-15 will be provided in separate submittals, as indicated in Enclosure 1. The ER markup will be incorporated in a future revision of the ESPA.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016
2. Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application, dated May 7, 2017

Supplemental Information associated with NRC Information Need Hydrology - Ground Water (HY-GW-14):

During the audit, the NRC requested clarification of a reference citation in ER Subsection 2.3.2.2.2, "Current Groundwater Use." The citation identifies an existing potential risk to the groundwater supply of community public water systems in Middle and East Tennessee from surface water contaminants and pathogens.

After discussion and review, TVA has concluded that the citation is not relevant to the discussion of current groundwater use in ER Subsection 2.3.2.2.2, and is therefore being removed.

ENCLOSURE 4

Hydrology - Groundwater Supplemental Information

ER Subsection 2.3.2.2.2 (last two paragraphs) is being revised as indicated. Strikethroughs indicate text to be deleted.

2.3.2.2.2 Current Groundwater Use

...

A later report by TDEC published in 2009 assesses Tennessee drinking water sources and potential threats to drinking water quality and quantity (Reference 2.3.2-14). The report states that a recent drought impacted 30 groundwater systems throughout the state, including the Oliver Springs Water Board in Roane County. The town of Oliver Springs is located approximately 2 mi northwest of Oak Ridge, Tennessee, and utilizes Bacon Spring for a portion of its water supply (Reference (2.3.2-14). The report also notes the complicated geology of Middle and East Tennessee (karst, faulting, etc.) and urges additional assessment of groundwater resources in the state. ~~In addition, the report notes the close interaction of surface water and groundwater in the region (Reference 2.3.2-14):~~

~~Approximately 2/3 of the community public water systems using ground water in Middle and East Tennessee have had at least one source determined under the direct influence of surface water. This means that these sources of groundwater are located close enough to a source of surface water to receive direct surface water recharge and are thus considered at risk from surface water contaminants and pathogens.~~

ENCLOSURE 5

Land Use Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with Environmental Report (ER) Section 2.4, "Land," to reflect the information that TVA provided during the NRC audit.

This enclosure provides the supplemental information associated with audit information needs Land Use (LU-01, LU-06, LU-07, and LU-08), as discussed during the audit. Supplemental information associated with audit information needs LU-02 and LU-04 will be provided in a separate submittal, as indicated in Enclosure 1.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016
2. Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application, dated May 7, 2017

Attachment:

1. Clinch River Nuclear Site Aerial Photographs

Supplemental Information associated with NRC Information Need Land Use (LU-01):

During the audit, the NRC requested that the high resolution digital scan of the 1939 aerial photograph presented be provided on the docket. The NRC also requested that, if available, TVA provide high resolution digital scans of aerial photographs of Sites 2 and 8, and high resolution digital scans of aerial photographs during construction period of the Clinch River Breeder Reactor Project (CRBRP). Attachment 1 to this enclosure provides the 1939 Clinch River Site Aerial Photograph, a 1939 Site 2 and a 1939 Site 8 Aerial Photograph, and aerial photographs of the CRBRP from 1983 and 1984.

Supplemental Information associated with NRC Information Need Land Use (LU-06):

During the audit the NRC requested supplemental information to clarify the discussion regarding potential land disturbing activities associated with transmission line improvements that might be needed to support the Clinch River Small Modular Reactor project. The following information summarizes the project process which would be used to address potential land disturbing activities.

The TVA process is documented in the Transmission and Power Supply (TPS) Project Process procedure, which defines the process for implementing Transmission and Power Supply projects. It defines the applicable structure, system or component, the actions required, and the

ENCLOSURE 5

Land Use Supplemental Information

organization/position responsible for the actions. The project process consists of the following five stages:

- **Planning:** Defines the organizational responsibilities and steps that are used to create and evaluate proposed projects and obtain approval, if warranted.
- **Scoping:** Defines the organizational responsibilities and steps that are used to define the conceptual approach to build new or modify substations, Telecom and Control System (TCS) facilities, and transmission lines. Specific activities performed during in this stage include:
 - Identify routing of new lines, substation, or radio facilities as required.
 - Identify property owners.
 - Initiate environmental reviews including Categorical Exclusion Checklist (CEC), Environmental Assessment (EA) or Environmental Impact Statement (EIS) based on expected level of environmental impacts.
 - Conduct Public Information Day, if required.
 - Provide information to the Joint Project Team, external/internal customers, and Generating Plant Manager, as required.
 - Select preferred route/site.
- **Engineering:** This stage further develops the conceptual design developed during scoping into a detailed design reflecting all documentation changes required to construct and test the new feature or modification to existing features. Specific environmental activities performed during this stage include:
 - Continue to perform environmental reviews per Standards and Criteria for Environmental.
 - Identify wetlands, blue-line streams, or special environmental considerations.
 - Identify best management practices (BMPs) to be utilized.
 - Complete CEC, EA, or EIS, as required.
 - Identify environmentally sensitive areas and provide the information to Product Line for inclusion on drawings.
 - Collect and coordinate input from Transmission Service Manager, other organizations internal and external for TPS Environmental Program Manager, Transmission Construction and Maintenance Environmental Contact, Environmental Contact, and Transmission Programs and Regulatory Compliance, as needed.
 - Obtain permits from US Army Corps of Engineers and other regulatory agencies, as required.
 - Identify environmentally sensitive materials to be retired or installed.
 - Obtain required environmental permits.
- **Construction:** This stage defines the organizational responsibilities and steps that are required to build and test the design produced in the Engineering/Design phase. Specific items established during in this stage include:
 - Construction will be conducted in compliance with environmental permits and requirements.
 - At Pre-Construction Meeting, Environmental Support identifies special environmental concerns, reviews applicable BMPs required, identifies environmental issues and specific locations, and provides copies of commitments and permits.
 - At the end of construction, Environmental Support coordinates all restoration activities.

ENCLOSURE 5

Land Use Supplemental Information

- **Project Closure:** This stage ensures the completion of the documentation for the project, including closure of any permits.

Supplemental Information associated with NRC Information Need Land Use (LU-07):

During the audit, the NRC requested that TVA provide an electronic copy of geographic information system (GIS) layers used to develop ER Figures 2.1-2, 2.2-1, 2.2-2, 2.2-3, 2.2-4, 2.2-5, and 4.1-1. Enclosure 7, Attachment 1, provides a set of CDs that contain electronic copies of the GIS layers used to develop the requested figures.

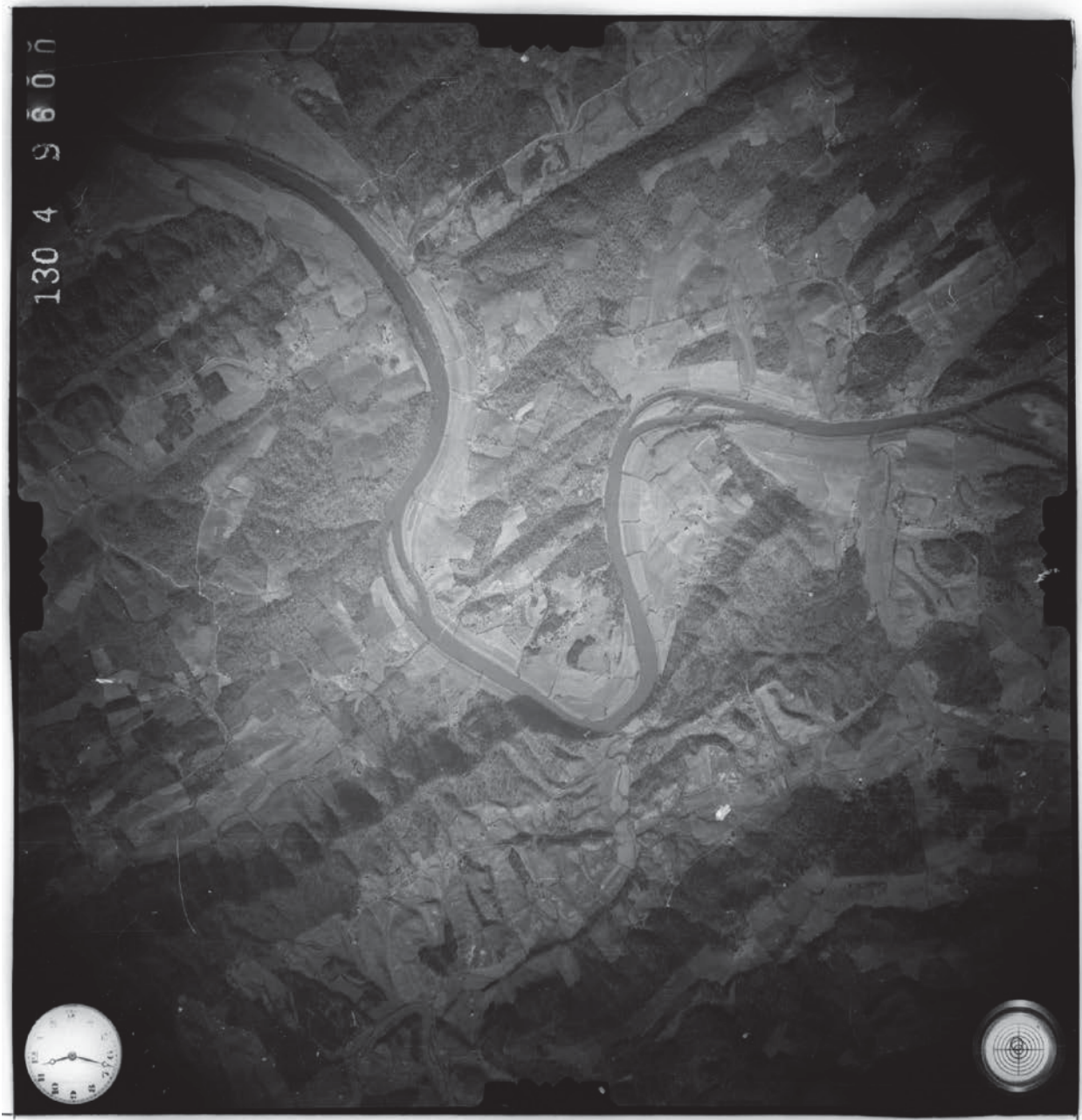
Supplemental Information associated with NRC Information Need Land Use (LU-08):

During the audit, the NRC requested supplemental information to clarify the acreage of the CRN Site areas expected to be disturbed.

The Farmland Conversion Impact Rating Form AD-1006 included the 935 acre CRN Site and the 196 acre Barge/Traffic Area. This consultation was initiated prior to a more refined understanding of the total acreage of the Barge/Traffic Area that would be disturbed. As it presents a bounding analysis, consultation was not reinitiated for a smaller impact area. The total disturbed acreage for the CRN Site is shown on ER Figure 3.1-2, "CRN Site Cleared Areas," and described in ER Subsection 4.1.1, "The Site and Vicinity."

Attachment 1

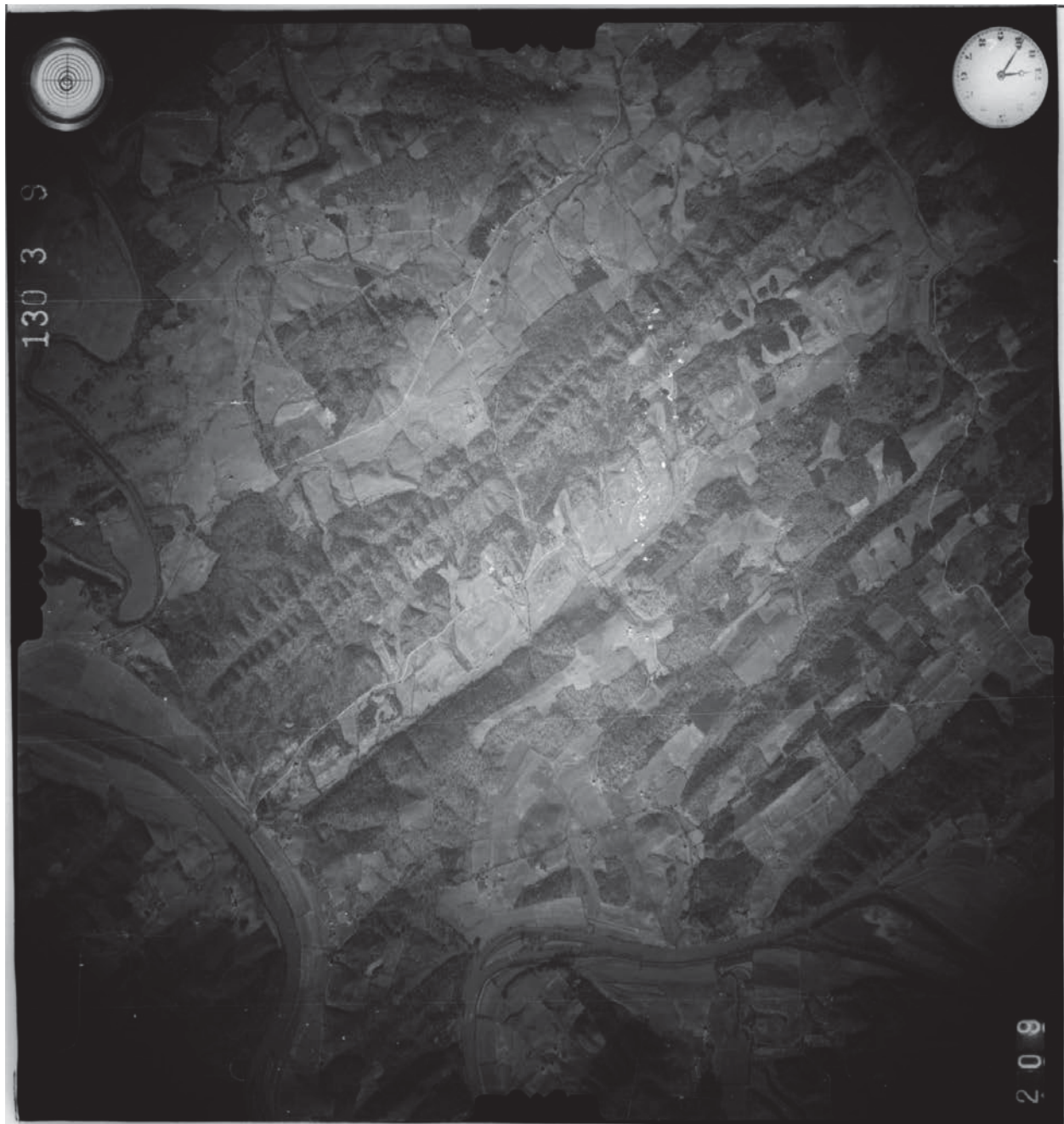
Clinch River Nuclear Site Aerial Photographs



1939 Clinch River Site Aerial Photograph

Attachment 1

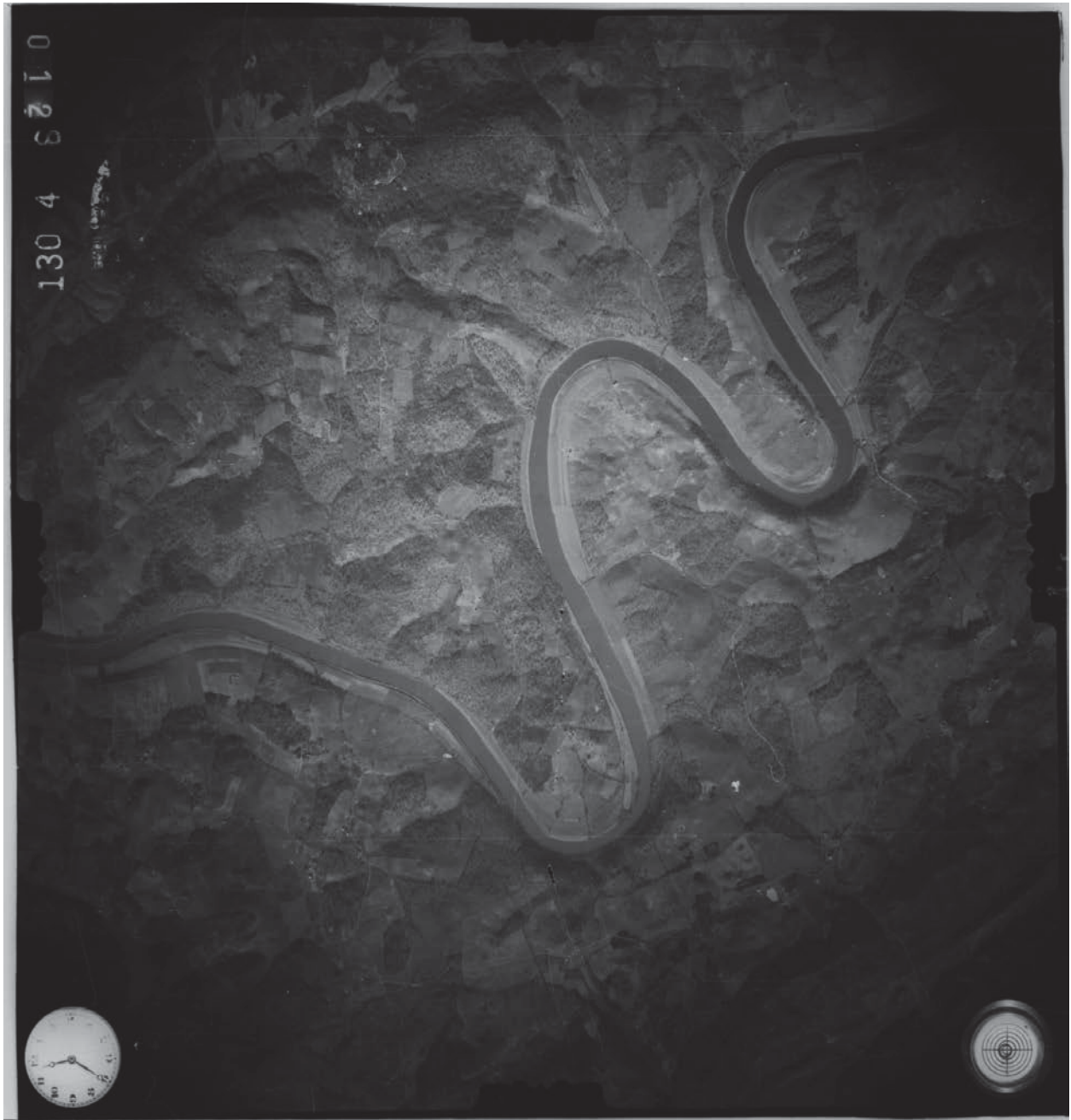
Clinch River Nuclear Site Aerial Photographs



1939 Site 2 Aerial Photograph

Attachment 1

Clinch River Nuclear Site Aerial Photographs



1939 Site 8 Aerial Photograph

Attachment 1

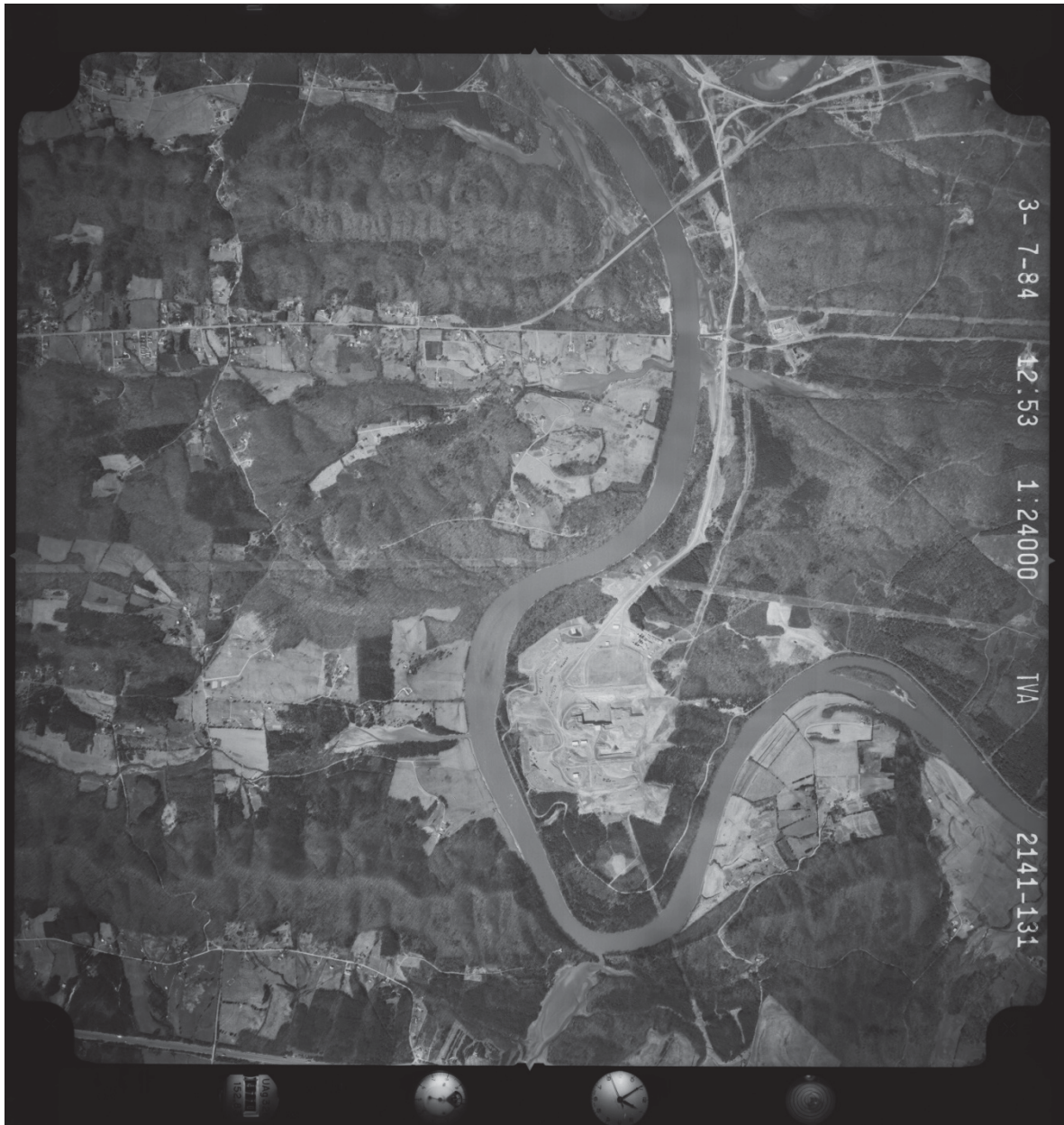
Clinch River Nuclear Site Aerial Photographs



1983 Clinch River Breeder Reactor Project Aerial Photograph

Attachment 1

Clinch River Nuclear Site Aerial Photographs



1984 Clinch River Breeder Reactor Project Aerial Photograph

ENCLOSURE 6

Radiological Health Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report (ER) information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with ER Section 4.5, "Radiation Exposure to Construction Workers," to reflect the information that TVA provided during the NRC audit.

This enclosure provides the supplemental information as discussed during the audit. Specifically, this enclosure provides supplemental information associated with audit information needs Radiological Health (RH-03 and RH-04). The ER markups included in this enclosure will be incorporated in a future revision of the ESPA.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016 (Accession No. ML16139A752)
2. NRC Audit Plan, "Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application," dated May 7, 2017 (Accession No. ML17088A728)

Supplemental Information Associated with NRC Audit Information Need Radiological Health (RH-03):

During the audit, the NRC requested clarification on whether construction workers were considered members of the public or radiation workers.

ER Subsection 4.5.2.1 discusses the expected direct radiation exposure to construction workers building a small modular reactor (SMR). SMRs are designed for series construction, which allows multiple units to eventually function as a larger nuclear power plant. Three of the four proposed SMR designs include "heavily shielded areas" between reactor buildings in operation and those under construction. The workers employed during construction of these SMRs after the initial facility startup would be considered construction workers for the purpose of the construction worker dose analysis.

In contrast to SMR designs having multiple reactor buildings, the NuScale design includes all reactors under a single structure. The NuScale building construction would be completed before the first reactor is installed and operated, so there would be no construction work on site after the first reactor is installed. Based on the unique design of the NuScale SMR, with multiple reactor units in a single structure, the work of "installing" new reactors in the pool containing operational reactors is not considered a traditional construction activity. Therefore, personnel installing additional NuScale reactor units after the initial facility startup will be considered radiation workers and are not considered construction workers for the purpose of the construction worker dose analysis. ER Subsection 4.5.2.1 is being revised to discuss the above differences, based on proposed reactor design, in the evaluation of construction worker dose.

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ER Subsection 4.5.5 compares the estimated annual doses to construction workers at the CRN Site to the 10 CFR 20.1301 limits for members of the public to determine whether construction workers can be classified as members of the public or classified as radiation workers. ER Table 4.5-1 presents the estimated total dose to construction workers at the CRN Site from all pathways. The total effective dose equivalent (TEDE), from Table 4.5-1, is 53 millirem per year (mrem/yr). The 10 CFR 20.1301 annual dose limit for individual members of the public is 100 mrem/yr TEDE. ER Subsection 4.5.5 is being revised to clarify that, based on the projected annual dose, construction workers at the CRN Site are considered members of the public and not radiation workers.

In addition to the above changes, the description of the reactor building has been revised in ER Section 4.5 and ER Subsection 4.5.2.1 to clarify that the NuScale SMR design does not utilize a "containment" building.

Supplemental Information Associated with NRC Audit Information Need Radiological Health (RH-04):

During the audit, the NRC requested clarification of the basis for the assumptions used in the computation of the direct dose to the construction workers, including assumed distances, operating reactor configurations and shielding.

An SMR design has not been selected for the CRN Site. Therefore, the CRN Site construction worker annual external gamma dose is an estimate based on the construction of two new AP1000 reactors (Units 3 and 4) at the Vogtle Electric Generating Plant (VEGP). VEGP Units 1 and 2 are pressurized water reactors operating at 3625 megawatts thermal. The dose to the construction worker is based on the reported average dose rate applicable to the construction worker adjacent to the VEGP Site.

Similar to the method used to estimate construction worker dose for the construction of VEGP Units 3 and 4, TVA estimated an external dose to the SMR construction worker based on doses measured using dosimeters placed on the protected area perimeter fence adjacent to the VEGP operating units (Units 1 and 2). The average measured dose rate of 66.9 mrem/yr is based upon continuous exposure for 24 hours (hr)/day or 8760 hr/yr. The minimum distance from the center of the closest operating VEGP power plant to the protected area fence is about 410 feet (ft). Because the exposure duration for the construction is 40 hr/week for 52 weeks/yr, or 2080 hr/yr, the external dose for the construction worker is estimated to be 15.9 mrem/yr at a distance of about 410 ft.

The CRN Site construction worker dose evaluation assumed up to two operating SMR units during the construction of a third and final unit. Distances of 1162 ft and 387 ft from center of the first and second SMR nuclear islands, respectively, to the construction worker were assumed in the analysis. Using the proposed configuration of three SMRs at the CRN Site, the dose to the worker constructing the third SMR from the other two operating SMRs is estimated as 24.0 mrem/yr. ER Subsections 4.5.3.1 and 4.5.4.1 are being revised to reflect the basis of these assumptions used in the computation of the direct dose to construction workers at the CRN Site.

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In addition to the above changes, editorial changes are being made in ER Subsection 4.5.4.2 to define the term “TEDE” and to ER Table 4.5-1, Note 2, to clarify the definition of “direct radiation,” define the term “SMR,” and replace the term “PWR” with “pressurized water reactor.” ER Table 4.5-2 is being revised to correct the total body gaseous effluent dose rate from all units.

ER Section 4.5 is being revised as indicated. Underlines indicate text to be added.

4.5 RADIATION EXPOSURE TO CONSTRUCTION WORKERS

This section evaluates potential radiological impacts on construction workers during the period of construction of two or more small modular reactors (SMRs) at the Clinch River Nuclear (CRN) Site. At this site, it is assumed that multiple units are to be constructed sequentially, so that construction would occur adjacent to operating units. An exception to this is the NuScale SMR design where there is one structure containing multiple reactors, and for which construction work would be completed prior to installation and operation of the first reactor. As discussed in Section 3.9, the SMRs would be manufactured in factories, and large, fabricated components would be shipped to the CRN Site. Therefore, less onsite construction is required for installation of SMRs than for installation of a typical commercial reactor. The number of units would vary based upon the SMR design selected. In most SMR designs, the reactor containment vessel is underground. Because an SMR design has not yet been selected, a plant parameter envelope (PPE), described in Section 3.1, has been developed for use in evaluating potential environmental impacts.

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ER Subsection 4.5.2.1 is being revised as indicated. Underlines indicate text to be added. Strikethroughs indicate text to be deleted.

4.5.2.1 Direct Radiation

The SMRs are pressurized water reactors (PWR) designed for series construction, thus allowing multiple units to collectively function as a larger nuclear power plant. Contained sources of radiation in such light water reactors (LWRs) are shielded. Because when completed the SMR facility at the CRN Site is anticipated to produce 800 megawatts electric (MWe) or less, dose estimates for the larger 1000 MWe AP1000 LWR were used to determine that direct radiation from the SMR containment and other buildings would be SMALL (Reference 4.5-1).

Further, the U.S. Nuclear Regulatory Commission (NRC) conducted an evaluation of operating nuclear plants and stated the following in NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Rev 0:

Direct radiation from sources within a light water reactor plant is due primarily to ^{16}N , a radionuclide produced in the reactor core by neutron activation of ^{16}O from the water. Because the primary coolant of an LWR is contained in a heavily shielded area, dose rates in the vicinity of light water reactors are generally undetectable and are less than 1 mrem/year at the site boundary.

Three of the four proposed reactor designs (BWXT mPower, Holtec, and Westinghouse) include “heavily shielded areas” between reactor buildings containing an operating reactor(s) and

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adjacent reactor buildings under construction. After startup of the first reactor (for BWXT mPower, Holtec, and Westinghouse), the workers employed during construction of the subsequent units would be considered construction workers for the purpose of the construction worker dose analysis.

The NuScale design includes all reactors under a single containment structure. Building construction would be completed before the first reactor is installed and operated, so there would be no construction work on site after the first reactor is installed. Therefore, personnel installing additional NuScale reactor units after the initial units start up facility startup will be radiation workers and are not considered construction workers for the purpose of this analysis the construction worker dose analysis.

ER Subsection 4.5.3.1 is being revised as indicated. Underlines indicate text to be added. Strikethroughs indicate text to be deleted.

4.5.3.1 Direct Radiation

An SMR design has not been selected for the CRN Site. In the absence of design-specific information, data available for the larger ~~Westinghouse AP1000~~ operating PWRs provides an indication that the potential direct radiation doses to which construction workers next to operational SMRs would be small. ~~Based on conservative estimates, TVA assumed a dose rate of 33 millirem per year (mrem/yr) to bound exposure rates for each operating unit. (Reference 4.5-1) TVA estimated an external dose to the SMR construction worker based on doses measured using dosimeters placed on the protected area perimeter fence adjacent to two operating pressurized water reactors (Reference 4.5-1). These measurements were previously used to estimate the construction worker dose for the construction of Vogtle Electric Generating Plant Units 3 and 4. The average measured dose rate of 66.9 millirem per year (mrem/yr) This dose is based upon continuous exposure for 24 hours (hr)/day or 8760 hr/yr (Reference 4.5-1). Because the exposure duration for the construction is 40 hr per week for 52 weeks per year, or 2080 hr/yr, the total effective external dose equivalent (TEDE) for the construction worker is estimated to be 8-15.9 mrem/yr from direct radiation from each operating unit during the construction of the last unit at a distance of about 410 feet (ft). Assuming up to two three operating SMR units at the CRN Site during construction of a third fourth and final unit and equal dose rates from each operating unit distances to the construction worker of 1162 ft and 387 ft from center of the first and second SMR nuclear islands, respectively, the total estimated dose to the construction worker would be 24 mrem/yr from direct radiation.~~

ER Subsection 4.5.4.1 is being revised as indicated. Underlines indicate text to be added. Strikethroughs indicate text to be deleted.

4.5.4.1 Direct Radiation

As stated in Subsection 4.5.3.1, the total average annual direct radiation dose rate to the construction worker from two all operating SMR units at the CRN Site is conservatively assumed to be 24 mrem/yr. The direct radiation dose to skin also is estimated to be 24 mrem/yr.

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ER Subsection 4.5.4.2 is being revised as indicated. Underlines indicate text to be added.

4.5.4.2 Gaseous Effluents

As stated in Subsection 4.5.3.2, the gaseous effluent dose to the construction worker calculated using the GASPAR II code is 28 mrem/yr, and the maximum dose to another organ (skin) is 51 mrem/yr. These dose estimates incorporate the construction worker onsite exposure duration of 2080 hr/yr. In accordance with NRC guidance, the total effective dose equivalent (TEDE) value for the construction worker was estimated by weighting the thyroid dose (48 mrem/yr) by 0.03 and summing with the total body dose of 28 mrem/yr, resulting in a TEDE of 29 mrem/yr from gaseous effluents (Table 4.5-1).

ER Subsection 4.5.5 is being revised as indicated. Underlines indicate text to be added. Strikethroughs indicate text to be deleted.

4.5.5 Compliance with Dose Regulations

Annual doses to the construction worker at the CRN Site are summarized in Table 4.5-1. The annual total body dose for the construction worker is 52 mrem, which includes direct radiation, gaseous effluent, and liquid effluent doses. Similarly, the annual total doses for the thyroid and the skin pathways are 48 and 51 mrem, respectively. Using these annual total doses, the TEDE was estimated to be 53 mrem/yr.

~~This annual dose was then~~The annual construction worker dose is compared to the dose limits for individual members of the public in 10 CFR 20.1301 to determine whether the CRN Site construction worker can be treated as a member of the public rather than being classified as a radiation worker. As shown in Table 4.5-2, the dose rates for CRN Site construction worker are lower than the 100 mrem/yr threshold for treatment as a radiation worker. Therefore, ~~for the purposes of radiation protection, the CRN Site construction workers are considered to be members of the general public. With~~with the exception of certain specialty contractors loading fuel or using industrial radiation sources for radiography (who would receive specialized training and be treated as radiation workers when appropriate), construction workers ~~do not work closely around radiation sources~~will not be required to be qualified as radiation workers.

NRC regulations govern dose rates to members of the general public. Dose rate limits to the public are provided in 10 CFR Part 20.1301 and 10 CFR Part 50, Appendix I. The design objectives of 10 CFR Part 50, Appendix I apply to maintaining dose as low as reasonably achievable (ALARA) for construction workers. Compliance with these regulations is discussed below.

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ER Table 4.5-1 is being revised as indicated. Underlines indicate text to be added. Strikethroughs indicate text to be deleted.

Table 4.5-1
Total Doses to Construction Workers from All Units (mrem/yr)

Pathway	Total Body	Thyroid	Skin	TEDE ¹
Direct Radiation ²	24	0	24	24
Gaseous Effluent	28	48	51	29
Liquid Effluent ³	0	0	0	0
Total	52	48	75	53
Workforce Dose⁴ from All Units (person-rem/yr)				
All pathways	170	160	250	175

¹ TEDE value is estimated by weighting the thyroid dose by 0.03 and summing with the total body dose.

² ~~Direct radiation is the conservative direct radiation dose rate estimate of 33 mrem/yr per unit multiplied by 3 units and multiplied 2080 hr/yr and divided by 8760 hr/yr. Direct radiation estimate is based on the occupational exposure measured adjacent to a commercial pressurized water reactor adjusted for differing distances from two operating small modular reactor (SMR) nuclear islands to the approximate construction area of a third SMR.~~

³ Liquid effluent dose to construction workers is zero. Water would be supplied to construction workers by the City of Oak Ridge, a source that is not affected by the liquids discharged from operational SMRs at the CRN Site.

⁴ Workforce dose is calculated by multiplying the total dose in rems to an individual construction worker by the peak workforce of 3300 workers. The peak work force of 3300 workers is conservatively assumed to remain onsite for a full year.

Notes:

mrem/yr = millirem per year

person-rem/yr = person-rem per year

TEDE = total effective dose equivalent

ER Table 4.5-2 is being revised as indicated. Underlines indicate text to be added. Strikethroughs indicate text to be deleted.

Table 4.5-2
Compliance of Construction Worker Doses from All Units with 10 CFR 20.1301 Criteria

	Construction Worker Dose	Limit
Annual Dose (mrem TEDE)	53 ¹	100
Unrestricted Area Dose Rate ² (mrem/hr)	0.0160 <u>0.006</u>	2

¹ From Table 4.5-1.

² The unrestricted area dose rate is the sum of the total body gaseous effluent dose rate from all units (~~12028~~ mrem/yr) and the direct radiation dose rate (24 mrem/yr) divided by ~~8760~~ 2080 hr/yr.

Notes:

mrem = millirem

TEDE = total effective dose equivalent

ENCLOSURE 7

Site and Technical/Regulatory Overview Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report (ER) information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with ER to reflect the information that TVA provided during the NRC audit.

This enclosure provides maps and figures of plant layout, off site structures, offsite transmission lines and associated affected areas associated with audit information needs Site Overview/Plant Description (STO-06). Supplemental information associated with audit information needs STO-01 through STO-05, STO-07, STO-08, STO-11, and STO-13 will be provided in a separate submittal, as indicated in Enclosure 1.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016 (Accession No. ML16139A752)
2. NRC Audit Plan, "Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application," dated May 7, 2017 (Accession No. ML17088A728)

Attachment:

1. Environmental Report, Revision 0, Figures, Geospatial Data Layers, Digital Imagery, and Metadata (provided on set of 5 CDs)

Supplemental Information associated with NRC Information Need Site Overview/ Plant Description (STO-06):

During the audit, the maps and figures in the ER were discussed. TVA was asked to provide publication quality files of the ER figures for future reproduction in the environmental impact statement. In addition, the geographic information system (GIS) files used to generate certain analysis and figures in the ESPA were also requested.

Attachment 1 to this enclosure provides a set of CDs that contain the ER, Revision 0, figures, geospatial data layers, digital imagery, and metadata, except for those figures previously withheld under the provisions of 10 CFR 2.390(a)(3).

Attachment 1

**Environmental Report, Revision 0,
Figures, Geospatial Data Layers, Digital Imagery, and Metadata
(provided on set of 5 CDs)**

ENCLOSURE 8

Terrestrial Ecology Supplemental Information

By letter dated May 12, 2016 (Reference 1), Tennessee Valley Authority (TVA) submitted an application for an early site permit for the Clinch River Nuclear (CRN) Site in Oak Ridge, TN. Between May 15, 2017 and May 19, 2017, the NRC conducted an audit of the Environmental Report information contained in the CRN Site Early Site Permit Application (ESPA) (Reference 2). During the face-to-face portion of the NRC audit held at the TVA offices in Knoxville, TN, the NRC requested that TVA provide supplemental information associated with ER Subsection 2.4, "Ecology," and 4.3, "Ecological Impacts," to reflect the information that TVA provided during the NRC audit.

This enclosure provides the supplemental information and supplemental information as an update of portions of SSAR Subsection 2.4 and 4.3 discussed during the audit. Specifically, this enclosure provides supplemental information associated with audit information needs for Terrestrial Ecology (TE-01, TE-04, TE-13, TE-21, and TE-22). The ER markup will be incorporated in a future revision of the ESPA.

References:

1. Letter from TVA to NRC, CNL-16-081, "Application for Early Site Permit for Clinch River Nuclear Site," dated May 12, 2016
2. Plan for Environmental Audit Related to the Clinch River Nuclear Site Early Site Permit Application, dated May 7, 2017

Attachment:

1. Electronic Copy of Barge/Traffic Area Habitat Layers (provided on CD)

Supplemental Information associated with NRC Information Need Terrestrial Ecology (TE-01):

During the audit, the NRC requested that TVA provide the geographic information system (GIS) layers used to develop ER Figures 2.4.1-1 and 4.3-1, and the habitat layers for the barge/traffic area (BTA). Supplemental information provided for Site Overview/Plant Description (STO-06) provides GIS layers for ER Figures 2.4.1-1 and 4.3-1 (See Enclosure 7). The habitat layers for the BTA are provided on the CD included in Attachment 1 to this enclosure.

Supplemental Information associated with NRC Information Need Terrestrial Ecology (TE-04):

During the audit, the timing of botanical surveys on the CRN Site and the barge/traffic area (BTA) were discussed. TVA explained that field surveys to observe and identify important plant species on the Clinch River Property were conducted in April and July 2011 and September 2013. Field surveys to identify important plant species on the BTA were conducted in May 2015. The NRC requested that TVA provide supplemental information to explain the adequacy of the botanical surveys conducted only during the month of May in the BTA.

The timing of field investigations on the CRN Site (spring, summer, and early autumn) helped to accurately identify the full suite of vascular plant species present on site, because a surveyor could visit the same area on-the-ground and see different species depending on the season. For instance, spring ephemeral species like dog-tooth violet (*Erythronium americanum*) are

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actively growing in April, but begin to senesce shortly thereafter. Similarly, many plants in the aster family such as goldenrods (*Solidago* spp.) are quite small and difficult to identify in April, but are vigorously growing and in flower in September.

With regard to conducting surveys to identify important species on the BTA, both shining ladies'-tresses (*Spiranthes lucida*) and spreading false foxglove (*Aureolaria patula*) have been previously reported from a small portion of the southern part of the BTA, just west of the Oak Ridge Bear Creek Plant. The last observation of shining ladies'-tresses and spreading false foxglove on the site were during years 2000 and 1991, respectively. The May 2015 field surveys of the wetland and associated uplands near the Oak Ridge Bear Creek Plant did not relocate individuals of either species, as neither currently occurs in the BTA. May is the flowering time for shining ladies'-tresses and would be an optimal time to search for that species. Although May is not an optimal search time for spreading false foxglove, the TVA botanists who performed the survey can readily identify the species at that time of year. In addition, other areas within the BTA are comparable to sites found on the CRN Site, which had already been surveyed during all seasons.

Supplemental Information associated with NRC Information Need Terrestrial Ecology (TE-13):

During the audit the NRC reviewer and TVA discussed the impact of permanent and temporary land area disturbances by habitat type for the BTA and for the footprint of disturbance for the underground transmission line to the Bethel Valley Substation. Based on the discussions at the audit, ER Table 4.3-1 has been expanded to include information about the BTA, based on the mapping of land cover/habitat areas in the BTA.

Supplemental Information associated with NRC Information Need Terrestrial Ecology (TE-21):

During the audit, TVA procedures and processes for complying with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, were discussed. Based on these discussions TVA was requested to provide a summary of process for monitoring and potentially relocating an osprey nest as a result of active construction, including explanation of TVA actions for both active and inactive seasons.

An osprey nest was observed on a tower supporting the 161-kV transmission line on the CRN Site and, in accordance with Executive Order 13186, monitoring of this or other such nests is proposed in advance of construction activities in the vicinity. Nests will be monitored to determine if they are active and likely to remain active at the time of scheduled construction in the area of the nest. Nests that do not contain eggs or young may be removed and their rebuilding deterred during the site preparation and construction periods. If necessary to avoid the loss of eggs or young present in a nest, construction schedules would be modified where practicable. Coordination with US Fish and Wildlife Service and application for appropriate permits would occur in the event that impacts to active nests cannot be avoided.

Supplemental Information associated with NRC Information Need Terrestrial Ecology (TE-22):

During the audit the NRC requested information on the impacts to the transmission system for the alternative sites. Impacts to Oak Ridge Reservation (ORR) Site 2 and Redstone Site 12 are provided below:

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For ORR Site 2, the impacts to the transmission system would be similar to those for the CRN Site. The connections to the 500kV and the 161kV lines would be similar in length to those for the CRN Site and the resulting impacts to the transmission system would likely be similar. For ORR Site 8, the impacts to the transmission system would be similar to the CRN Site. However, the connection to the 500kV line is 3.6 miles from ORR Site 8, requiring construction of two 500kV lines using a shared ROW of 3.6 miles.

For Redstone Site 12, the impacts to the transmission system would be large. The closest 161-kV lines are 2 to 4 miles and the closest 500-kV line is 16 to 18.6 miles from Redstone Site 12. The 500-kV mileage includes about six additional miles to avoid cutting across the airport. Even after a grid connection, impacts are expected to be significant for Redstone Site, because most of the existing capacity of the lines in this area is being used by the Browns Ferry Nuclear Plant.

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ER Table 4.3-1 is being revised as indicated. Underlines indicate text to be added.

**Table 4.3-1
Land Cover Types to be Disturbed by Development on the CRN Site**

Land Cover Types	Approximate Acreage Affected	<u>Approximate Percentage of Affected Areas</u>	Percent of cover type affected on the CRN Site ¹
<u>CRN Site</u>			
Permanently Disturbed Areas			
Herbaceous/grassland	152	47	75
Mixed evergreen-deciduous forest	106	32	27
Deciduous forest	53	16	18
Roads/developed areas	13	4	93
Evergreen forest	3	1	9
Total	327	100	
Temporarily Disturbed Areas			
Mixed evergreen-deciduous forest	90	54	23
Deciduous forest	19	11	7
Evergreen forest	17	10	53
Herbaceous/grassland	41	25	20
Total	167	100	
Total of Permanently and Temporarily Affected Areas	494		
<u>Barge/Traffic Area</u>			
<u>Permanently Disturbed Areas</u>			
<u>Herbaceous/grassland</u>	<u>1</u>	<u>3</u>	<u>NA</u>
<u>Deciduous forest</u>	<u>9</u>	<u>30</u>	<u>NA</u>
<u>Roads/developed areas</u>	<u>20</u>	<u>67</u>	<u>NA</u>
<u>Total</u>	<u>30</u>	<u>100</u>	
<u>Temporarily Disturbed Areas</u>			
<u>Herbaceous/grassland</u>	<u>1</u>	<u>7</u>	<u>NA</u>
<u>Deciduous forest</u>	<u>14</u>	<u>93</u>	<u>NA</u>
<u>Total</u>	<u>15</u>	<u>100</u>	
<u>Total of Permanently and Temporarily Affected Areas</u>	<u>45</u>		

Note:

NA = Not applicable.

¹ Approximate acreages used in the denominator of these percent calculations are from Table 2.4.1-1.
Source: Figure 4.3-1.

Attachment 1

**Electronic Copy of Barge/Traffic Area Habitat Layers
(provided on CD)**