


Agenda for Public Meeting
Between the AP1000 and ESBWR Design-Centered Working Groups (DCWGs)
and the NRC Regarding Pre-COL Activities

February 1, 2007


| Time | Topic | |
|------------|---|------|
| 9:00 a.m. | Introductory remarks | NRC |
| | Joint DCWG Session: | |
| | • DG-1145 status | NRC |
| | • Feedback on FSAR 13.1 | DCWG |
| | • COL application structure | DCWG |
| | • DCWG entity | DCWG |
| | • Preapplication interactions status | DCWG |
| | • Impact of Continuing Resolution | NRC |
| | • Status of classified security briefing | NRC |
| | • Action item review | ALL |
| 10:45 a.m. | Opportunity for public comment | NRC |
| 10:55 a.m. | Break | ALL |
| 11:00 a.m. | AP1000 DCWG Session: | |
| | • Project status | DCWG |
| | • DAC workflow | DCWG |
| | • DCD revision approach | DCWG |
| | • Status of SGI TSC briefing | NRC |
| | • AP1000-specific action item review | ALL |
| 12:00 p.m. | Opportunity for public comment | NRC |
| 12:15 p.m. | Lunch Break | ALL |
| 1:30 p.m. | ESBWR DCWG Session: | |
| | • Project Status | DCWG |
| | • DCD/ITAAC Development Criteria | DCWG |
| | • Parallel Review/ESBWR Design Changes | DCWG |
| | • ESBWR-specific action item review | ALL |
| 2:30 p.m. | Opportunity for public comment | NRC |
| 2:40 p.m. | Break | ALL |
| 2:45 p.m. | Environmental Report pre-application discussion | ALL |
| 4:30 p.m. | Adjourn | NRC |

Enclosure



**AP1000-ESBWR
Design Centered Work
Group**

Joint Meeting with NRC Staff
February 01, 2007



Introductory Remarks

Agenda

Joint DCWG Session:

| | |
|--|----------|
| DG-1145 status | NRC |
| FSAR 13.1 level of detail | DCWG/NRC |
| COL application structure | DCWG |
| Preapplication interactions status | DCWG |
| Impact of Continuing Resolution | NRC |
| Status of classified security briefing | NRC |
| Action item review | All |

AP1000 DCWG Session:

| | |
|----------------------------|------|
| Project status | DCWG |
| DAC workflow | DCWG |
| DCD revision approach | DCWG |
| Status of SGI TSC briefing | NRC |

ESBWR DCWG Session:

| | |
|--------------------------------------|------|
| Project Status | DCWG |
| DCD/ITAAC Development Criteria | DCWG |
| Parallel Review/ESBWR Design Changes | DCWG |

Environmental Report pre-application discussion


February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

2


DG-1145 Status

NRC Staff



Standardization Challenge: Organizational Descriptions (FSAR 13.1)


Amy Monroe
AP1000 DCWG



Standardization Challenge: Organizational Descriptions

- Originally briefed Oct 24, 2006
- FSAR Section 13.1 – Organization
- Guidance
 - DG-1145
 - SRP
- Significant level of detail proposed
 - Drives applications to site-specific level
 - Timing issues associated with information
 - Drives applicants to FSAR changes in future
- Industry proposal: functional level of detail
 - Allows for standardization
 - Matches level of detail commensurate with DCD
 - Provides adequate information to make reasonable assurance finding
- NRC Feedback

February 01, 2006 Joint AP1000-ESBWR DCWG Meeting 5



COL Application Structure

Peter Hastings
AP1000 DCWG

| Part No. | COLA Part Content | Regulation / Guidance Document [refs per proposed rule changes] |
|----------|--|--|
| 0 | Cover Letter(s) | •10 CFR 52.75(b) > 50.30(b) |
| 1 | General and Administrative Information | •10 CFR 52.77 > 50.33 & 50.75 |
| 2 | Final Safety Analysis Report | •10 CFR 52.79(a), (b), and (d) •10 CFR 52, Appendix #. III.A/B |
| 3 | Environmental Report | •10 CFR 52.79(a)(1) •10 CFR 51.50(c)(1) and (2) •10 CFR 50.80(c) |
| 4 | Technical Specifications | •10 CFR 52.79(a)(30) •10 CFR 50.33(f)(3) and 50.36 |
| 5 | Emergency Plan | •10 CFR 52.79(a)(21) > 50.47 & App E •10 CFR 52.79(b)(4) |
| 6 | LWA Request (including Site Redress Plan) | •10 CFR 50.10 |
| 7 | Generic DCD Departures Report | •Sections IV.A.2.b & X.B.3.a of DC Rule |
| 8 | Safeguards/Security Plans | •10 CFR 52.79(b), 52.79(a)(35) and (36) •10 CFR 50.34(c) and (d) |
| 9 | Site-specific PRA information, if necessary | •10 CFR 52.79(a)(46) |
| 10 | ITAAC & ITAAC Closures (ITAAC Design Descriptions) | •10 CFR 52.80(a) •10 CFR 52.79(a)(36)(iv), (b)(3), (d)(3) |

February 01, 2006 Joint AP1000-ESBWR DCWG Meeting 7

COL Application – Add'l Information

| Part No. | Additional Information | Regulation / Guidance Document [refs are per proposed rule changes] |
|----------|--|--|
| 11 | COLA Enclosures [or electronic "Reference Documents"] | •Electronic Submittal Guidance |
| 11A | Copy of Referenced Generic DCD (IBR via FSAR & ER [SAMDA only] sections) | •10 CFR 52, Appendix #, III.A/B |
| 11B | Copy of Referenced ESP Application & Permit (IBR via FSAR & ER sections) | •10 CFR 52.79(a)(1), (b)(1) •10 CFR 52.39(a)(2)(iv) |
| 11C | Copy of Referenced ESP Environmental Impact Statement (IBR via ER sections) | •10 CFR 51.50(c) |
| 11D | Copy of State Government Emergency Plan (IBR via Part 0 [Cover Letter]) | •10 CFR 52.79(d), (a)(21), (a)(22) |
| 11E | Copy of Local Government Emergency Plan (IBR via Part 0 [Cover Letter]) | •10 CFR 52.79(d), (a)(21), (a)(22) |
| 11F | Copy of any other Incorporated by Reference Document (e.g., Quality Assurance Plan [Topical Report] IBR via FSAR Chapter 17) | •10 CFR 52.79(a)(25) |

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

8

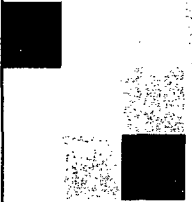
COL Application Structure - Misc

- Construction Information
 - Suggestion during DG-1145 development on compartmentalizing construction information (i.e., not relevant to operation or future design change considerations) for ready relegation to historical status for operations phase
 - Several sections could be consolidated in an appendix for this purpose
 - Did NRC incorporate recommendation? Should we implement for COLAs currently in progress?
- Supporting Information
 - Items requested by DG-1145 but not appropriate for inclusion in FSAR, ER, etc.
 - Plan to submit by separate letter as "supporting information"
 - Will finalize list upon issuance; examples:
 - Key references/cross references (based in part on electronic submittal subgroup efforts)
 - Reviewer aids, e.g., COL II – FSER AI cross reference

February 01, 2006


Joint AP1000-ESBWR DCWG Meeting

9




Pre-Application Interactions Status

Tom Williamson
ESBWR DCWG



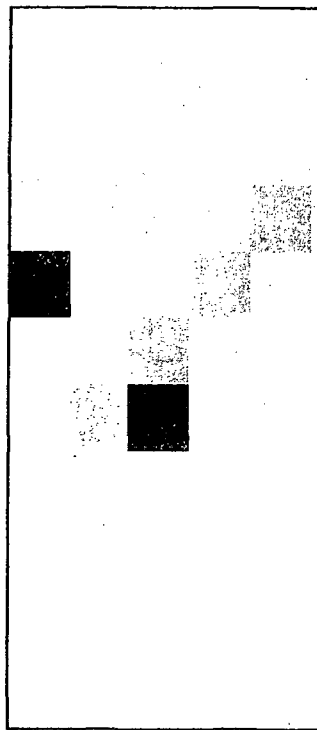
Impact of Continuing Resolution

NRC Staff



Action Item Review

Gina Borsh
ESBWR DCWG



AP1000 DCWG Session

Technical Report Status

- Westinghouse TRs
 - As of 1/30/07: 48/81 = 59%
 - Several pending (imminent) to ~70%
- Non-Westinghouse TRs

| | <u>Plan Date</u> |
|--|------------------|
| □ Containment LRT | 2/9/2007 |
| □ RV Material Surveillance | 2/16/2007 |
| □ MOV Program | 2/16/2007 |
| □ Environmental Qualification | 2/23/2007 |
| □ Preservice & Inservice Inspection | 2/23/2007 |
| □ Process & Effluent Monitoring & Sampling | 3/2/2007 |
| □ Preservice & Inservice Testing | 3/2/2007 |
- AP1000 DCWG monthly report next week to include non-Westinghouse TRs

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

14

Design Acceptance Criteria (DAC) Closure Process

Andrea Sterdis
AP1000 DCWG

Design Acceptance Criteria

- For design certification, requirements of 10 CFR 52 apply in addition to those of 10 CFR 50
- Part 52 requires level of design detail beyond a simple commitment to conformance with the existing requirements
- 10 CFR §52.47(b)(1) also states “this rule must provide an essentially complete nuclear power plant design except for site-specific elements”

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

16

Design Acceptance Criteria

- For AP1000, Design Certification defines DAC in 3 areas
 - Piping
 - I&C
 - Human Factors
- SECY-02-0059 defines acceptability of DAC during Design Certification review for all 3 areas
 - DAC approach defined as a possible substitute for required design details (but should be limited)
 - DAC enables NRC Staff to make a final safety determination, subject only to satisfactory design implementation and verification by the COL applicant, through appropriate use of ITAAC
 - NRC Staff defined DAC as a set of prescribed limits, parameters, procedures, and attributes upon which the NRC relies, in a limited number of technical areas, in making a final safety determination to support a design certification
- The acceptance criteria for DAC (i.e., Design ITAAC) are part of the design certification and referred to as Tier 1, Material (or Tier 1, Information)

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

17

Design Acceptance Criteria

- Timing of DAC closure
 - Not required to be closed prior to COL
 - All 3 DAC areas are being addressed through the implementation of detailed design to close as early as possible
 - Closure varies by subject area

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

18

Design ITAAC: Piping DAC

- Leak-before-break—Issued
- A significant set of piping calculations are issued and available for NRC inspection/review
- Remainder are planned and scheduled
- All piping calculations should not be required to close the DAC
- As-built ITAAC for piping analyses for safety-related piping will remain
- Bottom line:
 - Sufficient piping analyses are issued and Piping DAC can be closed

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

19

Design ITAAC: Protection and Safety Monitoring I&C DAC

- Design Certification included trips, ESF actuations and minimum inventory for dedicated indication and control
- Design Certification included the certification of the 5-phase design and implementation process
 - Conceptual (project definition) phase
 - System definition phase
 - Hardware and software design and implementation
 - System integration and test phase
 - Installation phase (including final V&V)

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

20

Design ITAAC: Protection and Safety Monitoring I&C (cont'd)

- A report exists and concludes that the process defines the organizational responsibilities, activities, and configuration management controls for the following:
 - 11a) Establishment of plans and methodologies
 - 11b) Specification of functional requirements
 - 11c) Documentation and review of hardware and software
 - 11d) Performance of system tests and the documentation of system test results
 - 11e) Performance of installation tests and inspections

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

21

Design ITAAC: Protection and Safety Monitoring I&C (cont'd)

- Conceptual (project definition) phase – 11a)
 - Planning and programmatic documents provided to NRC for inspection October 2006
- System definition phase underway; revisions to Functional Diagrams in process – 11b)
 - Functional Design completion sufficient to close
- Hardware and Software design planned and scheduled – 11c)
 - Sufficient progress should allow this DAC to be closed in the same time frame as the COL reviews
- Remaining acceptance criteria 11d) and e) require equipment to be procured and installed; replace with As-Built ITAAC, not DAC

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

22

Design ITAAC: Main Control Room/ Human Factors Engineering

- Design Certification included certification of 5-Phase design and implementation process:
 - Planning
 - Analysis
 - Design
 - V&V
 - Operation
- Planning (Complete, NRC review of TR 72 underway)
 - NRC meeting held in November 2006

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

23

Design ITAAC: Main Control Room/ Human Factors Engineering (cont'd)

- Analysis (Partial Completion Prior to COL Issuance)
 - Operating Experience Review
 - Functional Requirements/Functional Allocation
 - Task Analysis
 - Staffing
 - Human Reliability Analysis (Complete, NRC review of TR 59 Underway)
- Design (Partial Completion Prior to COL Issuance)
 - Human System Interface Design
 - Procedure Development
 - Training Development

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

24

Design ITAAC: Main Control Room/ Human Factors Engineering (cont'd)

- Verification and Validation (Post-COL Completion)
- Bottom Line:
 - NRC review of design efforts is underway
 - Some DAC can be closed in the same time frame as the COL review
 - Some remaining DAC may be re-written to be more specific in scope

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

25

Design ITAAC Closure Process

- The same for all DAC
 - Vendor completes sufficient design
 - Interaction with staff to confirm sufficiency
 - Technical Reports submitted for NRC review; detailed design documentation available for staff inspection/audit
 - Reasonable assurance conclusion reached by Staff
 - DAC items are closed
 - Design Certification Amendment
 - or
 - Individual SERs on TRs

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

26

DCD Revision Approach

Peter Hastings
AP1000 DCWG

Referencing AP1000 DCD Revision


- December 2006 presentation discussed option of referencing revised DCD
- DCWG has determined this to be most efficient approach; finalizing/implementing plan
- AP1000 DCD Revision 16 submittal anticipated Spring 2007
 - Current COLA drafts reference DCD Rev 15 plus TRs
 - Anticipate conforming change to Rev 16 prior to COLA submittal
- NRC Staff feedback sought
 - Approach on "one issue, one review" to include TR subjects in DC rulemaking
 - Confirm acceptability of referencing Rev 16

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting


28

ESBWR DCWG Session



DCD/COLA ITAAC Development

Tom Williamson
ESBWR DCWG



ITAAC & COL Applicant

- Critical interest in ITAAC
 - Develop site-specific ITAAC
 - Close DCD ITAAC

February 01, 2006 Joint AP1000-ESBWR DCWG Meeting 31

Jan 9, 2007 GE/NRC Meeting

- Agreement in Principle
 - Specificity needed
 - ITAAC development process

- Continued Dialogue
 - ITAAC scope (i.e., what portion of Design Description becomes ITAAC)

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

32

ESBWR DCWG Initiative

- ITAAC development criteria
 - DCD Tier 2 S14.3
- DCD ITAAC review
 - Appropriateness
 - Clarity
 - Closure

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

33


Path Forward

- Improved DCD ITAAC
 - Recommendations to GE from NRC & DCWG
 - Incorporation in DCD as soon as practicable
- Continued interaction w/Staff
 - GE
 - Industry (DCWG/NEI)
- Desired outcomes
 - Agreement on ITAAC scope & content
 - Inspectable & closeable ITAAC

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

34



Parallel Review/ ESBWR Design Changes

Steve Love
ESBWR DCWG

Parallel Review

- Basic assumption of submitting a COLA before DCD is certified
- Fundamental principle – DCD space and COL space are separate
- Future COL revisions to be submitted to NRC coincidental with DCD revisions

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

36

Parallel Review

- DCD SCHEDULE
- DCD Rev. 3 – February 22, 2007
- DCD Rev. 4 – 1st Quarter 2008
- COL SCHEDULE
- COLA Rev. 0 – November 9, 2007
- COLA Rev. 1 – 1st Quarter 2008

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

37

Goals & Objectives

- Cooperative effort between GE and COL Applicants to identify potential impacts to COLA content from DCD changes under development
- Facilitate efficient NRC Staff review
- Frequent communication with NRC Staff on potential changes

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

38



Environmental Report COLA Pre-Application Discussions

Discussion Topics

- Pre-Application Site Visits, Suggested Approach
- COLA ER, New & Significant (N&S) Review Process, Overview
- Discussion of N&S Review implementation
 - North Anna COLA ER 4.1, N&S Review
 - Grand Gulf COLA ER 5.1, N&S Review
- Demonstration that Facility Falls within ESP Design Parameters, Site Characteristics
 - Grand Gulf COLA ER Table 3.0-201 (Design Parameters review)
 - North Anna COLA ER Table 3.0-1 (Site Characteristics review)
- Going forward: Potential Future Pre-Application Topics

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

40

Environmental Report Pre-Application Site Visits

- Background
 - NRC proposed Six-Step Plan for pre-application site visits
 - Schedule constraints: Alternative approach, supporting NRC intent
- Adapt to COLA specifics (ESP, existing site, etc.)
- Generally: Three Step (or Visit) process

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

41

Visit 1 – Introduction or Update

- Introduction of NRC Environmental Project Manager, Utility Environmental Project Manager, Utility Licensing Manager, Utility Environmental Project Staff (as appropriate)
- Tour of site
- Review of site selection process with discussion of top alternate sites
- Review of environmental data collection; possible observation
 - Note that many of applicants have completed sampling
- Review of interactions with state environmental agencies and any other regulatory/permitting agencies desired.
- Adapt as needed, if Visit 1 is not on-site

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

42

Visit 2 - Stakeholders

- NRC visit with state environmental regulators agencies and any other regulatory/permitting agencies desired.
 - Should be scheduled such that utility has briefed the state regulators prior to meeting with NRC
- Public information meeting with local community
 - Depending on proximity of site to state capitol it may be possible to combine this with Visit 1

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

43

Visit 3 - Records Review

- Review draft sections of the Environmental Report.
 - May occur at utility site or at ER contractor offices
- Review records for Environmental Report.

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

44

3 Visit Approach: Suggested Schedule

- First visit could be supported, for most objectives, at NRC HQ
- Applicants establish a schedule to begin Visit 1 in February.
- Recommend coordination of visits to reduce travel
 - For example visit Lee and Summer the same week.
 - Possible coordination between applicants to hold joint pre-appl mtgs at a site (as was considered for North Anna and Grand Gulf @ the North Anna site)

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

45

Discussion of New & Significant Review Implementation

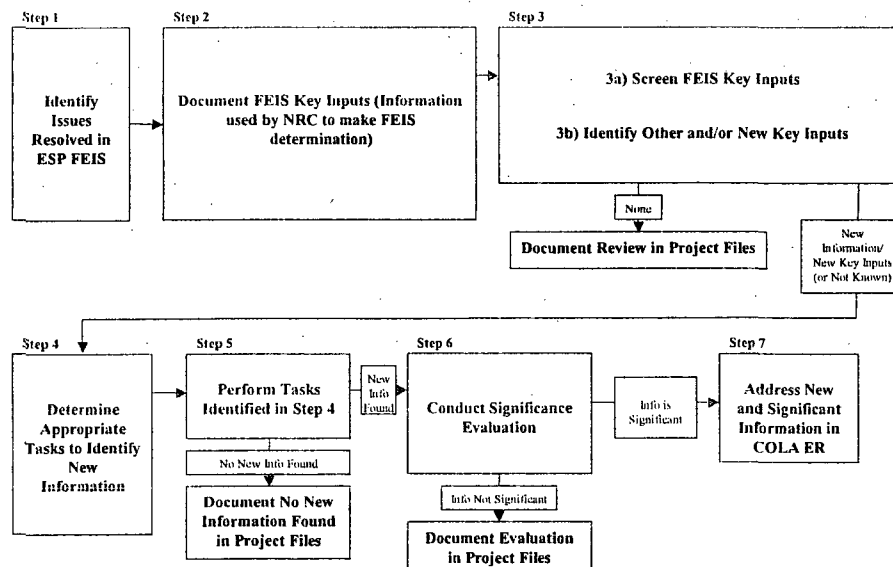
- N&S Process presented in 12/7/06 NRC-DCWG Meeting
- Continued joint effort to develop ESBWR DCWG N&S review
- Procedural work
- North Anna and Grand Gulf N&S review going forward
- Process and example discussion

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

46

COLA ER New and Significant Information Process - Flowchart



February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

47

North Anna COLA ER 4.1, N&S Review

Implementing the New and Significant Process for Land Use Impacts – Construction (ER Section 4.1)

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

48

Step 1: Identify Issues Resolved in the North Anna ESP FEIS

- Reviewed EIS Section 4.12, “Summary of Construction Impacts”
- Determined that the “Land Use Impacts – Construction” issue was resolved in the EIS
- NRC finding: “SMALL” impact level

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

49

DRAFT WORK IN PROGRESS
New and Significant Review - Land Use - Construction Page 1 of 28

Example 1

Construction Impacts at the Proposed Site

- Use of constructed facilities for alternative purposes, or their removal
- Mitigation of contamination resulting from site preparation and preliminary construction or post-construction activities

The staff reviewed the list of adverse site preparation and preliminary construction activities. The extent that the ESBW is agreed for the North Anna site and reviewed the full set of impacts that would be identified by the staff. As a result of the staff's review and the staff's experience with 10 CFR 52.25(a), the staff concludes that the potential site preparation and preliminary construction activities identified in Dominion's site review plan would not result in any significant adverse environmental impacts that could not be mitigated. In addition, consistent with 10 CFR 52.25(a), the staff recommended the reduction of the site review plan as an ESBW condition in Title J.2.

4.12 Summary of Construction Impacts

Impact level categories defined in Table 4-1 as SMALL, MODERATE, or LARGE were assigned to each resource area based on the staff's evaluation and conclusions regarding expected adverse environmental impacts, if any. A brief statement explains the basis for the impact level. Some impacts, such as the reduction of the revenue from Dominion for the local economies, are likely to be beneficial or neutral to the community, and are noted as such.

Table 4-1 Characterization of Impacts from Construction of the Closed Cycle Cooling System for Unit J at the North Anna ESP Site

| Category | Comments | Impact Level |
|-----------------------------|---|--------------|
| Land use impacts | | |
| The site and scenery | Construction activities will take place within existing site boundaries. | SMALL |
| Transportation and highways | No new construction and no new travel routes will be required. | SMALL |
| Air quality impacts | Construction activities will be conducted in accordance with applicable Virginia administrative codes, and dust and emissions will be controlled through a dust control plan. | SMALL |

NREG-1811, Volume I 4-50 December 2006

T. Potentially Time-Sensitive C. Commitment P. Project-Defined

February 01, 2006 Joint AP1000-ESBWR DCWG Meeting 50

DRAFT WORK IN PROGRESS
New and Significant Review - Land Use - Construction Page 3 of 28

Example 2

Construction Impacts at the Proposed Site

Table 4-1. (contd.)

| Category | Comments | Impact Level |
|---------------------------------|--|---------------------------------|
| Economy | Economic impacts of construction activities are limited to local economies, in the most ranging from small to moderately beneficial. | SMALL to BENEFICIAL to MODERATE |
| Transportation | Planned upgrades and traffic management plans would reduce temporary construction transportation impacts. Impacts could be moderate in some areas without planned upgrades. | SMALL to MODERATE |
| Tenure | Depends on residence location, generally, impacts are beneficial, especially for property taxes and employment, ranging from small to moderate (Louisa County). | SMALL to BENEFICIAL to MODERATE |
| Recreation | Visual impacts of construction would be limited and temporary. Increases in use of Lake Anna would be expected to increase, and traffic mitigation would have impacts small. Impacts could be moderate if mitigation measures are not undertaken. | SMALL to MODERATE |
| Housing | Adequate housing is available in Herndon and Spotsylvania Counties and in the City of Herndon to handle construction workers, if more construction workers than expected locate in Orange and Louisa Counties, the impact could be moderate. | SMALL to MODERATE |
| Public services | Public services are adequate for any temporary influx of workers resulting from construction at the NAPS site. | SMALL |
| Education | If no additional school capacity is added, then the impact in Louisa County could be moderate. If Louisa County builds new schools to accommodate the temporary influx of construction workers, then off counties would have room for additional students. | SMALL to MODERATE |
| Historic and cultural resources | Most of the proposed construction sites is previously disturbed, and Dominion has a well-managed cultural resource program in place at NAPS. | SMALL |
| Environmental justice | No watershed is likely to be disproportionately affected. | SMALL |

NREG-1811, Volume I 4-50 December 2006

T. Potentially Time-Sensitive C. Commitment P. Project-Defined

February 01, 2006 Joint AP1000-ESBWR DCWG Meeting 51

Step 2: Document EIS Key Inputs (information used by NRC to make EIS determination)

Performed line-by-line review of EIS Sections 4.1, 4.6, 4.10, 4.12, 7.1, and Appendix J.

- Identified key inputs and assumptions with brackets on hardcopy pages of EIS
- Added a unique number for each key input.
- Prepared Table 1, "Identification of Key Inputs and Assumptions and New Information."
- Listed unique numbers for EIS key inputs in Part 1, Column 1, of Table 1.

N&S Process, Supporting Documentation

DRAFT WORK IN PROGRESS
 North Anna COL Project
 Land Use Impacts - Construction (ER Section 4.1)
 January 16, 2007

Land Use Impacts - Construction (ER Section 4.1)
Table 1. Identification of Key Inputs and Assumptions and New Information

| Part 1 - FEIS Key Inputs or Assumptions | | | | | |
|---|---------------------|------------|------------------------------|----------------------------|-----------------------------|
| (Column 1) | (Column 2) | (Column 3) | (Column 4) | (Column 5) | (Column 6) |
| Key Input or Assumption | Category (see Note) | Assessment | is Further Action Necessary? | New Information Found? Y/N | New Information Signif? Y/N |
| <u>FEIS Section 4.1</u> | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| Etc | | | | | |
| | | | | | |
| | | | | | |

Note: T: Potentially Time-Sensitive, C: Commitment, P: Project-Defined

Step 3: EIS Screening and Identification of Other Inputs

- Step 3a: Screening Assessment of EIS Key Inputs
 - Screened each EIS key input; assessed need for research/obtaining new information
 - Categorized each key input and assumption;
 - Documented in Part 1
- Step 3b: Identification of Other Inputs to be considered
 - Aware of information (1) not considered in ESP ER, EIS; and (2) not generally known or publicly available during EIS preparation?
 - Documented in Part 2

N&S Process, Supporting Documentation

DRAFT WORK IN PROGRESS
 North Anna COL Project
 Land Use Impacts – Construction (ER Section 4.1)
 January 16, 2007

Land Use Impacts – Construction (ER Section 4.1)
 Table 1. Identification of Key Inputs and Assumptions and New Information

| Part 2 – New Information | | | | | |
|--|---------------------|------------|------------------------------|----------------------------|----------------------------------|
| Identification of New Information | | Response | | | |
| Beyond the items identified in Part 1 | | 1) | | | |
| 1) Does any new information (not considered in preparing the ESP ER or the EIS, and not generally known or publicly available during preparation of the EIS) exist that could have an impact on EIS conclusions? | | 2) | | | |
| 2) Did the review of the ESP ER identify an input or assumption which needs to be considered for obtaining new information? | | | | | |
| (Column 1) | (Column 2) | (Column 3) | (Column 4) | (Column 5) | (Column 6) |
| New Information Item | Category (see Note) | Assessment | Is Further Action Necessary? | New Information Found? Y/N | New Information Significant? Y/N |
| T | | | | | |
| etc | | | | | |
| | | | | | |
| | | | | | |

Note: T: Potentially Time-Sensitive, C: Commitment, P: Project-Defined

Step 4: Determine Appropriate Tasks to Identify New Information

- For each EIS key input or other/new key input identified in Steps 3a and 3b, the review team will:
 - Confirm that it is a key input or assumption.
 - Confirm the category.
 - Identify any actions necessary to attempt to determine if there is new information, i.e. check websites, contact regulatory agencies, etc.
- Document subject matter reviewers involved

N&S Process, Supporting Documentation

DRAFT WORK IN PROGRESS
 North Anna COL Project
 Land Use Impacts – Construction (ER Section 4.1)
 January 16, 2007

Page 3 of 3

Land Use Impacts – Construction (ER Section 4.1)
 Table 1. Identification of Key Inputs and Assumptions and New Information

| Part 3 – Meeting Information | |
|------------------------------|--|
| Date | Meeting Attendees / Position: ■ Dominion: ■ Bechtel: ■ F&NUS: |

Step 5: Perform Tasks Identified Above

- Summarize findings in Column 3 of Part 1 or 2. Document in Column 5, YES if new information was found and NO, if no new information found.
 - If YES, use new information in significance evaluation
 - If NO, document no new information found

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

60

Step 6: Conduct Significance Evaluation

- Reviewers consider new information in significance evaluation
- If there is a potential to affect the finding or conclusions of the NRC Staff's evaluation of the issues, the new information is significant and is to be added to COLA ER
- "Affect the finding or conclusions" primarily understood to mean change in level of impact (where explicitly stated in EIS)
- If not significant, document results of evaluation in auditable form

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

61

Step 7: Address New and Significant Information in COLA ER

- For new and significant information add to appropriate sections of COLA ER
 - Place in data section
 - Use in impact evaluation sections

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

62

Grand Gulf COLA ER 5.1, N&S Review

- Jointly developed concepts and process
- Review conducted re: Land Use Impacts from Operations (COLA ER Section 5.1)
- Documentation of review captured in tables, reference material as necessary
- Examples of key input review

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

63

Grand Gulf COLA ER 5.1, Cont'd

- No new and significant information identified in review
- Introductory statement text
- Use of "Left Margin Annotations" to describe content
- Project "Open Item"
 - Administrative tool in material development; resolved prior to submittal
 - Example in ER 5.1: Transmission and Distribution Study

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

64

Draft GG COLA ER 5.1

DRAFT WORK IN PROGRESS
January 15, 2007

Grand Gulf Nuclear Station Unit 2
Combined License Application
Part 5, Environmental Report

5.1 Land-Use Impacts

The information for this section is provided in the EEP Application Part 5 – Environmental Report and associated impacts are fully resolved in NUREG-1517. The following supplemental information is provided in accordance with 10 CFR 50.103(b)(2):

5.1.1 The Site and Vicinity

SCPP NUREG-1517 Section 5.1.1 resolved that land-use impacts in the vicinity of the EEP facility due to operations would be SMALL. No additional information provided.

5.1.2 Transmission Corridors and Offsite Areas

SCPP NUREG-1517 Section 5.1.2 resolved that the land-use impacts in the transmission line rights-of-way and offsite areas from EEP facility operations would be SMALL. This finding is based on the fact that the current transmission system serving the GENS site is likely to be needed, and under the bounding assumptions of the PPE and that upgrades to the existing transmission line rights-of-way or new rights-of-way may be required.

PROJECT WRITER'S NOTE: Any new and significant information on new upgraded transmission system right-of-way will be included as appropriate upon completion of the Energy Transmission and Distribution (T&D) study.

5.1.3 Historic Properties

SCPP NUREG-1517 Section 5.6 resolved that the potential impacts of facility operations on historic and cultural resources would be SMALL. No additional information provided.

References

1. NUREG-1517, "Environmental Impact Statement for an Early Site Permit (EEP) at the Grand Gulf Site"

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

65

Evaluation of ESP Design Parameters, Site Characteristics

- Regulation: **Proposed** 51.50(c)(i)
 - “information to demonstrate design of the facility falls within the site characteristics and design parameters specified in the ESP.”
 - Two “demonstrations”: (1) Site Charac. (2) Design Parameters
 - Draft ESP Template recently produced by NRC (GG ESP ASLB)
- Approach: Primarily, use of Table(s) in ER Chapter 3, augmented as appropriate, in ER Chapter 3 text
- DCWG cooperative effort. Some differences appropriate for application specific factors
- Objective Today: Example of each “demonstration”
 - Draft GG COLA ER Table 3.0-201 (Design parameters)
 - Draft NAPS COLA ER Table 3.0-1 (Site characteristics)

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

66

Compare COLA Design Characteristics with ESP Design Parameters

See separate handout: “DRAFT GG COLA ER Table 3.0-201”

DRAFT WORK IN PROGRESS
January 17, 2007

Grand Gulf Nuclear Station Unit 2
Compliance License Application
Part 3, Environmental Report

Table 3.0-201
Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics

| ESP Design Parameter | ESP Parameter | COL DESIGN CHARACTERISTIC | COMPARISON | Comments |
|----------------------|---------------|---------------------------|------------|----------|
| 1.1.1 | 125 ft | 125 ft | Yes | |
| 1.1.2 | 125 ft | 125 ft | Yes | |
| 2.1.1 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.2 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.3 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.4 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.5 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.6 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.7 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.8 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.9 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.10 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.11 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.12 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.13 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.14 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.15 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.16 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.17 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.18 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.19 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.20 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.21 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.22 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.23 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.24 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.25 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.26 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.27 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.28 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.29 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.30 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.31 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.32 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.33 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.34 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.35 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.36 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.37 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.38 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.39 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.40 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.41 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.42 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.43 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.44 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.45 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.46 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.47 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.48 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.49 | 1675-1800 ft | 1675-1800 ft | Yes | |
| 2.1.50 | 1675-1800 ft | 1675-1800 ft | Yes | |

February 01, 2006

Page 1 of 9

67

Evaluation of ESP Site Characteristics

See separate handout: "DRAFT North Anna COLA ER Table 3.0-1"

DRAFT WORK IN PROGRESS
January 17, 2007

North Anna
Combined License Application
Part 3 - Environmental Report

DRAFT Table 3.0-1
Evaluation of ESP Site Characteristics

| ESP Site Characteristics (From NUREG-1811, Volume 1, Table 1.1) | | | COL (Value) | Is ESP Site Bounding? (Yes/No) | Notes |
|--|--|---|--|--------------------------------------|-------|
| Item | Single Unit Value | Description & References | | | |
| Atmospheric Dispersion (AD) (Accident) | | 7-metric tonne $0.49 \times 10^3 \text{ sec}^{-1}$ $7.30 \times 10^4 \text{ g}^{-1} \text{ m}^3$ ESB | | | |
| * Evictor Area Exceeding (EAB) | $1.24 \times 10^3 \text{ sec}^{-1}$ | 0.6 day decay | $1.24 \times 10^3 \text{ sec}^{-1}$ | Yes | TEC |
| * Low Population Zone (LZ) | $2.17 \times 10^3 \text{ sec}^{-1}$ | 0.6 day decay | $2.17 \times 10^3 \text{ sec}^{-1}$ | Yes | TEC |
| | $1.2 \times 10^3 \text{ sec}^{-1}$ | 1.0 day decay | TEC | TEC | TEC |
| | $1.2 \times 10^3 \text{ sec}^{-1}$ | 1.0 day decay | TEC | TEC | TEC |
| Gaseous Effluents Dispersion Decision (Annual Average) | | | | | |
| * Atmospheric Dispersion (AD) | $0.49 \times 10^3 \text{ sec}^{-1}$ Detailed in ER Table 3.0-1.4 | The proposed dispersion coefficients used in calculations of potential exposure rates. | $0.49 \times 10^3 \text{ sec}^{-1}$ Detailed in ER Table 3.0-1.4 | Yes | TEC |
| Residence | $1.2 \times 10^3 \text{ sec}^{-1}$ | 1.0 day decay | $1.2 \times 10^3 \text{ sec}^{-1}$ | Yes | TEC |
| | $1.2 \times 10^3 \text{ sec}^{-1}$ | 1.0 day decay | $1.2 \times 10^3 \text{ sec}^{-1}$ | Yes | TEC |

February 01, 2006

DRAFT WORK IN PROGRESS

Page 1 of 6

68

Going Forward: Potential Future DCWG and Pre-Application Topics/Activities

- Support NRC proposed approach on pre-application interface
 - Continued discussions on common approaches (Pre-Application topic discussions at NRC or sites)
 - Cooperate on mutually agreeable pre-application interaction approach (e.g., proposed 3 visit process)
- Potential Future topics
 - Approach to T&D Right of Way construction impacts
 - Need for Power
- Next steps

February 01, 2006

Joint AP1000-ESBWR DCWG Meeting

69

Construction Impacts at the Proposed Site

- use of constructed facilities for alternative purposes, or their removal
- remediation of contamination resulting from site preparation and preliminary construction or site redress activities.

The staff reviewed the list of allowed site preparation and preliminary construction activities in the event that the ESP is granted for the North Anna site and reviewed the full site redress plan submitted by Dominion. As a result of its own independent review, the staff, in accordance with 10 CFR 52.25(a), concludes that the potential site preparation and preliminary construction activities described in Dominion's site redress plan would not result in any significant adverse environmental impacts that could not be redressed. In addition, consistent with 10 CFR 52.25(a), the staff recommended the inclusion of the site redress plan as an ESP condition in Table J-3.

4.12 Summary of Construction Impacts

Impact level categories denoted in Table 4-1 as SMALL, MODERATE, or LARGE were assigned to each resource area based on the staff's evaluation and conclusions regarding expected adverse environmental impacts, if any. A brief statement explains the basis for the impact level. Some impacts, such as the addition of tax revenue from Dominion for the local economies, are likely to be beneficial impacts to the community, and are noted as such.

Table 4-1. Characterization of Impacts from Construction of the Closed-Cycle Cooling System for Unit 3 at the North Anna ESP Site

| Category | Comments | Impact Level |
|---------------------------------|--|--------------|
| Land-use impacts | | |
| The site and vicinity | Construction activities would take place within existing site boundaries. | <u>SMALL</u> |
| Transmission line rights-of-way | No new transmission line rights-of-way would be needed. | <u>SMALL</u> |
| Air quality impacts | Construction activities would be conducted in accordance with applicable Virginia administrative codes, and dust and emissions would be minimized through a dust control plan. | SMALL |

Construction Impacts at the Proposed Site

Table 4-1. (contd)

| Category | Comments | Impact Level |
|-----------------------------------|--|--------------|
| Water-related impacts | | |
| Hydrological alterations | Impacts would be localized and temporary. Construction activities would be conducted in accordance with applicable Virginia administrative codes and ACE permit processes; hydrological impacts would be minimized through application of best management practices. | SMALL |
| Water use | Minimal water usage during construction. | SMALL |
| Water quality | Construction would be conducted using best management practices to control spills and storm water runoff. | SMALL |
| Ecological impacts | | |
| Terrestrial ecosystems | No important terrestrial species would be affected by construction at the NAPS site. | SMALL |
| Aquatic ecosystems | Construction impacts to benthic habitats would be temporary. | SMALL |
| Threatened and endangered species | There are no Federally listed species in the vicinity. | SMALL |
| Socioeconomic impacts | | |
| Physical impacts | | |
| Workers/local public | Construction takes place within existing plant boundaries, so impacts to the public would be minimal. Impacts to workers would be mitigated with training and protective equipment. | SMALL |
| Buildings | Construction would not affect any offsite buildings, and onsite buildings were constructed to withstand vibration from construction activities. | SMALL |
| Roads | Growth would put pressure on local road systems, but traffic control and management measures would protect any local roads during construction. | SMALL |
| Aesthetics | Construction activities would be temporary, and observation points would be limited because of site location. | SMALL |
| Demography | Percentage of construction workers relocating to the region would be small. Most would already live within the region. | SMALL |
| Community characteristics | | |

Construction Impacts at the Proposed Site

Table 4-1. (contd)

| Category | Comments | Impact Level |
|--|--|--|
| Economy | Economic impacts of construction overall are beneficial to local economies, in this case ranging from small to moderately beneficial. | SMALL BENEFICIAL to MODERATE BENEFICIAL |
| Transportation | Planned upgrades and traffic management plans would reduce temporary construction transportation impacts. Impacts could be moderate in some areas without planned upgrades. | SMALL to MODERATE |
| Taxes | Depends on residence location; generally, impacts are beneficial, especially for property taxes and employment, ranging from small to moderate (Louisa County). | SMALL BENEFICIAL to MODERATE BENEFICIAL |
| Recreation | Visual impacts of construction would be limited and temporary. Recreational use of Lake Anna would be expected to increase, and traffic mitigation would keep impacts small. Impacts could be moderate if mitigation measures are not undertaken. | SMALL to MODERATE |
| Housing | Adequate housing is available in Henrico and Spotsylvania Counties and in the City of Richmond to handle construction workers. If more construction workers than expected locate in Orange and Louisa Counties, the impact could be moderate. | SMALL to MODERATE |
| Public services | Public services are adequate for any temporary influx of workers resulting from construction at the NAPS site. | SMALL |
| Education | If no additional school capacity is added, then the impact in Louisa County could be moderate. If Louisa County builds new schools to accommodate the temporary influx of construction workers, then all counties would have room for additional students. | SMALL to MODERATE |
| Historic and cultural resources | Most of the proposed construction area is previously disturbed, and Dominion has a well-managed cultural resource program in place at NAPS. | <u>SMALL</u> |
| Environmental justice | No unusual resource dependencies in the area. | SMALL |

Construction Impacts at the Proposed Site

Table 4-1. (contd)

| Category | Comments | Impact Level |
|--------------------------------|--|--------------|
| Nonradiological health impacts | Emission controls and remote location of the NAPS site would keep nonradiological health impact small. | SMALL |
| Radiological health impacts | Exposures to site preparation workers would be below annual occupational and public dose limits. | SMALL |

4.13 References

Note: Because the web pages cited in this document may become unavailable, the staff has entered the appropriate pages into ADAMS. The accession number of the package containing the websites used as references in Chapter 4 of the North Anna ESP EIS is ML051150091.

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20, "Standards for Protection Against Radiation."

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants."

15 CFR Part 930. Code of Federal Regulations, Title 15, *Commerce and Foreign Trade*, Part 930, "Federal Consistency with Approved Coastal Management Programs."

29 CFR Part 1910. Code of Federal Regulations, Title 29, *Labor*, "Occupational Safety and Health Standards," Subpart G, "Occupational Health and Environmental Control."

36 CFR Part 800. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, Part 800, "Protection of Historic Properties."

40 CFR Part 122. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 122, "EPA Administered Permit Programs: The National Pollutant Discharge Elimination System."

40 CFR Part 204. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 204, "Noise Emission Standards for Construction Equipment."

Construction Impacts at the Proposed Site

construction permit and operating license (COL) reference the ESP, and the staff ultimately determines that a representation or an assumption has not been satisfied at the CP/COL stage, that information would be considered new and potentially significant, and the affected impact area could be subject to re-examination.

4.1 Land-Use Impacts

This section provides information regarding land-use impacts associated with site preparation activities and construction of proposed Units 3 and 4 at the North Anna ESP site. Topics discussed include land-use impacts at the site, in the vicinity of the site, and in transmission line rights-of-way and offsite areas.

4.1.1 The Site and Vicinity

- ① P [The ESP site is located entirely within the existing NAPS site, which is zoned for industrial use by Louisa County.] [All construction activities for proposed Units 3 and 4, including ② P ground-disturbing activities, would occur within the existing NAPS site boundary.] [According to Dominion (2006a), approximately 52 ha (128 ac) would be affected on a long-term basis as a result of permanent facilities. An additional 27.5 ha (67.9 ac) would be disturbed on a short-term basis as a result of temporary activities and construction of temporary facilities and laydown areas.] [Dominion represented that it would conduct any ground-disturbing activities in accordance with Federal, State and local regulatory requirements (Dominion 2006a) (see Appendix J).] [The planned power block area is relatively level. Undulating surfaces in the area of the planned cooling towers would be leveled to accommodate the towers. Dominion has submitted a site redress plan, which is evaluated in Section 4.11 of this EIS.] ④ C
- ③ P [The ESP site is located entirely within the existing NAPS site, which is zoned for industrial use by Louisa County.] [All construction activities for proposed Units 3 and 4, including ② P ground-disturbing activities, would occur within the existing NAPS site boundary.] [According to Dominion (2006a), approximately 52 ha (128 ac) would be affected on a long-term basis as a result of permanent facilities. An additional 27.5 ha (67.9 ac) would be disturbed on a short-term basis as a result of temporary activities and construction of temporary facilities and laydown areas.] [Dominion represented that it would conduct any ground-disturbing activities in accordance with Federal, State and local regulatory requirements (Dominion 2006a) (see Appendix J).] [The planned power block area is relatively level. Undulating surfaces in the area of the planned cooling towers would be leveled to accommodate the towers. Dominion has submitted a site redress plan, which is evaluated in Section 4.11 of this EIS.] ⑤ C
- ⑦ P [No new highways or railroad lines would be needed to support the construction of Units 3 and 4.] ⑥ T
[Clearing and removal of trees growing within the North Anna ESP site would be required.] [No agricultural lands would be directly affected by construction activities.] ⑧ T
- A few small wetland areas and two intermittent streams exist on the ESP site. [Dominion represented that it would avoid watercourses and wetlands to the extent practicable during construction (Dominion 2006a) (see Appendix J). Any work that has the potential to impact a wetland would be performed in accordance with applicable regulatory requirements.] ⑨ C
- ⑩ T [The floodplain along the Lake Anna shoreline was determined by Dominion using the Federal Emergency Management Agency Flood Insurance Rate Map (Dominion 2006a).] [Any flooding that might occur during construction of Units 3 and 4 would be limited to areas adjacent to the lake shoreline (i.e., below elevations of 255 feet above mean sea level).] [Preliminary construction activity would occur within the lake floodplain for the construction and installation of a new water intake structure.] ⑪ T
⑫ P

Construction Impacts at the Proposed Site

(13) T [Some offsite land-use changes as a result of construction activities would be expected. Likely changes are the conversion of some land in surrounding areas to housing developments (e.g., apartment buildings, single family condominiums and homes, manufactured home parks, and recreational vehicle parks) to accommodate construction workers and the addition of new retail developments.] [All counties surrounding the NAPS site have comprehensive land-use plans in place as required by Section 15.2-2223 of the Code of Virginia.]

(14) T

Based on the counties' comprehensive land-use plans for the surrounding vicinity, the site redress plan, Dominion's representations, and NRC's independent review, the staff concludes that the land-use impacts of construction would be SMALL, and mitigation is not warranted.

4.1.2 Transmission Line Rights-of-Way and Offsite Areas

(15) P [In the evaluation provided in the ER, Dominion concluded that no additional electrical transmission lines or rights-of-way would be required to transmit the power generated by the proposed North Anna Units 3 and 4 to the regional power grid (Dominion 2006a).] [Construction would be limited to providing the new units' switchyards and interconnections with the existing operating units. All planned construction activities would occur on the NAPS site.] [Because Dominion represented that construction would be limited to onsite work, and no additional land would be needed to connect the new units to the grid, the staff concludes that land-use impacts resulting from construction in transmission line rights-of-way would be SMALL, and mitigation is not warranted.]

(16) P

4.2 Meteorological and Air Quality Impacts

During construction activities on the North Anna ESP site, some minor air quality impacts would be expected to occur. The likely sources of these air quality impacts would be fugitive dust emissions from general construction activities and the potential for elevated ambient air quality levels caused by transportation emissions from the vehicles and equipment used by the workforce used in construction. These impacts are discussed further in the following sections.

4.2.1 Construction Activities

The impact of construction activities on local air quality conditions would primarily be governed by the influence of additional building structures on the dispersion of normal effluent releases from either the existing NAPS Units 1 and 2 or from Units 3 and 4 during construction.

Equipment emissions and fugitive dust from operation of earth-moving and material-handling equipment are sources of air pollution from construction activities. Also, operation of other equipment for hauling debris, equipment, and supplies on unpaved roads would produce additional fugitive dust. The pollutant emission of concern would be PM₁₀ particulate matter (less than 10 microns in diameter), reactive organic gases, and oxides of nitrogen and sulfur,

Construction Impacts at the Proposed Site

accommodate the increased enrollment. Growth is occurring in the county as a result of its lower taxes as compared to the surrounding counties (Louisa County has the NAPS facility in its tax base [see Table 2-15]). Increases in student population resulting from construction workers and their families relocating to the county would most likely be handled with modular units. Louisa County purchased property to build a new elementary school in 2004, and construction is scheduled to begin in 2007 (Lintecum in Jaksch and Scott 2005). Property has also been purchased for a new middle school.

It is expected that a maximum of 1000 workers would establish new residences within an 80-km (50-mi) radius of the NAPS site and that most of these would locate in the larger population centers because of the existing shortage of available housing in Louisa and Orange Counties. Given that the workers would be scattered throughout the metropolitan region of Henrico and Spotsylvania Counties and the City of Richmond, the effects of increased enrollment of students as a result of their relocation on school infrastructure in those areas is expected to be minimal.

Housing is more widely available in Henrico and Spotsylvania Counties and the City of Richmond than the other counties in the vicinity of the North Anna ESP site. Most construction workers are expected to already be located in these areas, and the majority of new construction workers from outside the region would most likely to locate to these areas as well. Under these assumptions, the staff concludes that the impacts of construction on school infrastructure are considered small in Orange County, which has expanded its school infrastructure and currently has excess capacity. The schools in Louisa County currently are overcrowded. Property has been purchased for a new elementary school, with construction to begin in 2007. The county is planning to build new schools, which will alleviate the current crowded conditions. However, if the numbers of construction workers locating in Louisa County is significantly greater than suggested by previous trends, the new capacity would not be sufficient to provide services, and the impact could rise to MODERATE.

Based on the overall availability of educational facilities in Henrico, Spotsylvania, Orange, and Louisa Counties and the City of Richmond and assuming that the housing pattern follows past experience, the staff concludes that the impacts of construction on educational resources would be SMALL to MODERATE, and mitigation is not warranted.

4.6 Historic and Cultural Resources

The National Historic Preservation Act (NHPA) requires Federal agencies to take into account the potential effects of their undertakings on historic properties. The review process mandated by Section 106 of the NHPA is outlined in regulations promulgated by the Advisory Council on Historic Preservation and codified in 36 CFR Part 800. Evaluating the suitability of a potential ESP site within the existing NAPS site for construction, operation, and decommissioning of new power units is an undertaking that could possibly affect either known or potential historic properties that may be located at the North Anna ESP site. Therefore, in accordance with the

Construction Impacts at the Proposed Site

provisions of NHPA, NRC is required to make a reasonable effort to identify historic properties in the area of potential effects. If no historic properties are present or affected, NRC is required to notify the State Historic Preservation Officer of this finding before proceeding. If it is determined that historic properties are present, NRC is required to assess and resolve possible adverse effects of the undertaking.

[In the case of the North Anna ESP site, Dominion has indicated that construction of additional units would involve land disturbance within a designated ESP plant construction area (currently a mostly disturbed area), the ESP cooling tower area, and in a spoils and overflow storage area. Both the cooling tower area and spoils storage areas exhibit less previous ground disturbance than the area where Units 3 and 4 would be constructed. Additionally, temporary parking, module fabrication areas, and laydown area would involve some ground disturbance. Following construction activities, disturbed support areas would be landscaped and replanted to match the overall site appearance.]

(17) P

Dominion commissioned studies to assist in recording and protecting known cultural resource sites, as in the case of the five historic period cemeteries located on the NAPS site. As part of the cultural resource assessment effort, the entire NAPS site has been classified into one of three categories, based on the potential for presently undiscovered historic properties to be present, including recommendations for responding to inadvertent discovery and preventing possible adverse effects to resources (Voigt 2003). These three categories are:

- *Areas with No Potential for Historic or Cultural Resources.* These areas include lands where past disturbances related to construction of the power station and appurtenant (associated) facilities have taken place to such an extent that any once-extant cultural resources are no longer present. No further archaeological investigations are recommended for these areas.
- *Areas with Low Potential for Historic or Cultural Resources.* Lands within the ESP site that fall into this category are those that are relatively undisturbed but that possess characteristics that would normally indicate a low possibility for most types of cultural resources to occur. For the most part, these lands have a degree of slope greater than 15 percent. For most of these areas, further archaeological work would not be necessary, although there could be smaller areas within the larger zone where specific ground conditions could require investigation.
- *Areas with Moderate-to-High Potential for Historic or Cultural Resources.* These areas are classified as those that are relatively undisturbed by past activities and have a likelihood for prehistoric and historic archaeological sites according to local models of prehistoric and historic land-use and settlement patterning. Archaeological investigation is recommended prior to undertaking any ground-disturbing activities in these areas.

Construction Impacts at the Proposed Site

The eastern part of the proposed project area, where proposed Units 3 and 4 are expected to be located, was extensively altered during ground-disturbing activities related to the original construction of the power plant and associated facilities. Therefore, it is classified as having No Potential for Historic and Cultural Resources (Voigt 2003).

The western sector of the proposed project area includes the cooling tower area, spoils and overflow storage areas, and parking and laydown areas. It includes lands that have been designated as Low and Moderate-to-High Potential for historical and cultural resources (Voigt 2003).

[Two known historic cemeteries are located in proximity to the proposed project area.] (18) T
[Site 44LS221 is situated in a wooded area near the proposed cooling tower area. The site was marked and avoided during original site construction activities. It would be protected by similar measures during any future site preparation and construction activities and would not be impacted. Site 44LS222 is located near the cooling tower area, but outside the ESP construction boundary. This cemetery is a known site and would be avoided to prevent construction activities from impacting the site.] (19) C

(20) P [As a result of recently completed consultation between NRC and VDHR, Dominion conducted an archaeological survey for ten individual survey areas, including approximately 6.0 acres (2.4 hectares) within the western sector of the North Anna ESP APE that fell into one of two categories: (1) acreage that has not been previously disturbed during construction of the original power station and (2) areas that required subsurface testing and pedestrian survey based on the results of the previous field inspection of the ESP APE (Voigt 2003). With the exception of the two previously recorded historic period cemeteries mentioned above, no artifacts, cultural features, or cultural deposits were identified during the field survey (Mullin 2006).]

[To date, literature reviews and consultations with regional Native American tribes have not identified any traditional cultural properties or other culturally significant resources that might occur in the vicinity of the proposed construction area.] (21) T

Based on the findings of the field survey for the ESP APE, NRC concludes that construction would have no adverse effect upon historic properties. The VDHR stated that if the sites are avoided, there would be no negative impact on the resources (VDHR 2006). Although field studies to date have not revealed any historic properties that would be adversely impacted, (22) C [Dominion would include the NAPS cultural resource-specific written directions in its site-wide Excavation and Backfill Work Procedures (North Anna Power Station NSS Work Procedure WP-C01) involving an immediate stop work order should archaeological, historic, or other cultural resources be discovered during excavation (Dominion 2006a). The construction supervisor is responsible for ensuring the work stoppage and for notifying the Environmental Compliance Coordinator of an inadvertent discovery. Dominion would then consult with VDHR regarding the need for and types of necessary cultural resources investigations.]

Construction Impacts at the Proposed Site

Based on the results of previous cultural resources field investigations at the North Anna ESP site and the presence of a well-managed cultural resources program at the NAPS site, which includes the existence of written procedures to provide immediate reaction and notification in the event of inadvertent discovery of historic and cultural resources, and its cultural resource analysis and consultation, the staff concludes that the potential impacts on historic and cultural resources would be SMALL, and mitigation is not warranted.

4.7 Environmental Justice Impacts

Environmental justice refers to a Federal policy under which each Federal agency identifies and addresses, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority^(a) or low-income populations. On August 24, 2004, the Commission issued its policy statement on the treatment of environmental justice matters in licensing actions (69 FR 52040). Figures 2-6 and 2-7 (Section 2.8.4) show the locations of minority and low-income populations around the NAPS site and within an 80-km (50-mi) radius.

The staff identified the pathways through which the environmental impacts associated with the construction of Units 3 and 4 at the NAPS site could affect human populations. The staff then evaluated whether minority and low-income populations could be disproportionately affected by these impacts. In its December 2003 site audit, the staff interviewed local government officials and the staff of social welfare agencies concerning potentially disproportionate impacts to low income and minority populations (Jaksch and Scott 2005). The staff found no unusual resource dependencies or practices, such as subsistence agriculture, hunting, or fishing, through which the populations could be disproportionately impacted by construction of Units 3 and 4 at the North Anna ESP site and that would result in those populations being adversely affected. In addition, the staff did not identify any health-related or location-dependent disproportionately high and adverse impacts affecting these minority and low-income populations. In addition, no disproportionately high and adverse impacts on minority or low-income groups were identified during the scoping process, from comments on the DEIS or SDEIS, or from other public outreach activities.

Based on information provided by Dominion, and NRC's independent review, the staff concludes that offsite impacts of construction of Units 3 and 4 at the NAPS site to minority and low-income populations would be SMALL, and mitigation is not warranted.

(a) The NRC Guidance for performing environmental justice reviews defines "minority" as American Indian or Alaskan Native; Asian; Native Hawaiian or other Pacific Islander; or Black races; or Hispanic ethnicity ("other" may be considered a separate minority category.) The 2000 census included multi-racial data (NRC 2004).

Construction Impacts at the Proposed Site

and gaseous effluents being small. This estimate is well within both the dose limits to individual members of the public found in 10 CFR 20.1301 and occupational dose limits to workers found in 10 CFR 20.1201. The annual dose limit to an individual member of the public is 1 mSv (100 mrem) TEDE. The annual occupational dose limit to workers is 0.05 Sv (5 rems) TEDE.

4.9.5 Summary of Radiological Health Impacts

Based on the Dominion estimate of dose to site preparation workers and NRC's independent review, the staff found the doses to be well within NRC exposure limits designed to protect the public health, even if workers exceed the 2080 hrs/yr occupancy factor, and concludes that the impacts of radiological exposures to site preparation workers would be SMALL, and mitigation is not warranted.

4.10 Measures and Controls to Limit Adverse Impacts During Construction Activities

In its evaluation of environmental impacts during construction activities for the proposed new North Anna units, the staff relied on Dominion's compliance with the following regulatory requirements:

- Compliance with applicable Federal, State, and local laws, ordinances, and regulations intended to prevent or minimize adverse environmental impacts (e.g., solid waste management, ground-disturbing activities including erosion and sediment control and threatened and endangered species, air emissions, noise control, storm-water management, spill response and cleanup, hazardous material management). This includes testing any soil suspected of contamination from radioactive waste or other contaminants
- Compliance with applicable requirements of existing permits and licenses (e.g., VPDES permit, operating license) for the existing units and other permits or licenses required for construction of the new units (for example, Clean Water Act Section 404 Permit, VDEQ wetlands permit)
- A permit from VDEQ and compliance with county ordinances if burning of construction materials is required
- A VPDES permit related to accidental spills and storm-water runoff

In the ER, Dominion tabulated its representation of "feasible and adequate measures/controls" in Table 4.6-1, "Summary of Impacts and Measures and Controls to Limit Adverse Impacts During Construction" (Dominion.2006a). This tabulation includes measures and controls that Dominion would be required to implement by applicable Federal, Commonwealth, local statutes

Construction Impacts at the Proposed Site

and regulations, and permit requirements, terms, and conditions. The staff relied on these measures and controls in its evaluation of environmental impacts during construction of the proposed new units and the North Anna ESP site; for those issues where Dominion indicated that a study, process, or capability "would be considered," the staff relied upon the study, process, or capability as implemented or conducted.

In addition to the foregoing measures and controls tabulated in the ER Table 4.6-1, the staff also relied on the following general plans or specific mitigation measures:

- Incorporation of environmental requirements into construction contracts (ER Section 4.6)

[• Avoid watercourses and wetlands to the extent possible during any construction (ER Sections 4.1.1.6.2, 4.3.1.2)] (23) C

- Develop a dust control plan to mitigate the impacts of emissions from construction activities (ER Section 4.4.1.4)
- Develop a construction traffic management plan to include several traffic mitigating measures (ER Section 4.4.2.2.1)
- Mitigate potential impacts for materials delivery. Methods include (1) avoiding routes that could adversely affect sensitive areas (e.g., housing, hospitals, schools, retirement communities, businesses) to the extent possible and (2) restricting delivery times activities to daylight hours. (ER Section 4.4.1.1.3)
- Repair any damage to public roads, markings, or signs caused by construction activities to pre-existing condition or better (ER Section 4.4.1.1.3)
- Build and maintain new access road on the NAPS site to support construction activities (by Virginia Power personnel as needed). (ER Section 4.4.1.1.3)
- Minimize emissions from heavy construction equipment by scheduled equipment maintenance procedures (ER Section 4.3.1.2)
- Prevent contaminants from entering the aquatic system through use of a Spill Prevention Control and Countermeasure Plan (ER Section 4.3.2)
- Manage nuisances and concerns from adjacent residents, business owners, or landowners on a case-by-case basis through a Dominion prepared concern resolution process (ER Section 4.4.1)

Construction Impacts at the Proposed Site

- Coordinate with the VDHR regarding the potential presence of historic and cultural resources within planned disturbed areas and notify VDHR in the event of any unanticipated discovery (ER Section 4.1.3)

(24) C

In addition, the staff relied upon the following Dominion statements:

- Dominion stated it could construct/modify the intake structure in accordance with State and permit regulations. It noted that it may install a barrier between the ESP site and the lake to reduce the potential for silt and soil entrainment through the existing units to the WHTF (ER Section 4.3.2)
- Dominion stated it could institute controls to minimize potential noise impacts including inspection and maintenance of equipment and restrict noise-related activities to daylight hours. (ER Section 4.4.1.3)
- Dominion stated it would provide safety training and personal protective equipment to construction workers to minimize the risk of potentially harmful exposures; provide regular health and safety monitoring (ER Section 4.4.1.1.1)
- Dominion stated it would follow construction best management practices for erosion control in Lake Anna, the WHTF, and potentially impacted streams (ER Section 4.2.1).

4.11 Site Redress Plan

Site Preparation and Preliminary Construction Activities

In its ESP application, Dominion requested that it be allowed to conduct site preparation activities at the North Anna ESP site as authorized by 10 CFR 52.17(c) and 10 CFR 52.25, and enumerated in 10 CFR 50.10(e)(1). In its application, as provided by 10 CFR 52.17(c), Dominion included a site redress plan that would be implemented if site preparation activities were performed, but the ESP expired before the issuance of a CP or COL by the NRC (Dominion 2006b). The objective of the site redress plan is to ensure that the ESP site would be returned to an environmentally stable and aesthetically acceptable condition suitable for non-nuclear uses consistent with Louisa County zoning requirements. Under the site redress plan, locations that are permanently disturbed would be stabilized and contoured to conform with surrounding areas. Revegetation of disturbed lands would be conducted.

In a letter dated October 6, 2005, Dominion requested that the ESP be conditioned to prohibit activities that could result in a discharge to navigable waters until a Section 401 Certification is either obtained or waived by the Commonwealth of Virginia (Dominion 2005). In a letter dated June 16, 2006, the Commonwealth agreed on the need for this permit condition (VDEQ 2006). The staff included this as a recommended permit condition in Table J-3.

Construction Impacts at the Proposed Site

- use of constructed facilities for alternative purposes, or their removal
- remediation of contamination resulting from site preparation and preliminary construction or site redress activities.

The staff reviewed the list of allowed site preparation and preliminary construction activities in the event that the ESP is granted for the North Anna site and reviewed the full site redress plan submitted by Dominion. As a result of its own independent review, the staff, in accordance with 10 CFR 52.25(a), concludes that the potential site preparation and preliminary construction activities described in Dominion's site redress plan would not result in any significant adverse environmental impacts that could not be redressed. In addition, consistent with 10 CFR 52.25(a), the staff recommended the inclusion of the site redress plan as an ESP condition in Table J-3.

4.12 Summary of Construction Impacts

Impact level categories denoted in Table 4-1 as SMALL, MODERATE, or LARGE were assigned to each resource area based on the staff's evaluation and conclusions regarding expected adverse environmental impacts, if any. A brief statement explains the basis for the impact level. Some impacts, such as the addition of tax revenue from Dominion for the local economies, are likely to be beneficial impacts to the community, and are noted as such.

Table 4-1. Characterization of Impacts from Construction of the Closed-Cycle Cooling System for Unit 3 at the North Anna ESP Site

| Category | Comments | Impact Level |
|---------------------------------|--|--------------|
| Land-use impacts | | |
| The site and vicinity (25)P | [Construction activities would take place within existing site boundaries.] | SMALL |
| Transmission line rights-of-way | [No new transmission line rights-of-way would be needed.] (26)P | SMALL |
| Air quality impacts | | |
| | Construction activities would be conducted in accordance with applicable Virginia administrative codes, and dust and emissions would be minimized through a dust control plan. | SMALL |

Construction Impacts at the Proposed Site

Table 4-1. (contd)

| Category | Comments | Impact Level |
|-----------------------------------|--|--------------|
| Water-related impacts | | |
| Hydrological alterations | Impacts would be localized and temporary. Construction activities would be conducted in accordance with applicable Virginia administrative codes and ACE permit processes; hydrological impacts would be minimized through application of best management practices. | SMALL |
| Water use | Minimal water usage during construction. | SMALL |
| Water quality | Construction would be conducted using best management practices to control spills and storm water runoff. | SMALL |
| Ecological impacts | | |
| Terrestrial ecosystems | No important terrestrial species would be affected by construction at the NAPS site. | SMALL |
| Aquatic ecosystems | Construction impacts to benthic habitats would be temporary. | SMALL |
| Threatened and endangered species | There are no Federally listed species in the vicinity. | SMALL |
| Socioeconomic impacts | | |
| Physical impacts | | |
| Workers/local public | Construction takes place within existing plant boundaries, so impacts to the public would be minimal. Impacts to workers would be mitigated with training and protective equipment. | SMALL |
| Buildings | Construction would not affect any offsite buildings, and onsite buildings were constructed to withstand vibration from construction activities. | SMALL |
| Roads | Growth would put pressure on local road systems, but traffic control and management measures would protect any local roads during construction. | SMALL |
| Aesthetics | Construction activities would be temporary, and observation points would be limited because of site location. | SMALL |
| Demography | Percentage of construction workers relocating to the region would be small. Most would already live within the region. | SMALL |
| Community characteristics | | |

Construction Impacts at the Proposed Site

Table 4-1. (contd)

| Category | Comments | Impact Level |
|---|--|--|
| Economy | Economic impacts of construction overall are beneficial to local economies, in this case ranging from small to moderately beneficial. | SMALL BENEFICIAL to MODERATE BENEFICIAL |
| Transportation | Planned upgrades and traffic management plans would reduce temporary construction transportation impacts. Impacts could be moderate in some areas without planned upgrades. | SMALL to MODERATE |
| Taxes | Depends on residence location; generally, impacts are beneficial, especially for property taxes and employment, ranging from small to moderate (Louisa County). | SMALL BENEFICIAL to MODERATE BENEFICIAL |
| Recreation | Visual impacts of construction would be limited and temporary. Recreational use of Lake Anna would be expected to increase, and traffic mitigation would keep impacts small. Impacts could be moderate if mitigation measures are not undertaken. | SMALL to MODERATE |
| Housing | Adequate housing is available in Henrico and Spotsylvania Counties and in the City of Richmond to handle construction workers. If more construction workers than expected locate in Orange and Louisa Counties, the impact could be moderate. | SMALL to MODERATE |
| Public services | Public services are adequate for any temporary influx of workers resulting from construction at the NAPS site. | SMALL |
| Education | If no additional school capacity is added, then the impact in Louisa County could be moderate. If Louisa County builds new schools to accommodate the temporary influx of construction workers, then all counties would have room for additional students. | SMALL to MODERATE |
| Historic and cultural resources (27C) | [Most of the proposed construction area is previously disturbed, and Dominion has a well-managed cultural resource program in place at NAPS.] | SMALL |
| Environmental justice | No unusual resource dependencies in the area. | SMALL |

Construction Impacts at the Proposed Site

Table 4-1. (contd)

| Category | Comments | Impact Level |
|--------------------------------|--|--------------|
| Nonradiological health impacts | Emission controls and remote location of the NAPS site would keep nonradiological health impact small. | SMALL |
| Radiological health impacts | Exposures to site preparation workers would be below annual occupational and public dose limits. | SMALL |

4.13 References

Note: Because the web pages cited in this document may become unavailable, the staff has entered the appropriate pages into ADAMS. The accession number of the package containing the websites used as references in Chapter 4 of the North Anna ESP EIS is ML051150091.

10 CFR Part 20. Code of Federal Regulations, Title 10, *Energy*, Part 20, "Standards for Protection Against Radiation."

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants."

15 CFR Part 930. Code of Federal Regulations, Title 15, *Commerce and Foreign Trade*, Part 930, "Federal Consistency with Approved Coastal Management Programs."

29 CFR Part 1910. Code of Federal Regulations, Title 29, *Labor*, "Occupational Safety and Health Standards," Subpart G, "Occupational Health and Environmental Control."

36 CFR Part 800. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property*, Part 800, "Protection of Historic Properties."

40 CFR Part 122. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 122, "EPA Administered Permit Programs: The National Pollutant Discharge Elimination System."

40 CFR Part 204. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 204, "Noise Emission Standards for Construction Equipment."

7.0 Cumulative Impacts

The U.S. Nuclear Regulatory Commission (NRC) staff considered potential cumulative impacts during its evaluation of information applicable to each of the impact categories of constructing and operating reactors at the proposed North Anna Power Station (NAPS) early site permit (ESP) site for reactor designs that fall within the plant parameter envelope (PPE) (Dominion 2006). For the purpose of this analysis, past actions are those occurring after Lake Anna was created, but prior to operation of the existing NAPS Units 1 and 2. Present actions are those from the start of operation of existing NAPS Units 1 and 2 until the start of construction of the proposed Units 3 and 4 (hereafter referred to as Units 3 and 4). Future actions are those that are reasonably foreseeable through construction and operation of Units 3 and 4, including decommissioning. The geographical area over which past, present, and future actions could contribute to cumulative impacts depends on the type of impact evaluated.

The impacts of the proposed action, as described in Chapters 4 and 5, are combined with other past, present, and reasonably foreseeable future actions in the vicinity of the NAPS site that would affect the same resources impacted by NAPS Units 1 and 2 regardless of what entity (Federal or non-Federal) or person undertakes such other actions. These combined impacts are defined as "cumulative" in Title 40 of the Code of Federal Regulations (CFR) Part 1508.7 and include individually minor but collectively significant actions taking place over a period of time. It is possible that an impact that may be SMALL by itself could result in a MODERATE or LARGE impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline.

7.1 Land Use

For purposes of this analysis, the geographic area considered for cumulative impacts resulting from construction and operation of Units 3 and 4 includes the three-county area of Louisa, Orange, and Spotsylvania Counties, Virginia, because the impacts to land use are insignificant outside the three-county area. The staff reviewed the available information on land-use impacts of constructing two additional nuclear units at the North Anna ESP site. Accordingly, the staff concludes that, while lower tax rates or better services could encourage development, the comprehensive land-use plans would control development. As a result, cumulative land-use impacts would be SMALL, and mitigation is not warranted.

Appendix J

Dominion Nuclear North Anna, LLC, Permit Conditions, Representations, Assumptions, and Unresolved Issues

Appendix J

Dominion Nuclear North Anna, LLC, Permit Conditions, Representations, Assumptions, and Unresolved Issues

If an early site permit (ESP) for the North Anna ESP site is issued and an applicant references it in an application for a construction permit (CP) or a combined license (COL), the applicant would have to demonstrate that the design selected for the site falls within the bounds of the Nuclear Regulatory Commission's (NRC's) ESP analysis in this environmental impact statement (EIS). With regard to the environmental impacts associated with construction and operation of proposed Units 3 and 4, Dominion Nuclear North Anna, LLC (Dominion), made a number of representations in its application. As listed in this appendix, the staff relied on these representations and staff-developed assumptions in assessing the environmental impacts associated with construction and operation of the units. As such, fulfillment of these representations and assumptions provide part of the basis for the final impact assessment. Should a CP or COL applicant reference the ESP, and the staff ultimately determine that a representation or assumption has not been satisfied at the CP/COL stage, that information would be considered new, and potentially significant, and the affected impact area could be subject to re-examination.

Table J-1 references Dominion's representations and the staff's assumptions about design (Appendix I, the plant parameter envelope), permits and authorizations (Appendix L), mitigation (Section 4.10 and 5.11 of the EIS), and the site redress plan (section 4.11). Table J-2 contains references to representations and assumptions organized by technical area without repeating the information in Table J-1. Table J-3 is a list of unresolved issues. Table J-4, is a list of recommended ESP environmental permit conditions.

Within the ER (Dominion 2006), Dominion provides:

- (1) representations to address certain issues in the design, construction, and operation of the facility
- (2) representations of planned compliance with current laws, regulations, and requirements
- (3) representations of to future activities and actions that it will take should it receive an ESP and decide to apply for a COL for the North Anna ESP site
- (4) representations of Dominion's estimates of future activities and actions of others and the likely environmental impacts of those activities and actions that would be expected should Dominion decide to apply for a CP or COL.

The following tables are meant to aid the staff and the applicant in the event this EIS is referenced in a CP or COL application. The tables are not meant to replace the analysis in the EIS.

Appendix J

Table J-1. Appendix I, Appendix L, Section 4.10, and 5.11 Assumptions and Commitments

| Area | Representations/Assumptions |
|---------------------------------------|---|
| Site Characteristics | An applicant referencing this EIS will demonstrate its application is bounded by the ESP site characteristics contained in Table I-1. |
| Plant Parameter Envelope (PPE) Values | An applicant referencing this EIS will demonstrate its application is bounded by the PPE values contained and referenced in Table I-2. |
| Authorizations and Permits | An applicant referencing this EIS will provide the status of the authorizations and permits specified in Appendix L. |
| Mitigation of Construction Impacts | An applicant referencing this EIS will demonstrate its application contains the mitigation measures contained in Section 4.10. |
| Mitigation of Operational Impacts | An applicant referencing this EIS will demonstrate its application contains the mitigation measures contained in Section 5.11. |
| New and Significant Information | An applicant referencing this EIS will provide, in its application, any new information that could affect the technical basis or conclusions for determination of an impact level in the EIS. |

NUREG-1811, Volume I

J-2

Table J-2. Assumptions by Technical Area Not Contained in Table J-1

| Technical Area | Representations/Assumptions (28) P | Source |
|---|---|------------------|
| Land Use-Transmission Corridors and Offsite Areas | <p>[Based on an initial evaluation, the existing transmission lines have sufficient capacity to carry the total output of the existing units and the new units.] [A system study (load flow) modeling these lines with the new units' power contribution would be performed to confirm this conclusion, if and when Dominion decided to proceed with the development of new units at the ESP site.] (29) C</p> | ER Section 4.1.2 |

December 2006

Table J-2. (contd)

| Technical Area | Representations/Assumptions | Source |
|-----------------------------|--|--|
| Meteorology and Air Quality | The meteorological monitoring program would continue throughout the construction and operational phases of the project. The monitoring program would be a continuation of the ongoing meteorological monitoring program for the North Anna Power Station (NAPS) site. The impacts on local air quality from onsite construction activities would be mitigated through a dust control plan, while the impacts on local air quality from automobile exhaust from increased site workers would be mitigated through a construction management plan. | ER Sections 4.4.1.4, 4.4.2.2.1e, and 6.4 |
| Water Use and Quality | Flows and temperatures specified in Appendix I are bounding. | ER Table 3.1-9 |
| Water Use and Quality | Groundwater use would be limited to potable and landscape maintenance function. | ER Section 3.3.1 |
| Terrestrial Ecology | The existing transmission lines would be adequate to transmit additional power generated by Units 3 and 4. | ER Section 3.7.2 |
| Terrestrial Ecology | Once the facility design is finalized, appropriate analyses of transmission and distribution system adequacy would be made. | ER Section 3.7.2 |
| Terrestrial Ecology | There would be no new impacts created as a result of operation of a new facility with regards to maintenance of transmission line rights-of-way. | ER Section 5.6.1 |
| Terrestrial Ecology | No important species as described in NUREG-1555 currently live on the ESP site or are likely to, and except for a few small, potential wetlands, no important habitats are present on the ESP site. | ER Section 2.4.1 |
| Terrestrial Ecology | The existing switchyard would be used, with modifications. | ER Section 3.7.1 |
| Terrestrial Ecology | Total area for the ESP construction site is approximately 200 acres including approximately 80 acres of forested habitat. | ER Section 4.3.1.2 |
| Aquatic Ecology | The operational-phase aquatic ecological monitoring program for the new units would be similar to the ongoing Virginia Power and Virginia Department of Game and Inland Fisheries (VDGIF) monitoring programs. | ER Section 6.5.2.3 |

Appendix J

December 2006

J-3

NUREG-1811, Volume 1

T: Potentially Time-Sensitive; C: Commitment; P: Project-Defined

Appendix J

Table J-2. (contd)

| Technical Area | Representations/Assumptions | Source |
|-----------------|--|------------------------------------|
| Aquatic Ecology | The passage through the cofferdam will not represent critical velocity into the intake. | ER Section 3.4.2.1 |
| Socioeconomics | Lake Anna lake levels, temperatures, and downstream flows are the same as shown in Appendix K and Section 5.4.2.4. | EIS Appendix K and Section 5.4.2.4 |
| Socioeconomics | General growth of the regional economy and population will occur within the times and in the locations projected in the ER. | ER Section 2.5.1 |
| Socioeconomics | State and local governments will continue to expand and upgrade infrastructure and public services to meet general population growth. | EIS Sections 4.5, 5.5 |
| Socioeconomics | Construction workers moving into the region of the plant will concentrate in areas with larger amounts of available housing (e.g., Henrico County, Richmond). Operations work force will be geographically distributed similarly to the existing NAPS workforce. | ER Sections 4.4.2.2 and 5.8.2 |
| Socioeconomics | Lake Anna lake levels, temperatures, and downstream flows are the same as shown in Appendix K and Sections 5.4.2.4. | EIS Appendix K and Section 5.4.2.4 |
| Socioeconomics | Although noise would not cause adverse offsite impacts, a noise study would be performed as part of the final selection of the Units 3 and 4 cooling systems and the results described in the COL application. | ER Section 5.8.1.2 |
| Socioeconomics | The evaluation of the need for noise impact from the transmission system would be completed at a "suitable time" within Dominion's future planning work. | ER Section 5.8.1.2 |

NUREG-1811, Volume I

J-4

December 2006

T: Potentially Time-Sensitive; C: Commitment; P: Project-Defined

Table J-2. (contd)

| Technical Area | Representations/Assumptions | Source |
|---------------------------------|--|--------------------|
| Historic and Cultural Resources | <p>[Dominion would implement the necessary administrative steps to make proper notifications in the event of any unanticipated discovery (including human remains). These steps would include stop-work, assessment, and notification protocol.</p> <p>The primary controls to be used to minimize impacts in the event of an unanticipated discovery would include ongoing coordination with VDHR with regards to the potential presence of historic and cultural resources within planned disturbed areas, adherence to Dominion administrative procedures regarding activities to be implemented in the event of an unanticipated discovery, and adherence to specific permit requirements through their integration into construction scheduling and work practices.]</p> | ER Section 4.1.3 |
| Environmental Justice | Minority and low income populations will continue to exist in the same proportions and locations as populations increase | EIS Section 2.10 |
| Human Health | Radioactive waste management systems would be designed to minimize releases from reactor operations to values as low as reasonably achievable (ALARA). These systems would be designed and maintained to meet the requirements of 10 CFR 20 and 10 CFR 50, Appendix I. | ER Section 3.5 |
| Human Health | Gaseous releases of light-water reactors (LWR) are well known, and studies of gas-cooled reactor operation have indicated that their gaseous releases would be bounded by the LWR data. | ER Section 3.5.2 |
| Human Health | Nonradioactive solid wastes are addressed by local regulation under "truck-and-haul" permitting. Hazardous wastes are handled by permitted contractors and are addressed onsite in compliance with Federal regulations. | ER Section 3.6.3.3 |
| Fuel Storage | All of the LWR technologies considered have a design storage capacity for spent fuel shipping casks that far exceeds that needed to accommodate 5-year cooling. | ER Section 3.8.1 |

(30) C

December 2006

J-5

NUREG-1811, Volume I

T: Potentially Time-Sensitive; C: Commitment; P: Project-Defined

Table J-2. (contd)

| Technical Area | Representations/Assumptions | Source |
|----------------|---|--------------------|
| Human Health | The calculated construction worker doses are based on available dose rate measurements and calculations. It is possible that these dose rates would increase in the future as site conditions change. However, the ESP site would be continually monitored during the construction period and appropriate actions would be taken as necessary to ensure that the construction workers are protected from radiation. | ER Section 4.5.4.4 |
| Human Health | The new units would release liquid effluents to the Waste Heat Treatment Facility through the discharge canal used for the existing NAPS Units 1 and 2. | ER Section 5.4.1.1 |
| Human Health | Transmission lines carrying the additional power would not exceed the NESC criteria for electric shock. | EIS Section 5.8.4 |
| Human Health | Dominion would require appropriate procedures if it was necessary to store mixed wastes temporarily on the ESP site. These procedures would include proper labeling of containers, installation of fire detection and suppression equipment (if required), use of fences and locked gates, availability of emergency shower and eyewash facilities, posting of hazard signs, and regular inspections. Dominion would also develop and implement contingency plans, emergency preparedness plans, and spill prevention procedures that would be implemented in the event of a mixed waste spill. Personnel who are designated to handle mixed waste or to respond to mixed waste emergency spills would receive appropriate training to enable them to perform their work properly and safely. | ER Section 5.5.2.3 |
| Human Health | The structure of the ESP site Radiation Environmental Management Program (REMP) would be based on the necessary components of the monitoring program established for the existing units, which encompasses the entire NAPS site and would be expanded to include radiological environmental monitoring for the new units. This expanded REMP would continue to be in accordance with the existing units' Technical Specifications and is described in the NAPS UFSAR Section 11.6. It would be implemented through the existing units' Offsite Dose Calculation Manual (ODCM), and via administrative and technical procedures. | ER Section 6.2.1 |

Table J-2. (contd)

| Technical Area | Representations/Assumptions | Source |
|----------------|--|---|
| Transportation | The transportation impact analysis used information from INEEL (2003) to estimate the unirradiated and spent fuel shipping cask capacities. | EIS Sections 6.2.2.1, 6.2.2.2, G.1.1, and G.2.1 |
| Transportation | The transportation impact analysis for advanced reactor spent fuel shipments assumed the radiation dose rate emitted from the shipments is at the maximum allowed by Federal regulations | EIS Sections 6.2.2.1 and G.2.1 |
| Transportation | It was assumed that shipping casks for advanced reactor spent fuel will provide equivalent mechanical and thermal protection of the spent fuel cargo [relative to the current LWR spent fuel shipping cask designs]. | EIS Sections 6.2.2.2 and G.2.2 |
| Transportation | For this assessment, release fractions for current generation LWR fuels were used to approximate the impacts from advanced reactor spent fuel shipments. This essentially assumes that the behavior of fuel materials and containment systems (cladding, fuel coatings) is similar to that of the current generation LWR fuel under applied mechanical and thermal conditions. | EIS Sections 6.2.2.2 and G.2.2 |

December 2006

J-7

NUREG-1811, Volume I

Table J-3 Issues Not Resolved

| Issue | EIS Section | Comment |
|---|-------------|---|
| Need for Power | 1.1.3 | In accordance with 10 CFR 52.18, assessment of benefits is not required at ESP stage. |
| Energy Alternatives | 1.4 | Commission determined that energy alternatives need not be addressed at the ESP stage. (68 FR 55905, 55911) |
| Water Quality | 5.3.3 | Chemical concentrations of waste streams other than Unit 3 blowdown to the WHTF was not defined. |
| Alternatives to Mitigate Severe Accident | 5.10.3 | Review Standard, RS-002, Processing Applications for Early Site Permits stated that the SAMA review could be deferred to the COL stage when the detailed design information is available. Design not selected. Issue to be resolved in COL application when a design is selected. |
| Design and Severe accident | 5.10.3 | Design and severe accident impacts are unresolved for gas-cooled reactors due to insufficient information. Issue to be resolved in COL application if a gas cooled is selected. |
| J-8 Fuel Cycle Impacts and Solid Waste Management | 6.1 | Environmental impacts from the uranium fuel cycle activities and solid waste management for other than LWR reactors are not resolved. |
| Transportation | 6.2.4 | For gas-cooled reactors, the impacts [of transporting fuel and radioactive waste to and from the reactor] are likely to be small, but this issue is not resolved because of the lack of verifiable information on these designs. Verifiable information is lacking about unirradiated and spent fuel shipping cask designs, fuel performance under applied mechanical and thermal accident conditions, unirradiate fuel initial core/refueling requirements, spent fuel generation rates, and radioactive waste generation rates. |
| Decommissioning | 6.3 | Design not selected. Issue to be resolved in COL application when a design is selected. |

NUREG-1811, Volume I

J-8

December 2006

T: Potentially Time-Sensitive; C: Commitment; P: Project-Defined

Table J-4. Recommended Permit Conditions for the North Anna Early Site Permit

| Condition No. | EIS Section | Recommended Permit Condition |
|---------------|-------------|--|
| 1 | 4.11 | [Applicant will have a site redress plan as stated in EIS section 4.11 and the North Anna ESP Application – Part 4 – Programs and Plans, Revision 9.] |
| 2 | 1.5 | The holder of this ESP shall not perform any site preparation or preliminary construction activities authorized by 10 C.F.R. 52.25 unless such holder obtains the certification required pursuant to Section 401 of the Federal Water Pollution Control Act from the Commonwealth of Virginia, or obtains a determination by the Commonwealth that no certification is required and submits the certification or determination to the NRC before commencement of any such activities. |
| 3 | | The CP or COL applicant will conduct an instream flow incremental methodology study pursuant to the Coastal Zone Management Act consistency determination. |
| 4 | | Dominion shall conduct a comprehensive Instream Flow Incremental Methodology study (IFIM), designed and monitored in cooperation and consultation with the VDGIF and the VDEQ, to address potential impacts of the proposed Units 3 and 4 upon the fishes and other aquatic resources of Lake Anna and downstream waters. Development of the Scope-Of-Work for the IFIM study shall begin in 2007, and the IFIM study shall be completed prior to issuance of a combined construction and operating license (COL) for this project. Dominion agrees to consult with VDGIF and VDEQ regarding analysis and interpretation of the results of that study, and to abide by surface water management, release, and instream flow conditions prescribed by VDGIF and VDEQ upon review of the completed IFIM study, and implemented through appropriate state or federal permits or licenses. |

(31) C

December 2006

J-9

NUREG-1811, Volume I

T: Potentially Time-Sensitive; C: Commitment; P: Project-Defined

5.1 Land-Use Impacts

The information for this section is provided in the ESP Application Part 3 – Environmental Report, and associated impacts are fully resolved in NUREG-1817. The following supplemental information is provided in accordance with 10 CFR 51.50(c)(1)(iii).

5.1.1 The Site and Vicinity

SUPP

NUREG-1817 Section 5.1.1 resolved that land-use impacts in the vicinity of the ESP facility due to operations would be SMALL. No additional information provided.

5.1.2 Transmission Corridors and Offsite Areas

SUPP

NUREG-1817 Section 5.1.2 resolved that the land-use impacts in the transmission line rights-of-way and offsite areas from ESP facility operations would be SMALL. This finding considered the fact that the current transmission system serving the GGNS site is likely to be inadequate under the bounding assumptions of the PPE, and that upgrades to the existing transmission line right-of-way or new rights-of-way may be required.

[PROJECT WRITER'S NOTE: Any new and significant information on new/upgraded transmission system right-of-way will be included as appropriate upon completion of the Entergy Transmission and Distribution (T&D) study.]

5.1.3 Historic Properties

SUPP

NUREG-1817 Section 5.6 resolved that the potential impacts of facility operations on historic and cultural resources would be SMALL. No additional information provided.

References

1. NUREG-1817, "Environmental Impact Statement for an Early Site Permit (ESP) at the Grand Gulf Site"
-

| Table 3.0-201 | | | | |
|--|---|---|---|--|
| Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> ⁵ (Yes / No) | <u>Comments</u> ⁴ |
| 1. Structures | | | | |
| 1.1 Building Characteristics | | | | |
| 1.1.2 Foundation Embedment | 140 ft. (42.7 m) | 69.23 ft. (21,100 mm) | Yes | An embedment depth less (deep) than the ESP design parameter is bounded. ESBWR Std. Plant (DCD Tier 2, Table 3.8-13) |
| 2. Normal Plant Heat Sink | | | | |
| 2.3 Condenser | | | | |
| 2.3.2 Condenser / Heat Exchanger Duty | 10.7E+9 Btu/hr | 1E+10 Btu/hr | Yes | ESBWR Std. Plant (DCD Tier 2, Table 10.1-1) |
| 2.4 NHS Cooling Towers - Mechanical Draft (2.4), (or Natural Draft (2.5)) ⁶ | | | | |
| 2.4.3 (2.5.3) Blowdown Constituents and Concentrations | See Table 3.0-202 | Site specific value - TBD | | |
| 2.4.4 (2.5.4) Blowdown Flow Rate | 12,800 gpm expected (39,000 gpm max) | Site specific value - TBD | | |
| 2.4.5 (2.5.5) Blowdown Temperature | 100°F | Site specific value - TBD | | |

| Table 3.0-201 | | | | |
|--|--------------------------------------|---|---|--|
| Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> (Yes / No) ⁵ | <u>Comments</u> ⁴ |
| 2.4.6 (2.5.6) Cycles of Concentration | 4 | Site specific value - TBD | | |
| 2.4.7 (2.5.7) Evaporation Rate | 35,100 gpm expected (39,000 gpm max) | Site specific value - TBD | | |
| 2.4.8 (2.5.8) Height ⁷ | 60 ft (475 ft / 550 ft) | Site specific value - TBD | | The selected design includes a single natural draft cooling tower (xxx ft.) and a ##-cell mechanical draft (helper) tower (yy ft.). |
| 2.4.9 (2.5.9) Makeup Flow Rate | 47,900 gpm expected (78,000 gpm max) | Site specific value - TBD | | |
| 2.4.10 (2.5.10) Noise | 55 dba @ 1000 ft | Site specific value - TBD | | |
| 2.4.12 (2.5.12) Cooling Water Flow Rate | 865,000 gpm | 669,000 gpm (152,000 m ³ /hr) | Yes | Main Condenser design value. DCD Tier 2, Table 10.4-1 |
| 3. Ultimate Heat Sink | | | NA | The atmosphere provides UHS function via IC/PCCS pools. See DCD Tier 2, Sections 9.2.5, 9.1.3.2, 9.1.3.3 for ESBWR. Therefore this item is not applicable. |
| 3.3 Mech Draft Cooling Towers | | | NA | Not applicable for ESBWR. |
| 3.3.4 Blowdown Flow Rate | 288 gpm expected (1700 gpm max) | NA | NA | Not applicable for ESBWR. |

| Table 3.0-201 | | | | | |
|--|-----------------------------------|---|---|------------------------------|----------------------------|
| Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | | |
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> (Yes / No) ⁵ | <u>Comments</u> ⁴ | |
| 3.3.5 | Blowdown Temperature | 95°F | NA | NA | Not applicable for ESBWR. |
| 3.3.7 | Evaporation Rate | 822 gpm expected (1700 gpm max) | NA | NA | Not applicable for ESBWR. |
| 3.3.9 | Makeup Flow Rate | 1110 gpm expected (3,400 gpm max) | NA | NA | Not applicable for ESBWR. |
| 3.3.12 | Cooling Water Flow Rate | 26,125 gpm (normal) 52,250 gpm (shutdown / accident) | NA | NA | Not applicable for ESBWR. |
| 5. Potable Water/Sanitary Waste System | | | | | |
| 5.1 Discharge to Site Water Bodies | | | | | |
| 5.1.1 | Flow Rate | 120 gpm expected (210 gpm max) | Site specific value - TBD | | |
| 5.2 Raw Water Requirements (Potable Water/Sanitary Waste Systems) | | | | | |
| 5.2.1 | Maximum Use | 240 gpm | 200 gpm (12.6 l/s) – peak demand | Yes | DCD Tier 2, Section 9.2.4. |
| 5.2.2 | Monthly Average Use | 180 gpm | Site specific value - TBD | | |

| Table 3.0-201 | | | | |
|--|-----------------------------------|---|---|---|
| Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> ⁵ (Yes / No) | <u>Comments</u> ⁴ |
| 6. Demineralized Water System (ESBWR Makeup Water System) | | | | |
| 6.1 Discharge to Site Water Bodies | | | | |
| 6.1.1 Flow Rate | 220 gpm expected (290 gpm max) | TBD | | |
| 6.2 Raw Water Requirements | | | | |
| 6.2.1 Maximum Use | 1440 gpm | TBD | | |
| 6.2.2 Monthly Average Use | 1100 gpm | TBD | | |
| 7. Fire Protection System | | | | |
| 7.1 Raw Water Requirements | | | | |
| 7.1.1 Maximum Use | 1890 gpm | 1065 gpm | Yes | DCD Tier 2, Table 9.5-2 (See GE RAI Response: MFN 06-304, Enclosure 2, RAI 9.5-15). |
| 7.1.2 Monthly Average Use | 30 gpm | 0 gpm | Yes | |

| Table 3.0-201 | | | | |
|--|---|---|---|--|
| Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> (Yes / No) ⁵ | <u>Comments</u> ⁴ |
| 8. | Miscellaneous Drain | | | |
| 8.1 | Discharge to Site Water Bodies | | | |
| 8.1.1 | Flow Rate | 200 gpm expected (300 gpm max) | Site specific value - TBD | |
| 9. | Unit Vent/Airborne Effluent Release Point | | | |
| 9.4 | Release Point | | | |
| 9.4.2 | Elevation (Normal) | Ground level | 165 ft (50,000 mm) | Yes GENS-SR3-2006-0004, dated Sept. 14, 2006 (RFI GE-0006 Response) |
| 9.4.3 | Elevation (Post Accident) | Ground level | Ground level and higher | Yes |
| 9.4.4 | Minimum Distance to Site Boundary | 0.52 mi (841 m) exclusion area | 0.50 miles (800 meters) | Yes DCD Tier 2, Section 12.2.2.1, Table 12.2-15 |
| 9.5 | Source Term | | | |
| 9.5.1 | Airborne Effluents (Normal) | 32,699 Ci/yr | 4.23E+03 Ci/yr (1.56E+08 MBq/yr) See Table 3.0-207 | Yes |
| 9.5.2 | Airborne Effluents (Post-Accident) ⁸ | Based on limiting DBAs. | Based on limiting DBAs. | TBD |

| Table 3.0-201 Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
|--|-----------------------------------|--|--|---|
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> (Yes / No) ⁵ | <u>Comments</u> ⁴ |
| 9.5.3 Tritium Airborne Effluent (Normal) | 7060 Ci/yr | 7.57E+01 Ci/yr (2.80E+06 MBq/yr) See Table 3.0-207 | Yes | |
| 10. Liquid Radwaste System | | | | |
| 10.2 Release Point | | | | |
| 10.2.1 Flow Rate | 35 gpm (with 12,800 gpm dilution) | Dilution Factor = 10 | Yes | DCD Tier 2, Table 12.2-20a Dilution factor of 10 bounds a DF of 366 (12,800/35 = 366) for dose calculations. |
| 10.3 Source Term | | | | |
| 10.3.1 Liquid | 0.694 Ci/yr | 9.28E-02 Ci/yr (3.43E+03 MBq/yr) See Table 3.0-208 | TBD | |
| 10.3.2 Tritium | 6,200 Ci/yr | 7 Ci/yr (2.59 E+05 MBq/yr) See Table 3.0-208 | Yes | |
| 11. Solid Radwaste System | | | | |
| 11.2.1 Activity | 5400 Ci/yr | TBD | | |
| 11.2.2 Principal Radionuclides | See Table 3.0-203 | See Table 3.0-203 | | |

| Table 3.0-201 | | | | |
|--|-----------------------------------|---|---|---|
| Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> (Yes / No) ⁵ | <u>Comments</u> ⁴ |
| 11.2.3 Volume | 18,646 ft ³ /yr | 16,764 ft ³ /yr (474.42 m ³ /yr) | Yes | ESP parameter is for the total plant (i.e., two "units"); value for ESBWR is for one unit. The ESP value is bounding for the GGNS COL for one unit. |
| 13. Auxiliary Boiler System | | | | |
| 13.2 Flue Gas Effluents | See Table 3.0-204 | NA | NA | ESBWR uses electric auxiliary boilers. DCD Tier 2, Section 9.3.12 |
| 16. Standby Power System | | | | |
| 16.1 Diesels | | | | |
| 16.1.3 Diesel Flue Gas Effluents | See Table 3.0-205 | See Table 3.0-205 | | |
| 16.2 Gas Turbines | | | | |
| 16.2.3 Gas-Turbine Flue Gas Effluents | See Table 3.0-206 | | NA | ESBWR does not use gas turbines in its standard plant design. |
| 17. Plant Characteristics | | | | |
| 17.3 Megawatts Thermal | 4300 MWt | 4500 MWt | No | DCD Tier 2, Section 1.1.2.7, Table 1.3-1, Figure 1.1-3a. DCD Tier 1, Table 1.1-1 |
| 17.4 Plant Design Life | 60 years | 60 years | Yes | DCD Tier 2, Section 3.9.3.1 |

| Table 3.0-201 Comparison of ESP Plant Parameters Envelope (PPE) Design Parameters to COL Design Characteristics | | | | |
|--|-----------------------------------|---|---|------------------------------|
| <u>PPE Section</u> ¹ / <u>Parameter</u> ² | <u>ESP Parameter</u> ³ | <u>COL Design Characteristic</u> ⁴ | <u>ESP Parameter Bounding?</u> ⁵ (Yes / No) | <u>Comments</u> ⁴ |
| 17.5 | Plant Population | | | |
| 17.5.1 | Operation | 1160 people | TBD | |
| 18. | Construction | | | |
| 18.3.1 | Noise | 76-101 db @ 50 ft | TBD | |
| 18.4 | Plant Population | | | |
| 18.4.1 | Construction | 3150 people max | TBD | |

DRAFT WORK IN PROGRESS

January 17, 2007

Grand Gulf Nuclear Station Unit 3
Combined License Application
Part 3, Environmental Report

NOTES:

1. The "PPE Section" numbers assigned to each parameter relate to the PPE Worksheet from which the PPE tables were developed. See ESP Application Part 2, Site Safety Analysis Report, Section 1.3 (Reference ##) for a discussion of the basis for the parameters included in this table.
2. A definition for each ESP parameter in this table is provided in Table 3.0-209, including specification as to whether the parameter is a maximum or minimum value for comparison purposes.
3. ESP Parameter is "Composite Value" as given in NUREG-1817 Appendix I Table 3.0-1. The "Composite Value" provides an envelope (bounding value) for design parameters for the various plant designs considered for the site.
4. COL Design Characteristics are standard plant design characteristics as defined by the reactor vendor, or are design characteristics determined for the site-specific system's design, as applicable.
5. An indication that the ESP parameter is "bounding" (Yes), demonstrates that the COL Design Characteristic for the selected facility falls within the ESP design parameters specified in the Early Site Permit.
6. Both mechanical draft and natural draft cooling tower alternatives were considered in the ESP Application. The most restrictive parameter for each cooling system, as they relate to environmental impacts, was used in table ESP Environmental Report (ER) (Reference ##) Table 3.0-1 (NUREG-1817 Appendix I Table 3.0-1).
7. For the purposes of environmental (aesthetic) impact, a natural draft cooling tower height of 550 ft was assumed as the ESP parameter. The cooling tower plume model discussed in Section 5.3.3.1 of the ESP ER was developed assuming a conservative natural draft cooling tower height of 475 ft., and a mechanical draft cooling tower height of 60 ft.
8. In general, source terms for any given accident are those used by the reactor vendor in its safety analyses. The methodologies used by the vendor for establishing source terms include those established in TID-14844, and in Regulatory Guide 1.183.

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|---------------------------------|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| Structure Height | ≤234 ft | The height from finished grade to the top of the tallest power block structure, excluding cooling towers | | | |
| Structure Foundation Embedment | ≤140 ft | The depth from finished grade to the bottom of the basemat for the most deeply embedded power block structure | | | |
| Normal Plant Heat Sink | | | | | |
| ▪ Condenser / Heat Exchanger Duty | ≤1.03 x 10 ¹⁰ Btu/hr | Waste heat rejected from the main condenser and the auxiliary heat exchangers during normal plant operation at full station load | | | |
| ▪ Maximum Inlet Temperature Condenser / Heat Exchanger | 100°F | Maximum intake temperature at condenser and heat exchanger inlet | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|--|---|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| ▪ Unit 3 Closed-Cycle, Dry and Wet Tower | | | | | |
| Height | ≤180 ft | The height above finished grade of the cooling towers | | | |
| Make-Up Flow Rate | 15,384 gpm, maximum (MWC mode) 22,268 gpm, maximum (EC mode) | The expected rate of removal of water from Lake Anna to replace water losses from the closed-cycle cooling water system | | | |
| Evaporation Rate | 8707 gpm, 365-day rolling average ^a , maximum (MWC mode) 16,695 gpm, maximum (EC mode) | Maximum rates at which water is lost by evaporation resulting from operation of the plant cooling towers. | | | |
| Drift Rate | 8 gpm, maximum (MWC mode) 8 gpm, maximum (EC mode) | Expected rates at which water is lost by drift resulting from operation of the plant | | | |

^a The staff used a 100 percent capacity factor based on a 365-day rolling average evaporative water use vs. the applicant's 96 percent capacity factor based on long term annual average evaporative water use.

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|---|---|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| | | cooling towers based on 0.001% of cooling water flow | | | |
| Blowdown Flow Rate | 3844 gpm, maximum (MWC mode) 5565 gpm, maximum (EC mode) | Flow rate of the blowdown stream from the closed-cycle cooling water system to the WHTF | | | |
| Blowdown Temperature | 100°F, maximum | The maximum expected temperature of the cooling tower blowdown stream to the WHTF | | | |
| Blowdown Constituents and Concentrations | | The maximum expected concentrations for anticipated constituents in the cooling water system blowdown to the WHTF | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|------------------------------|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| - Free Available Chlorine | <0.3 ppm | | | | |
| - Copper | <1 ppm | | | | |
| - Iron | <1 ppm | | | | |
| - Sulfate | <300 ppm | | | | |
| - Total Dissolved Solids | <3000 ppm | | | | |
| Heat Rejection Rate | ≤1.03 E 10 Btu/hr | The expected maximum heat rejection rate to the atmosphere during normal operation at full station load. | | | |
| Noise | <65 dBA EAB | Maximum expected sound level at the EAB from operation of the cooling towers | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|--|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| ▪ Unit 4 Dry Cooling Towers | | | | | |
| Evaporation Rate | None or negligible (on the order of 1 gpm, average) | The expected rate at which water is lost by evaporation from the cooling water system | | | |
| Height | ≤180 ft | The vertical height above finished grade of the cooling towers | | | |
| Makeup Flow Rate | None or negligible (on the order of 1 gpm, average) | The expected rate of removal of water from Lake Anna to replace evaporative water losses from the cooling water system | | | |
| Noise | <60 dBA at EAB | Maximum expected sound level at the EAB from operation of the cooling towers | | | |
| Heat Rejection Rate | ≤1.03 x 10 ¹⁰ Btu/hr | Waste heat rejected to the atmosphere from the cooling water system, during normal plant operation at full station load | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|--|-----------------------------------|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| Ultimate Heat Sink (UHS) Mechanical Draft Cooling Towers | | | | | |
| <ul style="list-style-type: none"> ▪ Blowdown Constituents and Concentrations | | The maximum expected concentrations for anticipated constituents in the UHS blowdown to the WHTF | | | |
| - Free Available Chlorine | <0.3 ppm | | | | |
| - Copper | <1 ppm | | | | |
| - Iron | <1 ppm | | | | |
| - Sulfate | <300 ppm | | | | |
| - Total Dissolved Solids | <3000 ppm | | | | |
| <ul style="list-style-type: none"> ▪ Blowdown Flow Rate | 144 gpm expected, 850 gpm maximum | The normal expected and maximum flow rate of the blowdown stream from the UHS system to the WHTF | | | |

**DRAFT Table 3.0-2
Evaluation of ESP Design Parameters**

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|----------------------------------|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| ▪ Evaporation Rate | 411 gpm normal, 850 gpm shutdown | The expected (and maximum) rate at which water is lost by evaporation from the UHS System | | | |
| ▪ Height | ≤60 ft | The vertical height above finished grade of mechanical draft cooling towers associated with the UHS system | | | |
| ▪ Maximum Consumption of Raw Water | 850 gpm, nominal | The expected maximum short-term consumptive use of water from Lake Anna by the UHS system (evaporation and drift losses) | | | |
| ▪ Monthly Average Consumption of Raw Water | 411 gpm | The expected normal operating consumption of water from Lake Anna by the UHS system (evaporation and drift losses) | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|---|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| Release Point | | | | | |
| ▪ Elevation | Ground Level | The elevation above finished grade of the release point for routine operational and accident sequence releases | | | |
| Source Term | | | | | |
| ▪ Gaseous (Normal) | Maximum values presented in Table H-5 of this FEIS and ER Table 5.4-7 | The annual activity, by isotope, contained in routine plant airborne effluent streams | | | |
| ▪ Atmospheric (Design Basis Accidents) | Ci as indicated in | | | | |
| | ER Table 7.1-3 | AP1000 Main Steam Line Break, Pre-existing Iodine Spike | | | |
| | ER Table 7.1-5 | AP1000 Main Steam Line Break, Accident-Initiated Iodine Spike | | | |
| | ER Table 7.1-6a | ABWR Cleanup Water Line Break | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|------------------------------|---|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| | ER Table 7.1-6c | ESBWR Feedwater System Pipe Break | | | |
| | ER Table 7.1-7 | AP1000 Locked Rotor Accident | | | |
| | ER Table 7.1-9 | AP1000 Rod Ejection Accident | | | |
| | ER Table 7.1-12 | ABWR Failure of Small Lines Carrying Primary Coolant Outside Containment | | | |
| | ER Table 7.1-13a | ESBWR Failure of Small Lines Carrying Primary Coolant Outside Containment | | | |
| | ER Table 7.1-14 | AP1000 Steam Generator Tube Rupture, Pre-Existing Iodine Spike | | | |
| | ER Table 7.1-16 | AP1000 Steam Generator Tube Rupture, Accident Initiated Iodine Spike | | | |
| | ER Table 7.1-18 | ABWR Main Steam Line Break | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|------------------------------|---|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| | ER Table 7.1-20a | ESBWR Main Steam Line Break | | | |
| | ER Table 7.1-11 | AP1000 Loss-of-Coolant Accident | | | |
| | ER Table 7.1-11 | ABWR Loss-of-Coolant Accident | | | |
| | ER Table 7.1-24a | ESBWR Loss-of-Coolant Accident | | | |
| | ER Table 7.1-25 | AP1000 Fuel Handling Accident | | | |
| | ER Table 7.1-25 | ABWR Fuel Handling Accident | | | |
| | ER Table 7.1-29 | ESBWR Fuel Handling Accident | | | |
| | ER Table 7.1-31 | ESBWR Cleanup Water Line Break | | | |
| ▪ Tritium | 3500 Ci/yr (maximum values) | The annual activity of tritium contained in routine plant airborne effluent streams | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|--|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| Liquid Radwaste System | | | | | |
| ▪ Release Point Dilution Factor | 1000 (minimum) | The ratio of liquid potentially radioactive effluent streams to liquid non-radioactive effluent streams from plant systems to the WHTF through the discharge canal used for NAPS Units 1 and 2 | | | |
| ▪ Liquid | Values presented in Table H-2 of the FEIS and ER Table 5.4-6 (maximum values)] | The annual activity, by isotope, contained in routine plant liquid effluent streams | | | |
| ▪ Tritium | ≤850 Ci/yr | The annual activity of tritium contained in routine plant liquid effluent streams | | | |
| Solid Radwaste System | | | | | |
| ▪ Activity | ≤2700 Ci/yr | The annual activity contained in solid radioactive wastes | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|--|--|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| | | generated during routine plant operations | | | |
| ▪ Volume | <9041 cu ft/yr | The expected volume of solid radioactive wastes generated during routine plant operations | | | |
| Plant Characteristics | | | | | |
| ▪ Acreage | Approximately 128.5 acres [Both units] | Approximate area on the NAPS site that would be affected on a long-term basis as a result of additional permanent facilities | | | |
| ▪ Megawatts Thermal | ≤4500 MWt | The thermal power generated by one unit | | | |
| ▪ Plant Population – Operation | Approximately 720 permanent employees [Both units] | Anticipated number of new employees that would be required for operation of the new units | | | |
| ▪ Plant Population – | Approximately 700 to 1000 | Anticipated number of additional workers | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|--|---|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| Refueling / Major Maintenance | temporary workers during planned outages | onsite during planned outages of the new units | | | |
| ▪ Plant Population – Construction | 5000 people maximum [simultaneous construction] | Peak workforce of 5000 for construction of both new units | | | |
| ▪ Maximum Fuel Enrichment for Light-Water- Cooled Reactors | 5% | Concentration of U- 235 in fuel | | | |
| ▪ Maximum Fuel Burn-up for Light-Water- Cooled Reactors | 62,000 MWd/MTU | The value derived by calculating the reactor thermal power multiplied by the time of irradiation divided by fuel mass (expressed as megawatt-days per metric ton of irradiated fuel) | | | |

| DRAFT Table 3.0-2 Evaluation of ESP Design Parameters | | | | | |
|---|------------------------------|---|--|---|--------------|
| ESP Design Parameters (From NUREG-1811, Volume 1, Table I-2) | | | COL Design Characteristic Value | Is ESP Design Parameter Bounding? (Yes/No) | Notes |
| Item | Single Unit Value | Description & References | | | |
| ▪ Maximum Fuel Enrichment for Gas-Cooled Reactors | 19.8% | Concentration of U-235 in fuel | | | |
| ▪ Maximum Fuel Burn-up for Gas-Cooled Reactors | 133,000 MWd/MTU | The value derived by calculating the reactor thermal power multiplied by the time of irradiation divided by fuel mass. (expressed as megawatt-days per metric ton of irradiated fuel) | | | |