12 RADIATION PROTECTION

This chapter provides information on radiation protection methods and estimated occupational radiation exposures (OREs) of operating and construction personnel during normal operations including refueling; purging; fuel handling and storage; radioactive material handling, processing, use, storage, and disposal; maintenance; routine operational surveillance; inservice inspection (ISI); and calibration, and anticipated operational occurrences (AOOs). Specifically, this chapter provides information on facility and equipment design, planning and procedures programs, and techniques and practices employed by the applicant to meet the radiation protection standards set forth in Title 10 of the Code of *Federal Regulations* (10 CFR) Part 20, and to be consistent with the guidance given in the appropriate regulatory guides (RGs), where the practices set forth in such guides are used to and in the implementation the U.S. Nuclear Regulatory Commission (NRC)'s regulations.

12.1 Assuring That Occupational Radiation Exposures are As-Low-As-Reasonably Achievable (Related to RG 1.206, Section C.III.1, Chapter 12, C.I.12.1, "Ensuring that Occupational Radiation Exposures are As Low As Is Reasonably Achievable")

12.1.1 *Introduction*

Section 12.1 addresses policy and design considerations to ensure that the ORE to personnel will be kept As Low As Is Reasonably Achievable (ALARA). The ALARA program is addressed in this section and in Appendix 12AA of the Turkey Point Units 6 and 7 combined license (COL) Final Safety Analysis Report (FSAR).

12.1.2 Summary of Application

Section 12.1 of the Turkey Point Units 6 and 7 COL FSAR, Revision 8, incorporates by reference Section 12.1 of the AP1000 Design Control Document (DCD), Revision 19.

In addition, in Turkey Point Units 6 and 7 COL FSAR Section 12.1, the applicant provided the following:

AP1000 COL Information Items

- STD COL 12.1-1

The applicant provided additional information in Standard (STD) COL 12.1-1 to resolve COL Information Item 12.1-1 (COL Action Item 12.2.1-1), which addresses ALARA and operational policies and compliance with RGs. The applicant provided additional information to incorporate Nuclear Energy Institute (NEI) NEI 07-08A, "Generic FSAR Template Guidance for Ensuring That Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (ALARA)," into Turkey Point Units 6 and 7 COL FSAR Section 12.1 and NEI 07-03A, "Generic FSAR Template Guidance for Radiation Protection Program Description," in Appendix 12AA.

The applicant also provided site specific information in their FSAR that was not included in NEI 07-08A, Section 12.1.2, to specify that the applicant's quality assurance criteria are described in Part III of the Quality Assurance Program Description which is discussed in Turkey Point Units 6 and 7 COL FSAR Section 17.5.

Supplemental Information

- STD SUP 12.1-1

The applicant provided supplemental (SUP) information by addressing equipment layout at the end of AP1000 DCD Section 12.1.2.4.2.

12.1.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1793, "Final Safety Evaluation Report [FSER] Related to Certification of the AP1000 Standard Design," and its supplements.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the ALARA program are given in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," Section 12.1.

The applicable regulatory requirements and guidance for STD COL 12.1-1 and STD SUP 12.1-1 are as follows:

- 10 CFR Part 20, "Standards for Protection against Radiation"
- 10 CFR 19.12, "Instructions to workers"
- RG 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Revision 3
- RG 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2
- RG 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," Revision 4
- RG 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable," Revision 3
- RG 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably A achievable," Revision 1-R
- NUREG-1736, "Consolidated Guidance: 10 CFR Part 20 – Standards for Protection Against Radiation"

12.1.4 Technical Evaluation

The NRC staff (the staff) reviewed Section 12.1 of the Turkey Point Units 6 and 7 COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the COL

application represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to ensuring that the ORE to personnel will be kept ALARA. The results of the staff's evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

Section 1.2.3 of this safety evaluation report (SER) provides a discussion of the strategy used by the staff to perform one technical review for each standard issue outside the scope of the design certification (DC) and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application Vogtle Electric Generating Plant (VEGP) Units 3 and 4 were equally applicable to the Turkey Point Units 6 and 7 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 5 to the Turkey Point Units 6 and 7 COL FSAR. In performing this comparison, the staff considered changes made to the Turkey Point Units 6 and 7 COL FSAR (and other parts of the COL application, as applicable) resulting from requests for additional information (RAIs).

- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.

- The staff verified that the site-specific differences were not relevant.

The staff completed its review and finds the evaluation performed for the standard content to be directly applicable to the Turkey Point Units 6 and 7 COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) contains evaluation material from the SER for the Bellefonte Nuclear Plant (BLN), Units 3 and 4 COL application.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.1.4:

[1] See Section 1.2.2 of this SER for a discussion of the staff's review related to verification of the scope of information to be included in a COL application that references a design certification (DC). This footnote will be referenced in several places throughout the chapter of this Safety Evaluation.

The following portion of this technical evaluation section is reproduced from Section 12.1.4 of the BLN SER

AP1000 COL Information Items

- *STD COL 12.1-1*

The applicant provided additional information in STD COL 12.1-1, related to ALARA and Operational Policies, to resolve COL Information Item 12.1-1. COL Information Item 12.1-1 states:

> *Operational considerations of ALARA, as well as operational policies and continued compliance with 10 CFR 20 and RGs 1.8, 8.8, and 8.10, will be addressed by the Combined Operating License applicant. In addition, the Combined Operating License applicant will address operational considerations of the Standard Review Plan to the level of detail provided in RG 1.70. RGs that will be addressed include: 8.2, 8.7, 8.9, 8.13, 8.15, 8.20, 8.25, 8.26, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, and 8.38.*

The commitment was also captured as COL Action Item 12.2.1-1 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:

> *The COL applicant will review all plant procedures and modification plans that involve personnel radiation exposure to ensure that the ALARA policy is applied. In addition, a COL applicant referencing the AP1000 certified design will address operational ALARA concerns and will submit an operational ALARA policy which conforms to the requirements of 10 CFR Part 20 and the recommendations of Revision 2 to RG 1.8, RG 8.8, and Revision 1-R to RG 8.10*

In response to COL Action Item 12.2.1-1 the following is stated in the BLN COL FSAR (Revision 1) as STD COL 12.1-1:

> *This section incorporates by reference [Nuclear Energy Institute] NEI 07-08, "Generic FSAR Template Guidance for Ensuring That Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (ALARA)," Revision 2, which is currently under review by the NRC staff. See Table 1.6-201. ALARA practices are developed in a phased milestone approach as part of the procedures necessary to support the Radiation Protection Program. Table 13.4-201 describes the major milestones for ALARA procedures development and implementation*

STD COL 12.1-1 includes a commitment to the use of a "Generic FSAR Template Guidance for Ensuring That Occupational Radiation Exposures Are as Low as Is Reasonably Achievable (ALARA)," as an operational program document, based on draft NEI Template 07-08, Revision 2. The NEI template

presents the functional elements of an ALARA program, which, if met, would demonstrate compliance with 10 CFR 20.1101 and 10 CFR 19.12. Accordingly, BLN FSAR Section 12.1, STD COL 12.1-1 needs to be updated as to its commitment to the final NEI ALARA template if it is accepted by the NRC staff. Therefore, the staff cannot find the applicant's reference to the NEI 07-08 template to be acceptable until the staff completes its review of this template as a method to meet the regulatory requirements of an ALARA program, and the BLN FSAR is updated to reference the final version of this template. This is identified as ***Open Item 12.1-1***

The NRC staff review finds that BLN FSAR Section 12.1 and Appendix 12AA describe programs and procedures that ensure ORE will be ALARA in accordance with the training requirements in 10 CFR 19.12 and the ALARA provisions of 10 CFR 20.1101(b). The ALARA policy will be described, displayed, and implemented in accordance with the provisions of RG 8.8 (Regulatory Position C.1) and RG 8.10 (Regulatory Position C.1) and NUREG-1736, as it relates to maintaining doses ALARA.

According to BLN FSAR Appendix 12AA, NEI 07-03, NEI 07-08, and Chapter 13, "Conduct of Operations," specific individual(s) will be designated and assigned responsibility and authority for implementing ALARA policy at the BLN site. The Functional Manager in charge of Radiation Protection and the Radiation Protection staff periodically will review, update, and modify as appropriate, plant design features and changes, as well as all operating and maintenance features, using exposure data and experience gained from operating nuclear power plants to ensure that occupational exposures will be kept ALARA in accordance with RG 8.8 guidance.

Using the guidance of Section 12.1 of NUREG-0800, the staff finds BLN FSAR Section 12.1 and Appendix 12AA are in accordance with the ALARA provisions of 10 CFR 20.1101(b) and RG 8.8 (Regulatory Position C.2) and will include incorporation of measures for reducing the need for time spent in radiological areas; measures to control access to radiological areas; measures to reduce the production, distribution, and retention of activated corrosion products throughout the primary system; measures for assuring that ORE during decommissioning will be ALARA; reviews of design modifications by competent radiation protection personnel; instructions to engineers regarding ALARA design; experience from operating plants and past designs; and continuing facility design reviews.

Using the guidance of Section 12.1 of NUREG-0800, the staff finds that BLN COL FSAR Section 12.1 and Appendix 12AA describe an acceptable program to develop plans and procedures in accordance with RGs 1.33, 1.8, 8.8, and 8.10 that can incorporate the experiences obtained from facility operation into facility and equipment design and operations planning and that will implement specific exposure control techniques.

Initially, it was not clear to the NRC staff when the appropriate ALARA program and planning procedures would be implemented as described in the proposed License Conditions (Part 10 of the BLN, Units 3 and 4 COL application).

Therefore, the staff issued request for additional information (RAI) 12.1-1. In a letter dated September 22, 2008, the applicant stated that ALARA focused procedures are developed in conjunction with the Radiation Protection Program (RPP) and thus will follow the RPP milestones for implementation found in FSAR Table 13.4-201. The applicant stated that FSAR Section 12.1, STD COL 12.1-1 text will be updated as to its commitment to the final ALARA program implementation. The NRC staff finds the RAI response acceptable because it clearly identified that ALARA practices will be in place at the same time as the RPP. The NRC staff verified that Revision 1 of the BLN COL FSAR adequately incorporates the above. As a result, RAI 12.1-1 is closed. For a discussion related to the proposed license condition related to the RPP, which includes ALARA practices, refer to SER Section 12.5.5.

In accordance with 10 CFR 20.1101(b), the staff finds that overall facility operations, as well as the RPP as described in BLN COL FSAR Section 12.5, Appendix 12AA, and NEI 07-03 will integrate the procedures necessary to ensure that radiation doses are ALARA, including work scheduling, work planning, design modifications, and radiological considerations. Operating and maintenance personnel will follow specific plans and procedures to ensure that goals related to keeping exposures ALARA are achieved in the operation of the plant. Engineering controls for the protection of personnel will be optimized. Operations involving high person-sievert (person-rem) exposures will be carefully preplanned and carried out by personnel who are well trained in radiation protection and using proper equipment. During maintenance activities, in radiological areas, personnel will be monitored for exposure to radiation and contamination. Their radiation exposures will be reviewed and used to make changes in future job procedures and techniques.

The BLN FSAR states that COL information item, STD COL 12.1-1 is addressed in NEI 07-08, and Appendix 12AA of the BLN COL FSAR, which references NEI 07-03. The staff has reviewed the current version of NEI 07-03 and NEI 07-08 with respect to compliance with RG 1.8. The NEI 07-03 template states that the Radiation Protection Manager, Radiation Protection Technicians, and Radiation Protection Supervisory and Technical Staff will be trained and qualified in accordance with the guidance of RG 1.8. In a letter dated March 18, 2009 (ML090510379), the NRC accepted NEI 07-03, Revision 7. Specifically, the NRC staff indicated that for COL applications, NEI 07-03, Revision 7 provides an acceptable template for assuring that the RPP meets the applicable NRC regulations and guidance. Since the BLN COL FSAR has not yet adopted the approved version of the NEI template, this is identified as Confirmatory Item 12.1-1. At present, the NRC has not accepted NEI-07-08 as an acceptable template to be used by the COL applicants. As a result, this is identified as Open Item 12.1-1.

Supplemental Information

- *STD SUP 12.1-1*

The applicant added the following text to the end of Section 12.1.2.3, "Facility Layout General Design Considerations for ALARA," of the DCD included in the DC amendment:

> *A video record of the equipment layout in areas where radiation fields are expected to be high following operations may be used to assist in ALARA planning and to facilitate decommissioning.*

The NRC staff acknowledges STD SUP 12.1-1 as a statement of fact not requiring NRC review.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.1.4:

Resolution of Standard Content Open Item 12.1-1 and Confirmatory Item 12.1-1

The NRC staff compared the VEGP and BLN COL applications and found them to be essentially identical, with two exceptions: first, the application material under STD COL 12.1-1 in Section 12.1 of the VEGP application references NEI 07-08A and the application material under STD COL 12.1-1 in Section 12.1 of the BLN application references NEI 07-08, Revision 2; and second, the VEGP FSAR Appendix 12AA references NEI 07-03A and the BLN FSAR Appendix 12AA references Revision 3 of NEI 07-03. Regarding these exceptions, the differing material associated with STD COL 12.1-1 in the VEGP FSAR is associated with adopting NEI 07-08A and NEI 07-03A, which are evaluated below as part of resolving Open Item 12.1-1 and Confirmatory Item 12.1-1.

In a letter from NEI to NRC dated October 29, 2009, NEI submitted NEI 07-08A to the NRC, which is the version of NEI 07-08 that has been accepted by the NRC. Accordingly, Open Item 12.1-1 is resolved for VEGP.

Confirmatory Item 12.1-1 is resolved for VEGP because the applicant has adopted the approved version of NEI 07-03, i.e., NEI 07-03A, (see paragraph below).

In Revision 2 of the VEGP COL FSAR, the applicant modified parts of FSAR Chapter 12, Appendix 12.AA that relate to STD COL 12.1-1. Specifically, in the FSAR, Revision 2, NEI 07-03A, is referenced. Accordingly, because NEI 07-03A is the approved version of NEI 07-03, the above conclusions regarding Confirmatory Item 12.1-1 are not affected by the changes to Revision 2 of the FSAR. One other change is the modification of a reference at the end of Appendix 12AA where the reference to RG 1.97 is changed from Revision 4 to Revision 3. The staff found the change acceptable, since Revision 3 provides for a more comprehensive version of the RG and also provides for portable radiation

monitoring equipment. Revision 4 of RG 1.97 indicates that partial implementation is not recommended.

12.1.5 Post Combined License Application

The post COL activities related to ALARA practices (part of the RPP) are discussed in Section 12.5.5 of this SER.

12.1.6 Conclusion

The staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the relevant information relating to this section, and no outstanding information related to this section remains to be addressed in the Turkey Point Units 6 and 7 COL FSAR. The results of the staff's technical evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

The staff concludes that the relevant information presented in the Turkey Point Units 6 and 7 COL FSAR is acceptable based on the relevant acceptance criteria provided in NUREG-0800, Section 12.1. The staff based its conclusion on the following:

- STD COL 12.1-1, relating to ALARA and operational policies and compliance with relevant regulatory guidance, is acceptable because the applicant incorporates approved references NEI 07-03A and NEI 07-08A into the Turkey Point Units 6 and 7 COL FSAR and meets the applicable regulatory requirements and guidance specified in Sections 12.1.3 and 12.1.4 of this SER.

- STD SUP 12.1-1, relating to the use of video recording of equipment layout in areas where radiation fields are expected to be high, is acceptable because it is a statement of fact not requiring NRC approval.

12.2 Radiation Sources

12.2.1 Introduction

This section addresses the issues related to contained radiation sources and airborne radioactive material sources during normal operations, AOOs, and accident conditions affecting in-plant radiation protection.

12.2.2 Summary of Application

Turkey Point Units 6 and 7 COL FSAR, Revision 8, Section 12.2 incorporates by reference AP1000 DCD, Revision 19, Section 12.2.

In addition, in Turkey Point Units 6 and 7 COL FSAR Section 12.2 (and in letter dated May 16, 2016 (ADAMS Accession No. ML16140A087)), the applicant provided the following:

Departures

- PTN DEP 6.4-1

The applicant provided additional information in Section 12.2 of the Turkey Point Units 6 and 7 COL FSAR about PTN DEP 6.4-1 related to design changes affecting habitability of the main control room and changes to the calculated doses to control room operators. This information, as well as related PTN DEP 6.4-1 information appearing in other chapters of the FSAR, is reviewed in Section 21.2 of this SER.

AP1000 COL Information Item

- STD COL 12.2-1

The applicant provided additional information in STD COL 12.2-1 to resolve COL Information Item 12.2-1 (COL Action Item 12.3.1-1), which addresses miscellaneous sources.

12.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1793 and its supplements.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the radiation sources are given in NUREG-0800, Section 12.2.

The applicable regulatory requirements for STD COL 12.2-1 are as follows:

- 10 CFR 20.1801, "Security of stored material"
- 10 CFR 20.1802, "Control of material not in storage"
- 10 CFR Part 50, "Domestic licensing of production and utilization facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 61, "Fuel Storage and Handling and Radioactivity Control"

12.2.4 Technical Evaluation

The staff reviewed Turkey Point Units 6 and 7 COL FSAR Section 12.2 and checked the referenced DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to radiation sources. The results of the staff's evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

Section 1.2.3 of this SER provides a discussion of the strategy used by the staff to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application (VEGP

Units 3 and 4) were equally applicable to the Turkey Point Units 6 and 7 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 5 to the Turkey Point Units 6 and 7 COL FSAR. In performing this comparison, the staff considered changes made to the Turkey Point Units 6 and 7 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs.

- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.

- The staff verified that the site-specific differences were not relevant.

The staff completed its review and finds the evaluation performed for the standard content to be directly applicable to the Turkey Point Units 6 and 7 COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) contains evaluation material from the SER for the BLN Units 3 and 4 COL application.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.2.4:

> *The following portion of this technical evaluation section is reproduced from Section 12.2.4 of the BLN SER:*
>
> *AP1000 COL Information Item*
>
> - *STD COL 12.2-1*
>
> *The applicant provided additional information in STD COL 12.2-1, related to miscellaneous sources, to resolve COL Information Item 12.2-1. COL Information Item 12.1-1 states:*
>
> *The Combined License applicant will address any additional contained radiation sources not identified in subsection 12.2.1, including radiation sources used for instrument calibration or radiography. The same commitment was also captured as COL Action Item 12.3.1-1 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793).*
>
> *The applicant provided additional information in the BLN COL FSAR to address the plant STD COL 12.2-1 dealing with miscellaneous sources. The applicant stated that licensed sources containing byproduct, source and special nuclear material that warrant shielding consideration will meet the applicable requirements of 10 CFR Parts 20, 30, 31, 32, 33, 34, 40, 50 and 70. The applicant indicated that there are byproducts and source materials with known isotopes and activity manufactured for the purpose of measuring, checking, calibrating, or controlling processes quantitatively or qualitatively. Accordingly, written procedures will be established and implemented that address procurement, receipt, inventory, labeling, leak testing, surveillance, control,*

transfer, disposal, storage, issuance and use of these radioactive sources. Also, the applicant indicated that sources maintained on-site for instrument calibration purposes will be shielded while in storage to keep personnel exposure ALARA.

The regulatory requirements cited in the above paragraph address the requirements applicable to sources that would likely be used in conjunction with construction, preoperational, and initial testing. The applicant will implement the practices for radioactive material control as described in NEI 07-03, Section 12.5.4.10, "Radioactive Material Control." In a letter dated March 18, 2009 (ML090510379), the NRC accepted NEI 07-03, Revision 7. Specifically, the NRC staff indicated that for COL applications, NEI 07-03, Revision 7 provides an acceptable template for assuring that the RPP meets the applicable NRC regulations and guidance. Since the BLN FSAR has not adopted the approved version of the NEI template, this is identified as ***Confirmatory Item 12.1-1.***

The staff concludes that the information provided by the applicant with respect to radiation sources is acceptable and meets the requirements of 10 CFR Sections 20.1801 and 20.1802 and GDC 61. This conclusion is based on the applicant's commitment to the NEI 07-03 administrative controls to meet the regulatory requirements. These controls apply to the additional contained radiation sources discussed in the COL item. The staff notes that its review did not encompass the entire set of regulatory requirements cited by the applicant (10 CFR Parts 20, 30, 31, 32, 33, 34, 40, 50 and 70), since the staff's review is focused on radiation protection requirements on sources used in conjunction with the RPP.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.2.4:

Resolution of Standard Content Confirmatory Item 12.1-1

The NRC staff compared the VEGP and BLN COL applications regarding STD COL 12.2-1, and found them to be essentially identical, with the exception that VEGP FSAR Appendix 12AA references NEI 07-03A, whereas, the BLN FSAR references NEI 07-03, Revision 3. As indicated in Section 12.1.4 above, Confirmatory Item 12.1-1, is resolved for VEGP because the applicant has adopted the approved version of NEI 07-03, which is now designated as NEI 07-03A.

12.2.5 Post Combined License Activities

There are no post-COL activities related to this section.

12.2.6 Conclusion

The staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the relevant information relating to this section, and no outstanding information related to this section remains to be addressed in the Turkey Point

Units 6 and 7 COL FSAR. The results of the staff's technical evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

The staff concludes that the relevant information presented in the Turkey Point Units 6 and 7 COL FSAR is acceptable based on the relevant acceptance criteria provided in NUREG-0800, Section 12.2. The staff based its conclusion on the following:

- PTN DEP 6.4-1, related to design changes affecting habitability of the main control room and changes to the calculated doses to control room operators, is reviewed and found acceptable by the staff in Section 21.2 of this SER.

- STD COL 12.2-1, which addresses miscellaneous radiation sources, is acceptable because the applicant has incorporated the approved reference NEI 07-03A into the Turkey Point Units 6 and 7 COL FSAR and meets the requirements of 10 CFR 20.1801, 10 CFR 20.1802, and GDC 61.

12.3 Radiation Protection Design Features

Section 12.3, "Radiation Protection Design Features" and the following Section 12.4, "Dose Assessment," are treated as separate sections in this SER (as well as in the AP1000 DCD). However, these two sections are listed as a single section, Section 12.3-12.4, "Radiation Protection Design Features," in both RG 1.206 and NUREG-0800, with the material discussed under the section "Dose Assessment" included in a section at the end of Section 12.3-12.4.

12.3.1 Introduction

This section addresses the issues related to radiation protection equipment and design features used to ensure that OREs are ALARA. It takes into account design dose rates, AOOs, and accident conditions. These issues include the facility design features, shielding, ventilation, area radiation and airborne radioactivity monitoring instrumentation, and dose assessment.

12.3.2 Summary of Application

Turkey Point Units 6 and 7 COL FSAR, Revision 7, Section 12.3 incorporates by reference AP1000 DCD, Revision 19, Section 12.3.

In addition, in Turkey Point Units 6 and 7 COL FSAR, Section 12.3 (and in letter dated May 16, 2016 (ADAMS Accession No. ML16140A087)), the applicant provided the following:

Departures

- PTN DEP 6.4-1

The applicant provided additional information in Section 12.3 of the Turkey Point Units 6 and 7 COL FSAR about PTN DEP 6.4-1 related to design changes affecting habitability of the main control room and changes to the calculated doses to control room operators. This information, as well as related PTN DEP 6.4-1 information appearing in other chapters of the FSAR, is reviewed in Section 21.2 of this SER.

- PTN DEP 18.8-1

The applicant described the following portion of the Tier 2 departure (DEP) from the AP1000 DCD related to the radiation design protection features. The applicant proposed revising several AP1000 DCD figures in Section 12.3 to reflect the relocation of the Operations Support Center (OSC). Other aspects of this Tier 2 departure are evaluated in Sections 12.5, 13.3, and 18.8 of this SER.

AP1000 COL Information Items

- STD COL 12.3-1

The applicant provided additional information in STD COL 12.3-1 to resolve COL Information Item 12.3-1 (COL Action Item 12.4.2-1), which addresses the administrative controls for use of the design features provided to control access to radiologically restricted areas.

- STD COL 12.3-2

The applicant provided additional information in STD COL 12.3-2 to resolve COL Information Item 12.3-2 (COL Action Item 12.4.4-1), which addresses the criteria and methods for obtaining representative measurement of radiological conditions, including airborne radioactivity concentrations in work areas.

- STD COL 12.3-3

The applicant provided additional information in STD COL 12.3-3 to resolve COL Information Item 12.3-3, which addresses the groundwater monitoring program beyond the normal radioactive effluent monitoring program.

- STD COL 12.3-4

The applicant provided additional information in STD COL 12.3-4 to resolve COL Information Item 12.3-4, which addresses the program to ensure documentation of operational events deemed to be of interest for decommissioning.

Supplemental Information

- PTN SUP 11.2-1

In a May 22, 2012, letter, the applicant provided supplemental information to be added to Turkey Point Units 6 and 7 COL FSAR Section 11.2.1.2.4. This supplemental information, which was added to Turkey Point Units 6 and 7 COL FSAR Section 11.2.1.2.4 , describes some of the features of the liquid radwaste discharge pipeline incorporated to minimize leakage to the environment. This section also states that the diluted liquid radwaste effluent will be routed to the deep injection wells.

12.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1793 and its supplements.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the radiation protection design features are given in NUREG-0800, Section 12.3-12.4.

The applicable regulatory requirements and guidance for STD COL 12.3-1 are as follows:

- 10 CFR Part 20
- RG 1.8, Revision 3
- RG 8.9, “Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program,” Revision 1
- RG 8.38 “Control of Access to High and Very High Radiation Areas in Nuclear Power Plants,” Revision 1
- NUREG-1736, “Consolidated Guidance: 10 CFR Part 20-Standards for Protection Against Radiation”

The applicable regulatory requirements and guidance for STD COL 12.3-2 are as follows:

- 10 CFR Parts 19, “Notices, instructions and reports to workers: inspection and investigations”
- 10 CFR Part 20
- 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities”
- NUREG-0737, ”Clarification of TMI Action Plan Requirements,” Item III.D.3.3
- RG 1.8, Revision 3
- RG 8.2, “Guide for Administrative Practices in Radiation Monitoring,” Revision 0
- RG 8.8, Revision 3
- RG 8.10, Revision 1-R
- RG 1.21, “Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants,” Revision 1, Appendix A, “Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste”
- RG 1.97, , “Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants,” Revision 4

The applicable regulatory requirements and guidance for STD COL 12.3-3 and STD COL 12.3-4 are as follows:

- 10 CFR 20.1406, "Minimization of contamination"
- 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning"
- RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life Cycle Planning," Revision 0

12.3.4 Technical Evaluation

The staff reviewed Turkey Point Units 6 and 7 COL FSAR Section 12.3 and checked the referenced DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to radiation protection design features. The results of the staff's evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

Section 1.2.3 of this SER provides a discussion of the strategy used by the staff to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application (VEGP Units 3 and 4) were equally applicable to the Turkey Point Units 6 and 7 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 5 to the Turkey Point Units 6 and 7 COL FSAR. In performing this comparison, the staff considered changes made to the Turkey Point Units 6 and 7 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff completed its review and finds the evaluation performed for the standard content to be directly applicable to the Turkey Point Units 6 and 7 COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) contains evaluation material from the SER for the BLN Units 3 and 4 COL application. Any confirmatory items in the standard content material retain the numbers assigned in the VEGP SER. Confirmatory items that are first identified in this SER section have a Turkey Point Units 6 and 7 designation (e.g., **Turkey Point Units 6 and 7 Confirmatory Item 12.3-1**).

Tier 2 Departure

- PTN DEP 18.8-1

PTN DEP 18.8-1 pertains to the relocation of the OSC from the location specified in the AP1000 DCD. In the AP1000 DCD description, the OSC is located in the same room as the ALARA Briefing Room in the Annex Building. For Turkey Point Units 6 and 7, the OSC was relocated to the Maintenance Shop/Office Building, which is inside the Protected Area but separate from the Units 6 and 7 Nuclear Islands. This departure to relocate the OSC for Turkey Point Units 6 and 7 is acceptable insofar as the health physics (HP) facility design is concerned because the location of the OSC does not have an impact on the radiation protection facilities design. The ALARA briefing room remains as stated in the AP1000 DCD, so there is no impact on radiation protection facilities, programs or functions.

The evaluation of the effect of the OSC relocation is addressed in SER Section 12.5 for the HP facilities, in Section 13.3 of this SER for emergency preparedness, and in Section 18.8 of this SER for the human system interface design.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.3.4:

> *The following portion of this technical evaluation section is reproduced from Section 12.3.4 of the BLN SER:*
>
> *AP1000 COL Information Items*
>
> - *STD COL 12.3-1*
>
> *The applicant provided additional information in STD COL 12.3-1, related to the administrative controls for radiological protection, to resolve COL Information Item 12.3-1. COL Information Item 12.3-1 states:*
>
> > *The Combined License applicant will address the administrative controls for use of the design features provided to control access to radiologically restricted areas, including potentially very high radiation areas, such as the fuel transfer tube during refueling operations and to the reactor cavity.*
>
> *The commitment was also captured as COL Action Item 12.4.2-1 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:*
>
> > *The COL applicant will address the administrative controls for use of the design features provided to control access to radiologically restricted areas, including potentially very high radiation areas, such as the reactor cavity and the fuel transfer canal during refueling operations. The hatch to the spent fuel transfer canal will be treated as an entrance to a very high radiation area under 10 CFR Part 20 and will be locked during spent fuel transfer operations.*
>
> *The applicant addressed this STD COL item in BLN COL FSAR, Appendix 12AA. This appendix incorporates by reference NEI 07-03, Revision 7. The NEI template directs COL applicants to describe the site-specific plant information for*

areas requiring administrative controls for very high radiation areas. To supplement NEI 07-03, Section 12.5.4.4, "Access Control," the applicant provided additional measures in Appendix 12AA for access controls such as signs, locks, plant manager (or designee) approval for entry, and radiation protection personnel accompaniment and exposure control for entry into very high radiation areas. The applicant also stated that a closed circuit television system may be installed in high radiation areas to allow remote monitoring of individuals entering high radiation areas by personnel qualified in radiation protection procedures.

The COL applicant will apply the administrative controls for the use of the design features to control access to very high radiation areas, such as the fuel transfer tube during refueling and to the reactor cavity during operations, and other radiologically restricted areas to comply with 10 CFR Sections 20.1601 and 20.1602. The opening of the fuel transfer hatch is administratively controlled, treated as an entrance to a very high radiation area, and is in place during spent fuel transfer operation.

The staff finds the applicant's approach meets the requirements of 10 CFR Sections 20.1601 and 20.1602, and is consistent with RG 8.38, Regulatory Position C1 and C3, which will ensure that an individual is unable to gain unauthorized or inadvertent access to such areas.

In a letter dated March 18, 2009 (ML090510379), the NRC accepted NEI 07-03, Revision 7. Specifically, the NRC staff indicated that for COL applications, NEI 07-03, Revision 7 provides an acceptable template for assuring that the RPP meets the applicable NRC regulations and guidance. Since the BLN FSAR has not adopted the approved version of the NEI template, this is identified as ***Confirmatory Item 12.1-1****.*

The NRC staff reviewed STD COL 12.3-1 dealing with administrative controls for radiological protection, using the text added in Appendix 12AA. The BLN COL FSAR Appendix 12AA, incorporates by reference NEI 07-03.

In Appendix 12AA, the applicant has taken exception to NEI 07-03, Section 12.5 to not conform to the guidance of the following regulatory guides:

RG 8.20, "Applications for Bioassay for I-125 and I-131"

RG 8.26 [sic], "Bioassay at Uranium Mills"

RG 8.32, "Criteria for Establishing a Tritium Bioassay Program"

The guidance documents were identified as outdated regulatory guidance in NUREG-1736, Consolidated Guidance: 10 CFR Part 20, "Standards for Protection Against Radiation," October 2001. NUREG-1736 describes that in conjunction with 10 CFR 20.1502(b), which requires licensees to monitor for likely intakes; 10 CFR 20.1204(a) and (b) prescribe how information obtained through monitoring is to be used when assessing exposures to workers from

intakes. The NUREG recommends that licensees (and therefore applicants) consider the methods described in RG 8.9, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program," for estimating intakes of radionuclides and determining the frequency of bioassay measurements. RG 8.9 provides updated methods and guidance that was previously contained in positions of the three RGs above. The applicant's commitment to RG 8.9 is sufficient to assure proper monitoring for intake of radionuclides.

In BLN COL FSAR, Appendix 12AA, the applicant took exception to the first paragraph of NEI 07-03, Section 12.5.2 to describe the equivalent key radiological protection positions for the BLN site. The description of organizational positions with specific radiation protection responsibilities is in BLN COL FSAR Section 13.1. BLN COL FSAR Section 13.1, "Organizational Structure of the Applicant," provides specific radiation protection responsibilities for key positions within the plant organization and the plant organization overall. Managers and supervisors within the plant operating organization are responsible for establishing goals and expectations for their organization and to reinforce behaviors that promote radiation protection. BLN COL FSAR Section 13.1.1, "Management and Technical Support Organization," and Section 13.1.2, "Operating Organization," provide the responsibilities of the organizations and positions to assure that radiological safety goals and expectations are adhered to.

The staff finds that the applicant's exception to NEI 07-03, Section 12.5.2 is acceptable because BLN COL FSAR Section 13.1 provides the key radiological safety responsibilities and organization consistent with RG 1.8.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.3.4:

<u>Correction of Errors in the Standard Content Evaluation Text</u>

The NRC staff identified an error in the text reproduced above from the BLN SER, Section 12.3.4, that requires correction. The BLN SER states that Appendix 12AA of the BLN COL FSAR incorporates by reference NEI 07-03, Revision 7. The appendix actually incorporates by reference NEI 07-03, Revision 3. The NRC staff also identified an error in the text reproduced above from the BLN SER, Section 12.3.4 regarding the reference to RG 8.22, which was incorrectly referred to as RG 8.26.

<u>Resolution of Standard Content Confirmatory Item 12.1-1</u>

The NRC staff compared the VEGP and BLN COL applications regarding STD COL 12.3-1, and found them to be essentially identical, with the exception that VEGP FSAR Appendix 12AA references NEI 07-03A and BLN FSAR Appendix 12AA references Revision 3 of NEI 07-03. Additional clarifying information has been added to the VEGP FSAR regarding STD COL 12.3-1, which is discussed below. As indicated in Section 12.1.4 above, Confirmatory

Item 12.1-1, is resolved for VEGP because the applicant has adopted the approved version of NEI 07-03, which is now designated as NEI 07-03A.

In addition, changes have been made in Revision 2 of the VEGP FSAR Chapter 12 that relate to STD COL 12.3-1. The changes are as follows:

1. *A new Table 12AA-201 has been added to Appendix 12AA that provides information concerning access to very high radiation areas (VHRA). The table provides VHRA locations, DCD cross references, radiation sources in the locations and other conditions and restrictions.*

2. *In FSAR Appendix 12AA, new text was added to Section 12.5.4.4 of NEI 07-03A. The text references new Table 12AA-201 and describes the information in it, discusses removal of the primary sources of radiation from the VHRA areas, and discusses verification walk downs of VHRA to ensure consistency with RG 8.38. In addition to the changes to Appendix 12AA discussed above, the applicant has also added text to Section 12.5.4 regarding the possible use of closed circuit television system to allow remote monitoring of individuals entering high radiation areas.*

These items (i.e., the addition of the table, reference to it and discussion of walk downs, and the closed circuit television system) are acceptable because they provide additional clarity and site-specific information regarding controls to VHRAs and more completely describe features that address STD COL 12.3-1.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.3.4:

The following portion of this technical evaluation section is reproduced from Section 12.3.4 of the BLN SER

- *STD COL 12.3-2*

The applicant provided additional information in STD COL 12.3-2, related to the criteria and methods for radiological protection, to resolve COL Information Item 12.3-2. COL Information Item 12.3-2 states:

> *The Combined License applicant will address the criteria and methods for obtaining representative measurement of radiological conditions, including airborne radioactivity concentrations in work areas. The Combined License applicant will also address the use of portable instruments, and the associated training and procedures, to accurately determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident.*

The same commitment was also captured as COL Action Item 12.4.4-1 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793).

The staff reviewed STD COL 12.3-2, dealing with criteria and methods for radiological protection. In BLN COL FSAR Section 12.3.4, the applicant presented the procedure detailing the criteria and methods for obtaining representative measurement of radiological conditions, including in-plant airborne radioactivity concentrations in accordance with applicable portions of 10 CFR Part 20 and consistent with the guidance in RGs 1.21, Appendix A, 8.2, 8.8, and 8.10.

The applicant also discussed the surveillance requirements and the frequency of scheduled surveillance that are consistent with the operational philosophy in RG 8.10. In Section 12.3.4, "Area Radiation and Airborne Radioactivity Monitoring Instrumentation," the applicant described the typical survey frequencies and varieties of surveys. The surveys described in general terms include radiation, contamination, airborne radioactivity, and job coverage surveys for occupational radiation workers during normal and off-normal conditions.

Appendix 12AA also describes qualification and training criteria for site personnel consistent with the guidance in RG 1.8 and as described in FSAR Chapter 13. Section 13.2, "Training," incorporates NEI 06-13A, "Template for an Industry Training Program Description." NEI 06-13A, Section 1.2.7, provides training for the use of survey instruments, use of analytical equipment, radiation protection procedures and emergency plan procedures.

The applicant discussed a portable iodine monitoring system used to determine the airborne iodine concentration in areas where plant personnel may be present routinely and during an accident which meets the guidance of NUREG-0737, Item III.D.3.3 and complies with 10 CFR Part 50, Appendix A. The applicant will incorporate the use of this sampling system into the emergency plan implementing procedures.

The NRC staff reviewed BLN COL FSAR Section 12.3.4 and Appendix 12AA, dealing with standards applied to the calibration and maintenance of portable radiation survey instruments. The applicant describes Area and Airborne Radioactivity Monitoring Instrumentation in BLN COL FSAR Section 12.3.4 and also in Section 14.2.9.4.27, "Portable Personnel Monitors and Radiation Survey Instruments."

The portable personnel monitor and radiation survey instrument testing verifies that the devices operate in accordance with their intended function in support of the RPP as described in Chapter 12. The applicant stated as a prerequisite that the monitors, instruments and certified test sources are on site. The applicant also stated that the general test method and acceptance criteria for the monitors and instruments would be source checked and tested in accordance with the manufactures' recommendations. The NRC staff determined that additional information should be provided in addition to the use of manufacturers' recommendations. Additional standards such as American National Standards Institute (ANSI) N42.17A-1989, as it relates to the accuracy and overall performance of portable survey instruments, and ANSI N323A-1997, as it relates to the calibration and maintenance of portable radiation survey instruments

should be provided. In response to RAI 12.3-12.4-5, in a letter from the applicant, dated September 22, 2008; the applicant stated that it intends to revise the BLN COL FSAR to include maintenance and calibration of survey instruments and to update the version of the ANSI standard in a future revision of the COL application. The NRC staff finds that Revision 1 of the BLN COL FSAR adequately addresses the above. As a result, RAI 12.3-12.4-5 is closed.

- *STD COL 12.3-3*

The applicant provided additional information in STD COL 12.3-3, related to the groundwater monitoring program, to resolve COL Information Item 12.3-3. COL Information Item 12.3-3 states:

> *The Combined License applicant will establish a groundwater monitoring program beyond the normal radioactive effluent monitoring program. If and as necessary to support this groundwater monitoring program, the Combined License applicant will install groundwater monitoring wells during the plant construction process. Areas of the site to be specifically considered in this groundwater monitoring program are as follows:*
>
> - *West of the auxiliary building in the area of the fuel transfer canal*
> - *West and south of the radwaste building*
> - *East of the auxiliary building rail bay and the radwaste building truck doors*

The applicant added text in BLN COL FSAR Appendix 12AA, Section 12AA.5.4.14 to the information incorporated from NEI 07-03 regarding the groundwater monitoring program.

The applicant stated that a groundwater monitoring program beyond the normal radioactive effluent monitoring program will be developed, if, and as necessary to support this groundwater monitoring program, design features will be installed during the plant construction process. The applicant discussed areas of the site to be specifically considered in this groundwater monitoring program.

The NRC staff evaluated the applicant's groundwater monitoring program to the criteria in 10 CFR 20.1406. 10 CFR 20.1406 requires the applicant to provide a description of how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment; facilitate eventual decommissioning; and minimize, to the extent practicable, the generation of radioactive waste. The regulatory guidance which describes an acceptable method for meeting the regulation was published in June 2008, RG 4.21, Revision 0, "Minimization of Contamination and Radioactive Waste Generation: Life Cycle Planning."

The groundwater monitoring program as described in BLN COL FSAR Appendix 12AA included some implementation considerations, but the program lacked a description of the key components of the program such as, types and periodicity of routine samples, threshold activity to be detected, actions to be taken upon detection, and quality assurance practices to be used to ensure reasonable assurance of prompt identification of leakage into the groundwater (RAI 12.3-12.4-1 and RAI 12.3-12.4-2).

The applicant stated in a letter dated September 22, 2008, that it will adopt the NEI 08-08, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," Revision 0 template. If approved by the NRC, the applicant will provide additional description of site specific design features and procedures for operation that minimize contamination of the facility, site, and environment. NEI 08-08 is currently under staff review. This is identified as ***Open Item 12.3-1.***

As described in Section 11.2.1 2.4 of the AP1000 DCD, Revision 17, the exterior monitored liquid effluent discharge pipe is engineered to preclude leakage by either enclosure within a guard pipe and leakage monitoring, or is accessible for visual inspection in total from the Radwaste Building to the licensed release point for dilution and discharge. No valves, vacuum breakers, or other fittings are incorporated outside of buildings. In a supplemental response dated December 16, 2008, to RAI 12.3-12.4-1, the applicant provided a proposed revision to the BLN COL FSAR to describe the site-specific design of the external radioactive waste discharge line. The staff agrees with the applicant that the site-specific design will minimize the potential for undetected leakage from this discharge to the environment at a non-licensed release point, and complies with 10 CFR 20.1406. The proposed change to the BLN COL FSAR is acceptable subject to a formal revision to the BLN COL FSAR. Accordingly, this is identified as ***Confirmatory Item 12.3-1****.*

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.3.4:

<u>Resolution of Standard Content Open Item 12.3-1</u>

Revision 2 of the FSAR references NEI 08-08A, which is the version of NEI 08-08 that has been accepted by NRC. Accordingly, Open Item 12.3-1 is resolved for VEGP.

<u>Resolution of Standard Content Confirmatory Item 12.3-1</u>

The NRC staff verified that Section 11.2.1.2.4 of the VEGP FSAR was updated to include the information identified in BLN Confirmatory Item 12.3-1; therefore, Confirmatory Item 12.3-1 is resolved for VEGP.

<u>Supplemental Information</u>

- PTN SUP 11.2-1

The exterior radwaste discharge piping, described above, runs from the Auxiliary Building to the Radwaste Building and then out of the Radwaste Buildings for both units to the licensed release point for dilution and discharge into the deep injection wells. The last paragraph of the standard content evaluation of STD COL 12.3-3, reproduced from Section 12.3.4 of the BLN SER above, provides the staff's evaluation of the exterior radwaste discharge piping for BLN. In an October 12, 2009, letter to NRC (Agencywide Documents and Management System (ADAMS) ML092870439), the Turkey Point Units 6 and 7 applicant endorsed BNL's response to BLN RAI 109, Question 12.3-12.4-1.

The applicant described the above-mentioned portions of the radwaste discharge piping in Turkey Point Units 6 and 7 COL FSAR Section 11.2. However, the Turkey Point Units 6 and 7 COL FSAR did not initially describe the site-specific design portions of the external radioactive waste discharge line. Following discussions with the staff, in a May 22, 2012, letter, (ML12144A360), the applicant proposed to modify Turkey Point Units 6 and 7 COL FSAR Section 11.2.1.2.4 by providing supplemental information (PTN SUP 11.2-1) regarding site-specific design features of the external radioactive waste discharge line. The staff verified that the applicant has incorporated these changes into Turkey Point Units 6 and 7 COL FSAR, Revision 4. In PTN SUP 11.2-1, the applicant stated that the exterior radwaste discharge piping is enclosed within a guard pipe and is monitored for leakage. The use of a guard pipe enclosure and leakage monitoring for the external radioactive waste discharge line complies with 10 CFR 20.1406. The exterior radwaste discharge piping runs from each of the Radwaste Buildings to where it connects to the blowdown sump discharge piping downstream of the blowdown sump pumps. At this connection point, the liquid radwaste in the discharge piping is mixed with the high volume circulating water system blowdown stream and is diluted so that the resulting mixture meets the release limits of 10 CFR Part 20, Appendix B Table II, Column 2. Downstream of this blowdown sump dilution connection point, the diluted radwaste solution flow is distributed through two separate piping branches. One of the piping branches is orientated in a North-South direction and is located to the East of Unit 6, and the second branch is orientated in the East-West direction and is located to the south of Turkey Point Units 6 and 7. Each of these piping branches contains six deep injection wells and three monitoring wells.

To obtain additional information about the layout and design features of the discharge piping and deep injection wells and how these components are designed to minimize leakage and contamination of the environment, the staff issued RAI 72, Questions 11.02-6-6 through 11.02-6-9. On August 9, 2013, the applicant provided an initial response to RAI 72, Questions 11.02-6-6 through 11.02-6-9. On April 22, 2014, the applicant provided a supplemental response to RAI 72, Question 11.02-6-6. The applicant submitted an additional supplemental response to RAI 72, Question 11.02-6-6 on September 23, 2014. As part of the applicant's response to these RAIs, the applicant amended the Turkey Point Units 6 and 7 COL FSAR to add Section 9.2.12.2.2, "Component Design," which provides a description of the deep injection wells and lists some of the design features of the associated piping, valves, and other components which make up the deep well injection system. The injectate piping connecting the pump station to the deep injection wells is a single-walled steel pipe. The diameter of the injectate piping varies from 152.4 cm (60 inches (in.)) closest to the pump station near the blowdown sump to 61 cm (24 in.) at the last well in each piping branch. This section of injectate piping between the pump station and the edge of the curbed concrete containment pad that will surround each injection well is buried. The above ground 15.2 meters (m) (50 feet (ft) portion of the injectate piping from where the piping exits the underground to the injection tubing is accessible for visual inspection to detect for any potential leakage from pipe and valve fittings.

During discharge operations, the diluted radwaste flow will be routed to a number of deep injection wells for discharge. The number of wells used will be dependent on the volume of the radwaste discharge flow.

To direct the discharge flow to the appropriate combination of discharge wells for discharge, the injectate piping contains manifolds, valves, and controls. In addition, the injectate piping also includes appurtenances, such as air/vacuum release valves, vent lines, and access ways, as necessary, for proper operation and maintenance of the discharge piping. The air/vacuum release valves are used to prevent potential water column separation in the branch pipelines when pumps may be started and stopped or valves cycled. These air/vacuum release valves provide assurance of continued integrity of the blowdown lines. To ensure that leakage is contained and controlled, these valves are included in the preventive maintenance program. As part of this program, the valves are checked periodically and maintained within acceptable parameters. The air/vacuum release valves are also included in the site routine maintenance program. Vent and drain lines, installed at system high points or where air would be most likely to collect on each branch line, are included to remove any air that may be introduced into the lines by the air/vacuum release valves or that is not swept out of the blowdown line during system startup. As required during pump startup, personnel will be present at the vent valve locations to allow air to escape from the blowdown lines and then to close the vent valves when the vent lines fill with water. To prevent leakage from these valves during system operation, the vent lines and drain lines will be capped and the valves will be locked to prevent inadvertent operation. The applicant will contain any spillage that could occur from the vent valves during pump startup or during normal operations and properly manage this spillage as being potentially contaminated, in accordance with Radiation Protection and ALARA Program requirements. The applicant will remove any soil impacted by an injectate spill and manage this as potential radioactive waste.

10 CFR 20.1406 specifies that applicants for licenses shall describe how the facility will minimize contamination of the facility and the environment. To comply with these requirements of 10 CFR 20.1406, the discharge piping, manifolds, valves, controls, and appurtenances are designed to minimize inadvertent or unidentified releases to the environment. The integrity of the injectate piping and the valve fittings will be monitored for leakage by performing periodic visual inspections, where accessible, as part of routine operation and maintenance activities. For those portions of the injectate piping that are not accessible, leakage monitoring will be performed through remote surveillance in conjunction with groundwater monitoring, as necessary, as part of the Units 6 and 7 Groundwater Monitoring Program. Monitoring points are provided to facilitate sampling for leakage consistent with contamination minimization requirements. Leakage monitoring of the liquid radwaste system discharge pipeline and the underground pit where the liquid radwase pipe ties into the blowdown sump discharge pipe is implemented as part of the Radiation Protection Program. The staff notes that the monitoring and leakage detection program complies with the requirements of 10 CFR 20.1406 and utilizes the applicable guidance contained in RG 4.21 and NEI 08-08A.

To ensure that the appurtenances are maintained in good condition to minimize the potential for leakage and to minimize, to the extent practicable, contamination of the facility and the environment, the piping and fittings are included in the site's routine preventive maintenance program. The deep well injection system equipment will be designed to minimize the possibility of damage to the injection equipment. Each deep injection well will be located on a curbed concrete containment pad to contain any leakage in the event of a spill. To eliminate

unauthorized personnel access or vehicle damage to the injection well and associated piping, the above ground portion of the piping at each well will be surrounded by locked protective fencing and/or closely spaced bollards of steel or concrete. In the event of a failure of some injection equipment, valves would be closed to isolate the damaged equipment and minimize the volume of spilled injectate. Each injectate feeder line is equipped with redundant isolation valves. These valves are used to isolate each individual injectate feeder line in the event of equipment failure and to prevent the upward flow of injected fluid from the well onto the containment pad due to a damaged injectate feeder line. As stated earlier, each injection well will be located on a curbed concrete containment pad to contain any injectate spilled from the injection well or from the surface piping. Any spills would be contained and managed in accordance with Radiation Protection and ALARA Program requirements. Any injectate that spills and pools on the ground would be pumped into a tank and ultimately pumped down one of the injection wells. Any soil impacted by an injectate spill would be removed and treated as radioactive waste. On the basis that the applicant has adequately described features of the discharge piping and deep injection wells to minimize leakage and contamination of the environment in accordance with 10 CFR 20.1406, the staff finds the applicant's response to the applicable portions of RAI 72, Questions 11.02-6-6 through 11.02-6-9 addressing these subjects acceptable.

RG 4.21 states that applicant should strive to minimize leaks and spills, provide containment in areas where such events might occur, and provide for detection that supports timely assessment and appropriate response. For the reasons stated above, the staff finds that the design features of the site-specific design portion of the external radioactive waste discharge line, which are described in PTN SUP 11.2-1 and in Turkey Point Units 6 and 7 COL FSAR Section 9.2.12.2.2, will minimize the potential for undetected leakage from this discharge to the environment in accordance with the guidance of RG 4.21. In addition, as stated above, the monitoring and leakage detection program complies with the requirements of 10 CFR 20.1406.

NEI 08-08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," provides a description of the operational and programmatic elements and controls that minimize contamination of the facility, site, and the environment, in order to meet the requirements of 10 CFR 20.1406. NEI 08-08A also states that the COL applicant should establish an on-site groundwater monitoring program to ensure timely detection of inadvertent radiological releases to the groundwater. In accordance with NEI 08-08A, the applicant has modified its radiation protection program described in Turkey Point Units 6 and 7 COL FSAR Section 12AA to include the development of a Groundwater Monitoring Program that is beyond the normal radioactive effluent monitoring program. This groundwater monitoring program will include a network of wells to ensure timely detection of inadvertent radiological releases to the ground water.

On the basis of the staff's review of the information provided in Turkey Point Units 6 and 7 COL FSAR PTN SUP 11.2-1, the responses to RAI 72, Questions 11.02.06-6 through 11.02.06-9, and the pertinent sections of Turkey Point Units 6 and 7 COL FSAR Section 9.2.12.2., the staff concludes that the discharge piping design features and implementation of the groundwater monitoring program meet the requirements of 10 CFR 20.1406 for minimizing the potential for the contamination of the environment. Thus, the staff finds this information acceptable.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.3.4.

> *The following portion of this technical evaluation section is reproduced from Section 12.3.4 of the BLN SER.*
>
> - *STD COL 12.3-4*
>
> *The applicant provided additional information in STD COL 12.3-4, related to the record of operational events of interest for decommissioning, to resolve COL Information Item 12.3-4. COL Information Item 12.3-4 states:*
>
> > *The Combined License applicant will establish a program to ensure documentation of operational events deemed to be of interest for decommissioning, beyond that required by 10 CFR 50.75. This or another program will include remediation of any leaks that have the potential to contaminate groundwater. The applicant added text in Appendix 12AA, Section 12AA.5.4.15 to the information incorporated from NEI 07-03 dealing with a record of operational events of interest for decommissioning. The applicant discussed procedures established to document the operational events that are deemed of interest for decommissioning, beyond that required by 10 CFR 50.75. These documented operational events assist in developing a historical assessment of the nuclear facilities, thereby reducing time, effort, and hazards to personnel during decommissioning planning. This documentation will include identification of the remediation of any leaks, which have the potential to contaminate groundwater. The procedures that govern retention of these records, and the records themselves, should specify the retention period required to assure availability when they may be required (e.g., life of facility plus 30 years). The NRC staff requested in RAI 12.3-12.4-3 that the applicant include the operational and design COL information items that fully meet the objectives of RG 4.21, Revision 0 and hence the requirements of 10 CFR 20.1406, 'Minimization of Contamination."*
> >
> > *In response to the RAI, in a letter dated September 22, 2008, the applicant stated that it intended to adopt NEI 08-08. This document is intended to provide the description of additional site procedures for decommissioning records which will demonstrate compliance with 10 CFR 20.1406. This is identified as* ***Open Item 12.3-1****.*

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.3.4:

Resolution of Standard Content Open Item 12.3-1

Revision 2 of the FSAR references NEI 08-08A, which is the version of NEI 08-08 that has been accepted by NRC. Accordingly, Open Item 12.3-1 is resolved for VEGP.

12.3.5 Post Combined license Activities

The post COL activities related to the RPP are discussed in Section 12.5.5 of this report.

12.3.6 Conclusion

The staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the relevant information relating to this section, and no outstanding information related to this section remains to be addressed in the Turkey Point Units 6 and 7 COL FSAR. The results of the staff's technical evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements. In addition, the staff concludes that the relevant information presented in the Turkey Point Units 6 and 7 COL FSAR is acceptable. The staff based its conclusion on the relevant acceptance criteria provided in Section 12.3-12.4 of NUREG-0800 and on the following:

- PTN DEP 6.4-1, related to design changes affecting habitability of the main control room and changes to the calculated doses to control room operators, is reviewed and found acceptable by the staff in Section 21.2 of this SER.

- PTN DEP 18.8-1, in which the applicant proposed to relocate the OSC from the location described in the AP 1000 DCD Section 12.5.2.2, is acceptable from a radiation design features perspective. The location of the OSC does not have an impact on the radiation protection facilities design. The ALARA briefing room remains as stated in the AP1000 DCD, so there is no impact on radiation protection facilities, programs or functions.

- STD COL 12.3-1, which addresses the administrative controls for use of the design features provided to control access to radiological restricted areas, is acceptable because the applicant has incorporated the approved reference NEI 07-03A into the Turkey Point Units 6 and 7 COL FSAR and meets the applicable regulatory requirements and guidance specified in Sections 12.3.3 and 12.3.4 of this SER.

- STD COL 12.3-2, which addresses the criteria and methods for obtaining representative measurement of radiological conditions, including airborne radioactivity concentrations in work areas, is acceptable because the applicant has demonstrated compliance with the applicable regulatory requirements and guidance specified in Sections 12.3.3 and 12.3.4 of this SER.

- STD COL 12.3-3 and PTN SUP 11.2-1, which address the groundwater monitoring program beyond the normal radioactive effluent monitoring program, are acceptable because the applicant has incorporated the approved reference NEI 08-08A into the Turkey Point Units 6 and 7 COL FSAR in order to

demonstrate conformance with the applicable regulatory requirements and guidance specified in Sections 12.3.3 and 12.3.4 of this SER.

- STD COL 12.3-4, which addresses the program to ensure documentation of operational events deemed to be of interest for decommissioning, is acceptable because the applicant has incorporated the approved reference NEI 08-08A into the Turkey Point Units 6 and 7 COL FSAR in order to demonstrate conformance with the applicable regulatory requirements and guidance specified in Sections 12.3.3 and 12.3.4 of this report.

12.4 Dose Assessment

12.4.1 Introduction

This section addresses the issues related to estimating the annual personnel doses associated with operation, normal maintenance, radwaste handling, refueling, in-service inspection and special maintenance (e.g., maintenance that goes beyond routine scheduled maintenance, modification of equipment to upgrade the plant, and repairs to failed components), and construction.

12.4.2 Summary of Application

Turkey Point Units 6 and 7 COL FSAR, Revision 8, Section 12.4, incorporates by reference Section 12.4 of the AP1000 DCD, Revision 19.

In addition, in Turkey Point Units 6 and 7 COL FSAR Section 12.4, the applicant provided the following:

Supplemental Information

- STD SUP 12.4-1

The applicant provided supplemental information to address dose to construction workers by adding new sections after AP1000 DCD Section 12.4.1.8.

- STD SUP 12.4-1

The applicant provided supplemental information regarding conduct of radiological surveys in unrestricted and controlled areas and for radioactive materials in effluents discharged to unrestricted and controlled areas.

12.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1793 and its supplements.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the dose assessment are given in NUREG-0800, Section 12.4.

The applicable regulatory requirements for PTN SUP 12.4-1 and STD SUP 12.4-1 are as follows:

- 10 CFR 20.1101, "Radiation Protection Programs"
- 10 CFR 20.1301, "Dose limits for individual members of the public"
- 10 CFR 20.1302, "Compliance with dose limits for individual members of the public"

12.4.4 Technical Evaluation

The staff reviewed Turkey Point Units 6 and 7 COL FSAR Section 12.4 and checked the referenced DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to dose assessment. The results of the staff's evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

Section 1.2.3 of this SER provides a discussion of the strategy used by the staff to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for the reference COL application (VEGP Units 3 and 4) were equally applicable to the Turkey Point Units 6 and 7 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 5 to the Turkey Point Units 6 and 7 COL FSAR. In performing this comparison, the staff considered changes made to the Turkey Point Units 6 and 7 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff completed its review and finds the evaluation performed for the standard content to be directly applicable to the Turkey Point Units 6 and 7 COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting.

The staff reviewed the information contained in the Turkey Point Units 6 and 7 COL FSAR:

Supplemental Information

- PTN SUP 12.4-1

The applicant provided supplemental information regarding dose to construction workers in Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9 (Sections 12.4.1.9.1 through 12.4.1.9.6), "Dose to Construction Workers." Turkey Point Units 6 and 7, Section 12.4.1.9.1,

"Site Layout," describes the site layout as depicted in Turkey Point Units 6 and 7 COL FSAR, Figure 2.1203.

Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.2, "Radiation Sources," describes the sources of radiation that will be encountered by construction workers. Turkey Point Units 6 and 7 construction workers will be exposed to direct radiation and gaseous effluents from the operation of existing Turkey Point Units 3 and Unit 4. Turkey Point Unit 7 construction workers could also be exposed to direct radiation and gaseous effluent from Unit 6 once Unit 6 becomes operational. The applicant stated that, on the basis of operational environmental thermoluminescent detector (TLD) measurements, direct radiation from the existing operating units (Turkey Point Units 3 and 4) to Turkey Point Units 6 and 7 is negligible. The applicant also stated that the exposure to Units 6 and 7 construction workers from a proposed Independent Spent Fuel Storage Installation (ISFSI) will be negligible. Based on analysis described in AP1000 DCD Section 12.4.2, the applicant stated that direct exposure to Turkey Point Unit 7 construction workers from the Turkey Point Unit 6 containment and other plant buildings is considered negligible.

To evaluate the applicant's statement that direct radiation from Turkey Point Units 3 and 4 is negligible, the staff issued RAI 31, Question 12.4.1.9.2-1 to request additional information, such as TLD data, measurement locations and dates. In an August 19, 2011, response to RAI 31, Question 12.4.1.9.2-1, the applicant provided the requested TLD data. This RAI response showed that the Turkey Point site pre-operational (1970 – 1971) direct radiation exposures (as measured by TLD) were similar to the exposures received after Turkey Point Units 3 and 4 became operational. Based on this information, the staff agrees that the potential direct radiation component of Units 6 and 7 construction worker exposures from the existing units will be negligible.

The applicant stated that construction workers will be exposed to routine gaseous effluents from Turkey Point Units 3 and 4. The applicant used the annual effluent reports from Units 3 and 4 to estimate the gaseous effluent doses from these units. Additionally, Turkey Point Unit 7 construction workers will be exposed to gaseous effluents released from Unit 6. The source term from these effluents is listed in the AP1000 DCD, Table 11.3-3.

The applicant stated that construction workers receive no exposure from the liquid effluent pathway since potable water is provided from an external source that is unaffected by the liquid discharge from Turkey Point Unit 6 or operating Units 3 and 4. The staff issued RAI 31, Question 12.4.1.9.2-2 to request that the applicant provide additional information concerning potential worker exposures to liquid effluents, specifically during activities related to the installation of liquid effluent discharge lines for Turkey Point Units 6 and 7. In an August 19, 2011, response to RAI 31, Question 12.4.1.9.2-2, the applicant stated that, during Turkey Point Unit 7 construction, any work involving contaminated Unit 6 liquid waste effluent discharge piping connections would be performed by trained and qualified radiation workers from Turkey Point Unit 6. The applicant revised Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.2 to address this issue. The staff reviewed the RAI response and agrees that there is no exposure to Turkey Point Unit 7 construction workers from the liquid effluent pathway.

In Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.3,"Construction Worker Dose Estimates," the applicant stated that although there has been no measurable direct radiation component from Turkey Point Units 3 and 4, and the calculated dose rate from the planned

ISFSI is only 0.009 millirem (mrem) (9E-5 millisievert (mSv)) per year, the applicant assumes a direct radiation dose rate of 1 mrem (0.01 mSv) per year per unit in the Units 6 and 7 construction area.

The staff notes that the applicant's assumption that construction workers would receive a direct radiation exposure of 1 mrem (0.01 mSv) per year per unit from the existing units is a reasonable and conservative assumption, based on the results of direct radiation measurements (TLD data). This exposure, adjusted by the assumed construction worker occupancy time, is used to estimate the annual construction worker direct radiation exposure from the existing units. The Turkey Point Units 6 and 7 COL FSAR, however, did not provide any basis for the calculated exposure of 0.009 mrem (9E-5 mSv) per year from the loaded ISFSI. Therefore, in RAI 31, Question 12.4.1.9.3-1, the staff requested that the applicant provide additional information to validate the calculated construction worker exposure from this potential pathway. In an August 19, 2011, response to RAI 31, Question 12.4.1.9.3-1, the applicant stated that the ISFSI is assumed to be fully loaded with 52 horizontal storage modules, each containing design basis pressurized water reactor (PWR) fuel. Turkey Point Units 6 and 7 are at least 914.4 m (3000 ft) from the ISFSI. Using Monte Carlo N-Particle Transport Code, Version 5 (MCNP5), the applicant calculated that the construction workers at Units 6 and 7 would be exposed to a dose rate of approximately 0.009 mrem (9E-5 mSv) per year from the planned ISFSI. The applicant's August 19, 2011, response to RAI 31, Question 12.4.1.9.3-1, stated that the detailed calculations performed to model the dose rates from the ISFSI are described in the applicant's electronic reading room. The staff performed an audit (ADAMS Accession No. ML15124A949, April 30, 2015) of these calculations and determined that the results are reasonable and acceptable. Compared to the direct radiation exposure to the Turkey Point Units 6 and 7 construction workers of 1 mrem (0.01 mSv) per year per unit from Turkey Point Units 3 and 4, the calculated annual dose of 0.009 mrem (9E-5 mSv) from the ISFSI is considered negligible. Adjusting for construction worker residence time, the applicant calculated (see Turkey Point Units 6 and 7 COL FSAR Table 12.4-201) a total direct radiation dose to the construction workers from Turkey Point Units 3 and 4 of 0.47 mrem (4.7E-3 mSv) per year. An independent evaluation by the staff produced comparable results.

In an October 22, 2014, supplemental response to RAI 31, Question 12.4.1.9.3-1, the applicant increased the storage capacity of the ISFSI from 52 spent fuel storage modules to 66 storage modules. This increase in the number of spent fuel storage modules in the ISFSI results in an increase in the dose rate to Units 6 and 7 construction workers from approximately 0.009 mrem (9E-5 mSv) per year to approximately 0.013 mrem (1.3E-4 mSv) per year. Although this revised dose rate is based on a fully loaded ISFSI containing 66 storage modules, the applicant stated that the ISFSI will be loaded with a maximum of only 38 storage modules during the construction of Turkey Point Unit 7. This revised dose of 0.013 mrem (1.3E-4 mSv) per year is still considered negligible compared to the combined direct radiation exposure from Units 3 and 4 to Units 6 and 7 construction workers of 2 mrem (0.02 mSv) per year. Therefore, the total direct radiation dose to construction workers from Turkey Point Units 3 and 4, adjusted for construction worker residence time, remains unchanged at 0.47 mrem (4.7E-3 mSv) per year.

The Turkey Point Units 6 and 7 COL FSAR states that construction worker doses from gaseous effluents from Turkey Point Units 3 and 4 were estimated from annual release reports, but did not identify the details of this estimation, such as which annual reports were used, what source term was used, the location of the calculated exposure or the dispersion and deposition parameters. To ascertain how the applicant determined the potential construction worker

exposure from gaseous effluents from Turkey Point Units 3 and 4, in RAI 31, Question 12.4.1.9.3-3, the staff requested that the applicant provide additional details on the assumptions used to calculate this exposure, including the applicable annual reports, assumed source terms, locations and assumed dispersion and deposition factors. In August 19, 2011, and October 22, 2014, responses to RAI 31, Question 12.4.1.9.3-3, the applicant stated that the gaseous effluent doses from Turkey Point Units 3 and 4 are the maximum values from the annual effluent reports for 2004 to 2008, adjusted for the annual construction worker occupancy of 2080 hours per year. The resulting annual estimated dose from gaseous effluent releases from Turkey Point Units 3 and 4 is 0.0023 mrem (2.3E-5 mSv). The RAI response stated that the data and the detailed calculations to determine the construction worker dose for the gaseous effluents for Turkey Point Units 3 and 4 are described in the applicant's electronic reading room. The staff performed an audit (ADAMS Accession No. ML15124A949) of this information and found that the calculation assumptions and methodology were appropriate and acceptable. Additionally, the staff performed an independent evaluation of the assumed construction worker exposure as a result of Turkey Point Units 3 and 4 gaseous effluents and determined that the applicant's assessment (0.0023 mrem (2.3E-5 mSv) per year, as indicated in Turkey Point Units 6 and 7 COL FSAR Table 12.4-201) is reasonable.

The Turkey Point Units 6 and 7 COL FSAR identifies the pathways and basic assumptions used to calculate the construction worker exposure from Turkey Point Unit 6 gaseous effluents. However, Turkey Point Units 6 and 7 COL FSAR did not provide the calculational details or the estimated Turkey Point Unit 7 construction worker exposure due to gaseous effluents from Unit 6 operation. Therefore, in RAI 34, Question 12.4.1.9.3-2, the staff requested that the applicant provide additional information on the subject. In an August 19, 2011, response to RAI 31, Question 12.4.1.9.3-2, the applicant referenced the Turkey Point Units 6 and 7 COL FSAR tables that contained the requested input information used for the dose calculation. In addition, the applicant amended the Turkey Point Units 6 and 7 COL FSAR to add Table 12.4-201, which summarizes the source, pathway and calculated dose to construction workers. The applicant estimated that the Turkey Point Unit 7 construction workers would receive an annual dose of 5.5 mrem (0.055 mSv), corrected for worker occupancy, from gaseous effluents from Turkey Point Unit 6. The staff verified that the calculation assumptions and methodology were appropriate. Additionally, the staff performed an independent evaluation of the assumed Turkey Point Unit 7 construction worker exposure as a result of Unit 6 gaseous effluents and concluded that the applicant's assessment of 5.5 mrem (0.055 mSv) per year to Turkey Point Unit 7 construction workers, per Turkey Point Units 6 and 7 COL FSAR Table 12.4-201, is reasonable.

In Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.4, "Compliance with Dose Regulations," the applicant stated that the construction workers are considered to be members of the public and, therefore, are limited by 10 CFR 20.1301, to an annual dose of 100 mrem (1 mSV) and 2 mrem (0.02 mSv) in any one hour. The applicant also committed to comply with the requirements of 10 CFR 20.1302 and 10 CFR Part 50, Appendix I, which govern dose rates to members of the general public.

In Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.5, "Collective Doses to Unit 7 Workers," the applicant stated assumptions for the estimated maximum number of construction workers onsite per year and their annual exposure time, which result in a calculated total worker collective dose of 17 person-rem (0.17 person-Sv) per year. As a result of a discrepancy noticed between information provided in Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.5 and the estimated construction worker dose shown in Turkey Point Units 6

and 7 FSAR Table 12.4-201, the staff issued RAI 31, Question 12.4.1.9.5-2. In an August 19, 2011, response to RAI 31, Question 12.4.1.9.5-2, the applicant changed the estimated annual construction worker peak loading from 2600 to 2800 workers to make the information in Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.5 consistent with the information in Turkey Point Units 6 and 7 COL FSAR Table 12.4-201. The staff finds the applicant's response to this RAI acceptable and, therefore, considers this RAI resolved.

Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9.5 also refers to Turkey Point Units 6 and 7 COL FSAR Table 12.4-202, where the results of the dose assessments are presented and compared to the applicable regulatory limits. Turkey Point Units 6 and 7 COL FSAR Table 12.4-202 states that the total estimated individual construction worker dose is 6.0 mrem (0.06 mSv) per year with a maximum dose in any one hour of 2.9E-03 mrem (2.9E-5 mSv). Since both of these worker dose estimates are within the public dose limits specified in 10 CFR 20.1301, the staff finds these worker dose estimates acceptable and, therefore, considers this RAI resolved.

The staff finds that the information provided in PTN SUP 12.4-1, regarding dose to construction workers, in Turkey Point Units 6 and 7 COL FSAR Section 12.4.1.9, is acceptable, for the reasons described above. On the basis of the reasons discussed in the above paragraphs, the staff finds the applicant's responses to RAI 31, Questions 12.4.1.9.2-1, 12.4.1.9.2-2, 12.4.1.9.3-1, 12.4.1.9.3-2, 12.4.1.9.3-3, and 12.4.1.9.5-2 acceptable and, therefore, considers this RAI resolved.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.4.4

- *STD SUP 12.4-1*

The applicant provided supplemental information regarding conduct of radiological surveys in unrestricted and controlled areas and for radioactive materials in effluents discharged to unrestricted and controlled areas. The supplemental text states that these surveys are conducted by the operating unit for the purposes of implementing 10 CFR 20.1302 and to demonstrate compliance with the standards of 10 CFR 20.1301 for construction workers. This text is acceptable because it is consistent with applicable regulatory requirements.

12.4.5 Post Combined License Activities

There are no post COL activities related to this section.

12.4.6 Conclusion

The staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the relevant information relating to this section, and no outstanding information related to this section remains to be addressed in the Turkey Point Units 6 and 7 COL FSAR. The results of the staff's technical evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

The staff concludes that the relevant information presented in the Turkey Point Units 6 and 7 COL FSAR is acceptable based on the relevant acceptance criteria provided in NUREG-0800, Section 12.3-12.4. The staff based its conclusion on the following:

- PTN SUP 12.4-1, which provides supplemental information to address dose to construction workers, is acceptable because the applicant has demonstrated compliance with the applicable requirements of 10 CFR 20.1101; 10 CFR 20.1301; 10 CFR 20.1302; and the applicable acceptance criteria provided in NUREG-0800, Section 12.3-12.4.

- STD SUP 12.4-1, which provides supplemental information regarding conduct of radiological surveys in unrestricted and controlled areas and for radioactive materials in effluents discharged to unrestricted and controlled areas is acceptable because the applicant has demonstrated compliance with the applicable requirements of 10 CFR 20.1301 and 10 CFR 20.1302.

12.5 Health Physics Facilities Design (Related to RG 1.206, Section C.III.1, Chapter 12, C.I.12.5, "Operational Radiation Protection Program")

12.5.1 Introduction

This section addresses the objectives and design of the health physics (HP) facilities. The HP facilities are designed with the objectives of the following:

- Providing capability for administrative control of the activities of plant personnel to limit personnel exposure to radiation and radioactive materials ALARA and within the requirements of 10 CFR Part 20.

- Providing capability for administrative control of effluent releases from the plant to maintain the releases ALARA and within the limits of 10 CFR Part 20 and the plant Technical Specifications.

12.5.2 Summary of Application

Turkey Point Units 6 and 7 COL FSAR, Revision 8, Section 12.5, incorporates by reference AP1000 DCD, Revision 19, Section 12.5.

In addition, in Turkey Point Units 6 and 7 COL FSAR Section 12.5, the applicant provided the following:

Tier 2 Departure

- PTN DEP 18.8-1

The applicant described the following Tier 2 departure from the AP1000 DCD. The AP1000 DCD states that the ALARA briefing room and OSC share the same location in the Annex Building. The applicant proposed to move the OSC from the location identified in the AP1000

DCD to a location described in the Emergency Plan and revise the AP1000 DCD Section 12.5.2.2 to exclude the reference to the OSC.

AP1000 COL Information Item

- STD COL 12.3-1

The applicant added additional information in STD COL 12.3-1 to resolve COL information item 12.3-1, which addresses the administrative controls for use of the design features provided to control access to radiologically restricted areas. This information pertains to the possible installation of a closed circuit television system in high radiation areas to allow remote monitoring of individuals entering high radiation areas by personnel qualified in radiation protection procedures

Although a sentence describing the possible use of such a system appears in Section 12.5.4 of the Turkey Point Units 6 and 7 COL FSAR, it is also addressed in Turkey Point Units 6 and 7 COL FSAR Section 12.3.5.1. The staff's evaluation of this STD COL item is addressed in Section 12.3.4 of this SER.

- STD COL 12.5-1

The applicant provided additional information in STD COL 12.5-1 to resolve COL Information Item 12.5-1 (COL Action Item 12.6-1), which addresses the RPP description.

License Conditions

- Part 10, License Condition 3, Items C.1, D.2, G.4, and K.1

The actual milestones for the RPP are listed in Turkey Point Units 6 and 7 COL FSAR Table 13.4-201.

- Part 10, License Condition 6, Operational Program Readiness

The applicant proposed a license condition to provide a schedule to support NRC inspection of operational programs including the RPP.

12.5.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1793 and its supplements.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the HP facilities design are given in NUREG-0800, Section 12.5.

The applicable regulatory requirements and guidance for STD COL 12.5-1 are as follows:

- 10 CFR Part 20

- RG 8.2, Revision 0

- RG 8.4, “Direct Reading and Indirect Reading Pocket Dosimeters,” Revision 0
- RG 8.6, “Standard Test Procedures for Gieger-Muller Counters,” Revision 0
- RG 8.8, Revision 3
- RG 8.9, Revision 1
- RG 8.10, Revision 1
- RG 8.28, “Audible-Alarm Dosimeters,” Revision 0
- NUREG-1736, “Consolidated Guidance: 10 CFR Part 20-Standards for Protection Against Radiation”

The applicable regulatory requirement for License Condition 3, Items C.1, D.2, G.4, and K.1 is as follows:

- 10 CFR 20.1101

12.5.4 Technical Evaluation

The staff reviewed Turkey Point Units 6 and 7 COL FSAR Section 12.5 and checked the referenced DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to this review topic.[1] The staff’s review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to the HP facilities design. The results of the staff’s evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

Section 1.2.3 of this SER provides a discussion of the strategy used by the staff to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff’s findings on standard content that were documented in the SER for the reference COL application (VEGP Units 3 and 4) were equally applicable to the Turkey Point Units 6 and 7 COL application, the staff undertook the following reviews:

- The staff compared the VEGP COL FSAR, Revision 5 to the Turkey Point Units 6 and 7 COL FSAR. In performing this comparison, the staff considered changes made to the Turkey Point Units 6 and 7 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff completed its review and finds the evaluation performed for the standard content to be directly applicable to the Turkey Point Units 6 and 7 COL application. This standard content

material is identified in this SER by use of italicized, double-indented formatting. Section 1.2.3 of this SER provides an explanation of why the standard content material from the SER for the reference COL application (VEGP) contains evaluation material from the SER for the BLN Units 3 and 4 COL application.

The staff reviewed the information contained in the Turkey Point Units 6 and 7 COL FSAR:

Tier 2 Departure

- PTN DEP 18.8-1

The location of the OSC for Turkey Point Units 6 and 7 differs from the OSC location described in the AP1000 DCD. Therefore, the applicant proposed to eliminate the reference to the OSC that appears in the first sentence of AP1000 DCD Section 12.5.2.2. The applicant proposed to revise the text in the first sentence of AP1000 DCD Section 12.5.2.2 to read: "The ALARA briefing room is located off the main corridor immediately beyond the main entry to the annex building."

This departure is acceptable to the staff insofar as the HP facility design is concerned because the location of the OSC does not have an impact on the radiation protection facilities design. The location of the ALARA briefing room remains as stated in the AP1000 DCD, so there is no impact on radiation protection facilities, programs or functions. The staff's evaluation of the OSC relocation on emergency preparedness is addressed in Section 13.3 of this SER and the evaluation on human system interface design is addressed in Section 18.8 of this SER.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.5.4

> *The following portion of this technical evaluation section is reproduced from Section 12.5.4 of the BLN SER:*
>
> *AP1000 COL Information Item*
>
> - STD COL 12.5-1
>
> *The applicant provided additional information in STD COL 12.5-1, addressing the RPP description, to resolve COL Information Item 12.5-1. COL Information Item 12.5-1 states:*
>
> > *The Combined License applicant will address the organization and procedures used for adequate radiological protection and to provide methods so that personnel radiation exposures will be maintained ALARA.*
>
> *The same commitment was also captured as COL Action Item 12.6-1 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793). The applicant stated that STD COL 12.5-1 is addressed in Appendix 12AA of the BLN COL FSAR. This appendix incorporates by reference NEI 07-03, Revision 3. The applicant described revisions to NEI 07-03 and supplemental information in Appendix 12AA of the BLN COL FSAR. The staff evaluated the revised text and*

supplemental information provided in conjunction with the referenced NEI 07-03, Revision 3 template. These revisions and supplements address STD COL Items 12.1-1, 12.3-1, 12.3-3, 12.3-4, and 12.5-1. The applicant's proposed revisions and supplements are:

1. *Specific organizational positions were described in Chapter 13 of BLN COL FSAR; and Sections 12.5.2.1 through 12.5.2.5 are not incorporated in Appendix 12AA.*

2. *Facilities, as described in general terms in NEI 07-03, Revision 3 are not incorporated in BLN COL FSAR Appendix 12AA; facilities, instrumentation, and equipment are described in DCD Section 12.5.2.*

3. *Supplemental information was provided for NEI 07-03, Section 12.5.3.3 to describe compliance with 10 CFR 20.1703(b) and 10 CFR 20.1705 when National Institute for Occupational Safety and Health (U.S. Public Health Service) tested and certified respiratory protection equipment is not used.*

4. *The following headings and associated material that are described in general terms in NEI 07-03, Revision 3 are not incorporated in Appendix 12AA. Radwaste Handling, Spent Fuel Handling, Normal Operation, and Sampling are described in DCD Section 12.5.3.*

5. *Supplemental information was provided for NEI 07-03, Section 12.5.4.4 [12.5.4.2 is the correct section number] to describe the use of a closed circuit television system to allow remote monitoring for high radiation areas access.*

6. *Supplemental information was provided for NEI 07-03, Section 12.5.4.4 to describe access control measures for very high radiation areas. Locations and radiological controls of the radiation zones are described on plant diagrams in DCD Section 12.5.3.*

7. *Appendix 12AA revised NEI 07-03, Section 12.5.4.7 to clarify the location of the COL applicant's management policy, organizational responsibility authorities for implementing an effective ALARA program, and the establishment and implementation of radiation protection.*

8. *The applicant revised the second bullet of NEI 07-03, Section 12.5.4.7 II to require that the functional manager in charge of radiation protection be responsible for defining the value for "Significant exposures" and the associated activities within written procedures. The example value described in NEI 07-03 includes activities that are estimated to involve greater than 1 person-rem of collective dose.*

9. *The COL applicant added text after the last bullet of NEI 07-03, Section 12.5.4.8 to adopt NEI 08-08 that is currently under review by the NRC staff.*

10. The COL applicant added information to NEI 07-03, Section 12AA.5.4.14 and Section 12AA.5.4.15 [sic] to adopt NEI 08-08 that is currently under review by the NRC staff.

The applicant describes the exceptions and supplemental information to NEI 07-03 that reference additional design and site-specific information necessary to clearly identify the source of the information addressed in the RPP as described in Appendix 12AA. The applicant's description provides sufficient detailed information supporting the exceptions or revisions such that the information described provides clear direction as to organizational structure, facilities, management policy for ALARA, and where the threshold for significant with exposures will be described. The NRC staff agrees that the applicant's exceptions to NEI 07-03, noted above are acceptable because these exceptions and the supplemental information satisfy the regulatory requirements of 10 CFR 20.1106 (b), the acceptance criteria of Sections 12.1 and 12.5 of NUREG-0800 and the regulatory guidance in RG 8.8, Position C.1.b, RG 8.9, and RG 8.10, Positions C.1.a, and C.2.

The applicant added Appendix 12AA, "Appendix 12AA, Radiation Protection Program Description," after Section 12.5 of the DCD. In this appendix the applicant incorporates by reference NEI 07-03, Revision 3. The applicant indicated that Table 13.4-201 provides milestones for radiation protection operational program implementation.

The NRC staff reviewed STD COL 12.5-1 dealing with the RPP description in BLN COL FSAR Appendix 12AA. The additional controls described in STD COL 12.5-1 are consistent with the discussion in NUREG-1736 regarding Bioassay programs for personnel monitoring and are consistent with the applicant's commitment to RG 8.9. The staff reviewed the threshold for determining significant exposures. The applicant stated that the functional manager in charge of radiation protection determines the threshold within procedures. Initially, the staff did not consider that the applicant exercised sufficient control related to maintaining ALARA (RAI 12.5-1).

In response to RAI 12.5-1, in a letter dated September 22, 2008, the applicant provided additional information that the final NEI 07-03 template (Revision 7) would be incorporated without departure concerning significant exposures. In a letter dated March 18, 2009 (ML090510379), the NRC accepted NEI 07-03, Revision 7. Specifically, the NRC staff indicated that for COL applications, NEI 07-03, Revision 7 provides an acceptable template for assuring that the RPP meets the applicable regulations and guidance. Since the BLN COL FSAR has not yet adopted the approved version of the NEI template, this is identified as ***Confirmatory Item 12.1-1****.*

The NRC staff reviewed Revision 0 of the BLN COL FSAR Appendix 1AA, which listed the applicant's conformance with radiation protection related RGs. The applicant stated that it will conform in general to RG 8.28, "Audible Alarm Dosimeters," Revision 0, dated August 1981, and specifically stated that it conforms to ANSI N13.7-1981, which was reaffirmed in 1992. ANSI N13.7-1983

is the "American National Standard for Radiation Protection-Photographic Film Dosimeters Criteria for Performance." RG 8.28, Revision 0, endorsed ANSI N13.27-1981, "Performance Specifications for Pocket-Sized Alarming Dosimeters/Ratemeters." This discrepancy was identified in RAI 1-10. In response to RAI 1-10, the applicant stated that BLN COL FSAR Appendix 1AA would be revised to the correct reference of the ANSI standard in a future revision of the BLN COL FSAR. The NRC staff verified that Revision 1 of the BLN COL FSAR adequately addresses the proposed change. As a result, RAI 1-10 is closed.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.5.4:

The staff notes that the VEGP FSAR has not been updated to correct the discrepancy identified in RAI 1-10 regarding the reference to ANSI N13.27-1981. Revision 2 of the VEGP FSAR currently references the incorrect standard, ANSI N13.7-1981, under RG 8.28 in Appendix 1AA. Since the VEGP applicant has endorsed RAI 1-10, the staff expects this discrepancy to be corrected in a future revision of the VEGP FSAR. This is ***VEGP Confirmatory Item 12.5-2.***

Correction of Error in the Standard Content Evaluation Text

The NRC staff identified two errors in the text reproduced above from the BLN SER, Section 12.5.4 that require correction. In the change numbered 5 above, the reference to "NEI 07-03, Section 12.5.4.4," is incorrect. The correct reference is to "NEI 07-03, Section 12.5.4.2." In the change numbered 10, above, the reference to "Section 12AA.5.4.14 and Section 12AA.5.4.15" is incorrect. The correct reference is to "Section 12.5.4.14 and Section 12.5.4.15."

Resolution of Standard Content Confirmatory Item 12.1-1

The NRC staff compared the VEGP and BLN COL applications regarding STD COL 12.5-1, and found them to be essentially identical, with the exception that VEGP FSAR Appendix 12AA references NEI 07-03A and BLN FSAR Appendix 12AA references Revision 3 of NEI 07-03. Additional clarifying information has been added to the VEGP FSAR regarding STD COL 12.5-1, which is discussed below. As indicated in Section 12.1.4 above, Confirmatory Item 12.1-1, is resolved for VEGP because the applicant has adopted the approved version of NEI 07-03, which is now designated as NEI 07-03A.

In Revision 2 of the FSAR, the applicant modified parts of FSAR Chapter 12, Appendix 12AA, that relate to STD COL 12.5-1. The changes are as follows:

1. *Text describing a closed circuit television system associated with high radiation areas has been moved from Appendix 12AA to Section 12.5.2.2 (this text is associated with STD COL 12.3-1, and is evaluated in Section 12.3.4 of this SER).*

2. References in NEI 07-03A have been revised to reflect the appropriate sections of the FSAR.

3. Proposed modifications to the second bullet of NEI 07-03, Section 12.5.4.7 have been withdrawn.

4. Bullet number 3 of NEI 07-03A, Section 12.5, has been revised to address aspects of the radiation program functional areas that must be in place at various milestones.

5. A cross reference to NEI 08-08A has been added in NEI 07-03A.

6. The first paragraph of Section 12.5.4.12 of NEI 07-03A has been revised to address 10 CFR 20.1101 and the Quality Assurance Program.

Items 1, 2, and 5 are acceptable because they are editorial and do not affect content. The change described in Item 3 is acceptable because NEI 07-03A is acceptable without modification. The changes described in Item 4 are acceptable because they are consistent with the milestones described in FSAR Table 13.4-201 and with applicable regulatory requirements. The changes described in Item 6 are acceptable because they are consistent with 10 CFR 20.1101 and the Quality Assurance Program described in FSAR Section 17.5.

Resolution of VEGP Confirmatory Item 12.5-2

Turkey Point Units 6 and 7 COL FSAR, Appendix 1AA correctly references ANSI N13.27-1981 under the conformance discussion of RG 8.28. Therefore, the staff considers VEGP Confirmatory Item 12.5-2 resolved for the Turkey Point Units 6 and 7 COL application.

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.5.4:

Exceptions to RGs 8.2, 8.4, 8.6, and Section C.3.b of RG 8.8

The following portion of this technical evaluation section is reproduced from Section 12.5.4 of the BLN SER.

The applicant took exception to RG 8.2, "Guide for Administrative Practices in Radiation Monitoring," regarding a reference to a previous version of 10 CFR Part 20 (10 CFR 20.401), because it is no longer valid. The staff agrees with the applicant's exception.

The applicant took exception to RG 8.4, "Direct Reading and Indirect Reading Pocket Dosimeters," regarding references to previous versions of 10 CFR Part 20 (10 CFR 20.202(a), and 10 CFR 20.401) because they are no longer valid. The staff agrees with the applicant's exception. The applicant also took exception to ANSI N13.5-1972 (R-1989), in that two performance criteria, accuracy and leakage, specified in the guidance, are to be met by acceptance standards in ANSI N322-1997, "ANSI Test, Construction, and Performance

requirements for Direct Reading Electrostatic/Electroscope Type Dosimeters." The staff finds that by using ANSI N322-1997 for performance criteria, 10 CFR 20 requirements are still met, as the major change is the allowance of an additional one percent leakage over a comparable time period. Test and calibration intervals recommended by RG 8.4 are not affected.

The applicant took exception to RG 8.6, "Standard Test Procedures for Geiger Mueller Counters," to reference an instrument calibration program based upon ANSI Criteria N323A-1997 (with 2004 Correction Sheet), "Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments." This methodology is acceptable over the previous program referenced in RG 8.6 because the ANSI standard reflects current industry practices. The staff agrees with the applicant's position.

The applicant took exception to part of Position C.3.b in RG 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposure at Nuclear Power Stations will be ALARA." This exception was to the reporting requirements associated with operating exposure. The applicant's basis for justifying the exception to RG 8.8, Position C.3.b, is that reporting of operating exposure information is no longer required. The staff agrees with the applicant's exception to RG 8.8, Position C3.b, because this specific reporting requirement has been superseded. All licensees are now required to report records of ionizing exposure to the NRC annually in accordance with 10 CFR 20.2206.

<u>License Condition</u>

- *License Condition 3, Items C.1, D.2, G.4, and K.1*

Implementation milestones were provided by the applicant to address the RPP required by 10 CFR 20.1101. A phased-in implementation should include appropriate milestones in the construction of the facility. Staffing levels, equipment, facilities, and procedures necessary to ensure radiation safety of the workers and public for each phase of implementation should be identified. In RAI 12.5-2, the staff requested that the applicant provide the specific programs to be implemented at each milestone identified in Table 13.4-201 of the BLN COL FSAR. In its response to the RAI, the applicant provided clarifying information regarding Table 13.4-201.

In a supplemental response to RAI 12.5-2, dated December 16, 2008, the applicant provided a proposed revision to BLN COL FSAR Table 13.4-201 to show the specific program(s) for each milestone and assignment of a Radiation Protection Manager and Supervisor. The proposed change to BLN COL FSAR Table 13.4-201 is acceptable subject to a formal revision to the BLN COL FSAR, based on the specific commitment to establish an individual responsible for each milestone. Accordingly, this is identified as ***Confirmatory Item 12.5-1****.*

The following portion of this technical evaluation section is reproduced from VEGP SER Section 12.5.4:

Resolution of Standard Content Confirmatory Item 12.5-1

The NRC staff verified that the VEGP FSAR was updated to include the information identified in the initial and supplemental BLN response to RAI 12.5-2. Accordingly, Standard Content Confirmatory Item 12.5-1 is resolved for the VEGP COL FSAR.

- *Part 10, License Condition 6, Operational Program Readiness*

The applicant proposed a license condition to provide a schedule to support NRC inspection of operational programs, including the RPP. The proposed license condition is consistent with the policy established in SECY-05-0197, "Review of Operational Programs in a Combined License Application and General Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," and is acceptable.

12.5.5 Post Combined License Activities

The license condition language in this section has been clarified from previously considered language. In a letter dated April 8, 2016 (ADAMS Accession No. ML16103A507), the applicant did not identify any concerns with the clarified license condition language. The changes do not affect the staff's above analysis of the conditions, and therefore, for the reasons discussed in the technical evaluation section above, the staff finds the following license conditions acceptable:

- License Condition (12-1) – The licensee shall implement the Radiation Protection Program (RPP) (including the ALARA principle) or applicable portions thereof (as identified in FSAR Section 12.5) as described in the milestones below:

    1. RPP features (including the ALARA principle) applicable to receipt of by-product, source, or special nuclear materials (excluding exempt quantities as described in 10 CFR 30.18) implemented before initial receipt of such materials;

    2. RPP features (including the ALARA principle) applicable to new fuel implemented before receipt of initial fuel on site;

    3. All other RPP features (including the ALARA principle) except for those applicable to control radioactive waste shipment implemented before initial fuel load;

    4. RPP features (including the ALARA principle) applicable to radioactive waste shipment implemented before first shipment of radioactive waste;

- License Condition (12-2) – No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the Office of New Reactors a schedule that supports planning for and conduct of NRC inspections of the operational program (RPP). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until this operational program has been fully implemented.

12.5.6 Conclusion

The staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the relevant information relating to this section, and no outstanding information related to this section remains to be addressed in the Turkey Point Units 6 and 7 COL FSAR. The results of the staff's technical evaluation of the information incorporated by reference in the Turkey Point Units 6 and 7 COL application are documented in NUREG-1793 and its supplements.

In addition, the staff concludes that the relevant information presented in the Turkey Point Units 6 and 7 COL FSAR is acceptable based on the relevant acceptance criteria provided in NUREG-0800, Section 12.5. The staff based its conclusion on the following:

- STD COL 12.5-1, which addresses the RPP description, is acceptable because the applicant incorporates NEI 07-03A into the Turkey Point Units 6 and 7 COL FSAR in order to meet the applicable regulatory requirements and guidance specified in Sections 12.5.3 and 12.5.4 of this SER.

- PTN DEP 18.1-1, in which the applicant proposes to relocate the OSC from the location described in the AP1000 DCD Section 12.5.2.2, is acceptable insofar as the HP facility is concerned because the location of the OSC does not have an impact on the radiation protection facilities design. The ALARA briefing room remains as stated in the AP1000 DCD, so there is no impact on radiation protection facilities, programs or functions.