13. CONDUCT OF OPERATIONS

13.1 Organizational Structure of the Applicant

In the AP1000 Design Control Document (DCD) Tier 2, Section 13.1, "Organization Structure of Applicant," the applicant stated that the organizational structure is the responsibility of the Combined License (COL) applicant. The applicant also stated that the organizational structure should be consistent with the human system interface. The staff discusses its evaluation of this matter in Sections 18.2, 18.6, and 18.10 of this report. In DCD Tier 2, Section 13.1.1, "Combined License Information Item," the applicant stated that a COL applicant referencing the AP1000 certified design will address the adequacy of the organizational structure. The staff finds this to be acceptable. This is COL Action Item 13.1-1.

13.2 Training

In DCD Tier 2, Section 13.2, the applicant stated that the COL applicant will be responsible for training programs. The applicant further referenced WCAP-14655, which describes the input from the designer on the training of operations personnel who participate as subjects in the human factors engineering verification and validation. The staff discusses its evaluation of this matter in Section 18.10 of this report. In DCD Tier 2, Section 13.2.1, "Combined License Information Item," the applicant stated that a COL applicant referencing the AP1000 certified design will develop and implement training programs for plant personnel. The staff finds this to be acceptable. This is COL Action Item 13.2-1.

13.3 Emergency Planning

13.3.1 Introduction

The staff reviewed DCD Tier 2, Section 13.3, "Emergency Planning." The staff issued requests for additional information (RAIs 472.001, 472.002, and 472.003 in a letter dated September 19, 2002, and requested further additional information (RAI 472.003, Revision 1) in a letter dated April 9, 2003. The staff also conducted a telephone conference with the applicant on April 9, 2003. The applicant responded to the initial request for additional information in a letter dated October 2, 2002, and to the subsequent RAI in an email on April 11, 2003.

The AP1000 Draft Safety Evaluation Report (DSER) was issued by the NRC on June 16, 2003, and identified two open items for emergency planning (EP). The two open items were associated with technical support center (TSC) habitability, and relocation of TSC functions to the emergency operations facility (EOF) upon loss of TSC habitability. In addition, the staff also identified an issue with the COL action item associated with the programmatic responsibility of a COL applicant for EP.

The applicant responded to the two EP open items in a letter dated July 7, 2003. The staff met with the applicant in a public meeting on July 10, 2003, and discussed the details and the resolution of the two EP open items. The staff subsequently conducted a telephone conference with the applicant on July 29, 2003, and the applicant submitted revised responses to the EP open items in a July 31, 2003, letter.

Conduct of Operations

A significant change in EP requirements for the AP1000, as compared to the AP600 design, was the elimination of various postaccident sampling system (PASS) requirements. The AP600 Final Safety Evaluation Report (FSER) reflected the NUREG-0737 PASS criteria as a COL action item. Subsequently, on October 31, 2000, the U.S. Nuclear Regulatory Commission (NRC) published the model safety evaluation in the Federal Register (65 FR 65018), which eliminated various requirements on post-accident sampling imposed on licensees through orders, license conditions, or technical specifications. Section 13.3.3.4.1 of this report discusses the model safety evaluation, as it applies to EP for the AP1000.

13.3.2 Emergency Planning Responsibilities

The following regulations, guidance, and standards apply to EP responsibilities.

The requirements of Title 10, Section 52.79(d), of the Code of Federal Regulations (10 CFR 52.79(d)) state that a COL application must contain emergency plans which provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the site. The requirements of 10 CFR 52.79(b) state that the COL application must contain the technically relevant information required of applicants for an operating license by 10 CFR 50.34. The requirements of 10 CFR 50.34(b)(6)(v) state that the application shall include information concerning facility operation, including plans for coping with emergencies, which shall include the items specified in 10 CFR Part 50, Appendix E. The requirements of 10 CFR 50.34(f)(2) specify that the COL applicant shall provide sufficient information to demonstrate that various required actions will be satisfactorily completed by the operating license stage. Specifically, 10 CFR 50.34(f)(2)(viii) requires a capability to promptly obtain and analyze samples from the reactor coolant system and containment that may contain accident source term radioactive materials, while ensuring that no individual receives radiation exposure in excess of 0.05 Sv (5 rem) to the whole body or 0.5 Sv (50 rem) to the extremities. In addition, 10 CFR 50.34(f)(2)(xxv) requires an onsite TSC and onsite operational support center (OSC). Finally, the COL applicant must comply with the applicable requirements of 10 CFR 50.47, “Emergency Plans.”

Compliance with these regulations is determined by utilizing the guidance in Regulatory Guide (RG) 1.101, “Emergency Planning and Preparedness for Nuclear Power Reactors” (Revision 4, July 2003), which endorses Revision 1 of NUREG-0654/FEMA-REP-1, “Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants” (Revision 1, November 1980), and through it NUREG-0696, “Functional Criteria for Emergency Response Facilities—Final Report” (February 1981), NUREG-0737 and Supplement 1 to NUREG-0737, “Clarification of TMI Action Plan Requirements—Requirements for Emergency Response Capability” (Generic Letter (GL) 82-33, December 17, 1982).

DCD Tier 2, Section 13.3, indicates that EP is the responsibility of the COL applicant. Additionally, it states that communication interfaces among the main control room (MCR), the TSC, and the EP centers are the responsibility of the COL applicant.

The staff agrees that the COL applicant referencing the AP1000 design will address EP, and EP information submitted in the application will significantly depend on plant- and site-specific

characteristics. Emergency planning basically consists of facilities, equipment, personnel, and training. The majority of EP requirements are programmatic in nature and supplement physical facilities and equipment. Later parts of this chapter address those aspects of physical facilities and equipment associated with EP that should be considered in the standard design. DCD Tier 2, Section 13.3.1, "Combined License Information Item," states the following:

> Combined License applicants referencing the AP1000 certified design will address emergency planning including post-72 hour actions and its communication interface.

The reference to post-72-hour actions is associated with the 72-hour battery bank (i.e., the second battery bank in Divisions B and C), which is used for loads requiring power for 72 hours following an event of loss of all alternating current (ac) power sources concurrent with a design-basis accident (DBA). The staff finds that this is acceptable, in that it complies with the requirements of 10 CFR 52.79(d) and the applicable portions of 10 CFR Part 50. It is consistent with the extent to which the COL applicant can more appropriately address certain EP design features, facilities, functions, and equipment. This is COL Action Item 13.3-1.

13.3.3 TSC/OSC/Decontamination Facility

Although the COL applicant will address many aspects of EP, the standard design must consider certain design features, facilities, functions, and equipment necessary for EP. Specifically, in accordance with 10 CFR 50.34(f)(2)(xxv), the standard design must address the characteristics of the onsite TSC and onsite OSC. The design should include adequate emergency facilities and equipment to support emergency response, in accordance with 10 CFR 50.47(b)(8) and Subsection IV.E.8 to 10 CFR Part 50, Appendix E. The design should also include an onsite decontamination facility, in accordance with 10 CFR 50.47(b)(11) and Subsection IV.E.3 to 10 CFR Part 50, Appendix E, to provide the capability for controlling radiological exposures and providing decontamination facilities for onsite individuals, respectively.

In addition, 10 CFR 50.47(b)(9) requires adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition; 10 CFR 50.47(b)(11) requires the establishment of the means for controlling radiological exposures to emergency workers; and 10 CFR 50.34(f)(2)(viii) requires that the standard design provide the capability to promptly obtain and analyze samples from the reactor coolant system and containment, which may contain accident source term radioactive materials, without radiation exposures to any individual exceeding 0.05 Sv (5 rem) to the whole body or 0.5 Sv (50 rem) to the extremities. The guidance in RG 1.101 determines compliance with these regulations.

13.3.3.1 General Description of Facilities

DCD Tier 2, Section 18.8.3.5, "Technical Support Center Mission and Major Tasks," and Section 18.8.3.6, "Operational Support Center Mission and Major Tasks," describe the mission and major tasks of the TSC and OSC, respectively, for the AP1000 standard design. The TSC

is to provide an area and resources for use by personnel providing plant management and technical support to the plant operating staff during emergency evolutions. The TSC relieves the reactor operators of peripheral duties and communications not directly related to reactor system manipulations, and prevents congestion in the control room. The OSC is to provide a centralized area and the necessary supporting resources for the assembly of predesignated operations support personnel during emergency conditions. The TSC and OSC are in different locations in the annex building. The TSC is located in the annex building at Elevation 117'-6", adjacent to the passage from the annex building to the nuclear island control room, as shown in DCD Tier 2, Figure 1.2-19, "Annex Building General Arrangement Plan at Elevation 117'-6" & 126'-3"." The TSC is identified as the Main TSC Operations Area (Room 40403). The OSC location, identified as the ALARA [as low as is reasonably achievable] Briefing Room & Operational Support Center (Room 40318), is shown as such in DCD Tier 2, Figure 1.2-18, "Annex Building General Arrangement Plan at Elevation 100'-0" & 107'-2"."

In RAI 472.002, the staff asked the applicant to explain why Figure 1.2-18, which shows the hot machine shop, depicts no decontamination facilities, while DCD Tier 2, Section 1.2.5, "Annex Building," indicates that the hot machine shop includes decontamination facilities. The applicant responded that the hot machine shop (Room 40358) will include a variety of equipment for servicing radiologically controlled area equipment, including a lathe, a power hacksaw, and a power band saw. Also included will be a permanent diked decontamination basin with a grating support floor, connected to the radioactive waste drain system for cleaning contaminated components. The hot machine shop will also contain a "portable decontamination system," which the COL holder will purchase according to specifications of its choosing. Personnel decontamination will be performed in a separate decontamination room (Room 40355), which will include two personnel showers and two sinks connected to the radioactive liquid waste system.

The staff concludes that the information provided in the AP1000 DCD pertaining to the TSC, OSC, and decontamination room is consistent with the guidance identified in RG 1.101. Thus, the staff finds that the applicant's design meets the applicable requirements of 10 CFR 50.34(f)(2)(xxv), 10 CFR 50.47(b)(8), 10 CFR 50.47(b)(11), and Subsections IV.E.3 and IV.E.8 to 10 CFR Part 50, Appendix E.

13.3.3.2 Technical Support Center Size

The guidance of Section H.1 of NUREG-0654/FEMA-REP-1, Revision 1, calls for the establishment of a TSC in accordance with NUREG-0696. NUREG-0696 states that the TSC shall be large enough to provide working space, without crowding, for the personnel assigned to the TSC at the maximum level of occupancy. Specifically, the TSC working space shall be sized for a minimum of 25 persons, with a minimum working space of approximately 7 m^2 (75 ft^2) per person. The guidance also calls for sufficient space for equipment and storage, as well as to perform certain repair and other TSC-related activities. In addition, Paragraph 8.2.1.c of Supplement 1 to NUREG-0737, which is consistent with NUREG-0696, states that the TSC will be sufficient to accommodate and support NRC and licensee predesignated personnel, equipment, and documentation.

DCD Tier 2, Section 18.8.3.5 describes the design considerations for the TSC. In that section, the applicant stated that the size of the TSC complies with the size criteria of NUREG-0696. DCD Tier 2, Section 9.4.1.2.1.1, "Main Control Room/Technical Support Center HVAC [heating, ventilation and air conditioning] Subsystem," further states that the TSC areas consist of the main TSC operations area, conference rooms, NRC room, computer rooms, shift turnover room, kitchen/rest area, and restrooms.

The staff concludes that the information provided in the DCD pertaining to the TSC size is consistent with the guidance identified in RG 1.101. Specifically, the area conforms with the size specifications of NUREG-0696 and is sufficient to accommodate and support NRC and licensee predesignated personnel, equipment, and documentation, in conformance with Supplement 1 to NUREG-0737. As such, the staff finds that this information meets the applicable requirements of 10 CFR 50.47(b)(8) and Subsection IV.E.8 to 10 CFR Part 50, Appendix E, and is, therefore, acceptable.

13.3.3.3 Technical Support Center Habitability

In DCD Tier 2, Section 18.8.3.5, the applicant stated that, consistent with NUREG-0737, the TSC has no emergency habitability requirements. In addition, it stated that the TSC complies with the habitability requirements of Supplement 1 to NUREG-0737, when electrical power is available. Paragraph 8.2.1.f of Supplement 1 to NUREG-0737 calls for the TSC to be provided with the following equipment:

> radiological protection and monitoring equipment necessary to assure that radiation exposure to any person working in the TSC would not exceed 5 rem [0.05 Sv] whole body, or its equivalent to any part of the body, for the duration of the accident.

Item II.B.2 of NUREG-0737 states that the TSC is considered vital after an accident and that the design dose rate for personnel in a vital area should be such that doses do not exceed the guidelines of General Design Criteria (GDC) 19 during an accident. In addition, GDC 19 requires adequate radiation protection, such that the dose to personnel does not exceed 0.05 Sv (5 rem) whole body, or its equivalent to any part of the body for the duration of the accident. NUREG-0696 provides more detailed criteria for emergency plans, design, and functional criteria for emergency response facilities, including the following habitability criteria for the TSC in Section 2.6 of NUREG-0696:

> Since the TSC is to provide direct management and technical support to the control room during an accident, it shall have the same radiological habitability as the control room under accident conditions. TSC personnel shall be protected from radiological hazards, including direct radiation and airborne radioactivity from inplant sources under accident conditions, to the same degree as control room personnel. Applicable criteria are specified in General Design Criterion 19; Standard Review Plan 6.4; and NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.B.2.

Conduct of Operations

> The TSC ventilation system shall function in a manner comparable to the control room ventilation system. The TSC ventilation system need not be seismic Category I qualified, redundant, instrumented in the control room, or automatically activated to fulfill its role. A TSC ventilation system that includes high-efficiency particulate air (HEPA) and charcoal filters is needed, as a minimum. Sufficient potassium iodide shall be provided for use by TSC and control room personnel. The capacity of the installed TSC ventilation filter system shall be independent of these thyroid-blocking provisions.
>
> If the TSC becomes uninhabitable, the TSC plant management function shall be transferred to the control room.

13.3.3.3.1 TSC Ventilation System

In a previous version of DCD Tier 2, Section 18.8.3.5, the applicant stated the following in regard to habitability-related systems and their operation under various conditions:

> When a source of ac power is available, the nuclear island nonradioactive ventilation system (VBS) provides HVAC service to the main control room and the TSC during normal and abnormal conditions. The VBS and its support systems provide these functions in a reliable and failure tolerant fashion. If offsite power is not available, backup power is automatically provided by either of the two nonsafety-related diesels within the onsite standby power system. [DCD Tier 2, Section] 9.4.1, provides additional design details of the VBS.
>
> The VBS system provides for cooling, heating, humidity control, filtration (HEPA and charcoal), and pressurization following design basis accidents except for a station blackout (loss of non-safety-related ac power, including the non-safety-related diesels). If nonsafety-related ac power is not available, including the diesels, the habitability of the main control [room] is provided by the main control room emergency habitability system (VES) as discussed in [DCD Tier 2,] Section 6.4. Although the TSC is not supplied by either the VBS or the VES during a station blackout, it still remains habitable. The doors to the TSC can be opened to aid with ventilation and control of room temperature for the two hours that the workstations continue to operate. The TSC workstations are powered from the non-Class 1E uninterruptable [sic] power supplies, therefore plant monitoring capability from the TSC exists for two hours following a station blackout.
>
> Should habitability be challenged within the TSC due to lack of cooling or a high radiation level resulting from a beyond design basis accident, the TSC personnel and the functions of the TSC are transferred to the emergency operations facility (EOF) where habitability is not dependent on plant systems and with communication and data transfer links to the main control room to provide essential exchange of information.

In a previous version of DCD Tier 2, Section 6.4, “Habitability Systems,” the applicant stated the following, in part:

> The habitability systems are a set of individual systems that collectively provide the habitability functions for the plant. The systems that make up the habitability systems [include the following]:
>
> - Nuclear island nonradioactive ventilation system (VBS)
> - Main control room emergency habitability system (VES)
>
> When a source of ac power is available, the nuclear island nonradioactive ventilation system (VBS) provides normal and abnormal HVAC service to the main control room (MCR), technical support center (TSC), instrumentation and control rooms, dc equipment rooms, battery rooms, and the nuclear island nonradioactive ventilation system equipment room as described in [DCD Tier 2, Section] 9.4.1.
>
> When a source of ac power is not available to operate the nuclear island nonradioactive ventilation system or radioactivity is detected in the MCR air supply, which could lead to exceeding General Design Criterion 19 operator dose limits, the main control room emergency habitability system (VES) is capable of providing emergency ventilation and pressurization for the main control room.

Further, in a previous version of DCD Tier 2, Section 6.4.4, “Emergency Mode,” stated the following:

> Automatic transfer of habitability system functions from the nuclear island nonradioactive ventilation system to the main control room emergency habitability system is accomplished by the receipt of one of two signals:
>
> - “High-high” particulate or iodine radioactivity in MCR air supply
> - Loss of ac power sources

The nonradioactive ventilation system (VBS) serves the TSC. An earlier version of DCD Tier 2, Section 9.4.1.1.2, “Power Generation Design Basis,” stated, in part, that the VBS provides the following functions:

- controls the MCR and TSC relative humidity between 25 to 60 percent
- maintains the MCR and TSC at a slightly positive pressure during normal operations
- isolates the MCR and/or TSC from normal outdoor air intake and provides filtered outdoor air to pressurize the MCR and TSC upon detection of a high gaseous radioactive concentration in the MCR supply air duct
- isolates the MCR and/or TSC upon detection of a high concentration of smoke in the outside air intake

- provides smoke removal capability for the MCR and TSC

DCD Tier 2, Section 9.4.1.2.2, "Component Description," indicates that the VBS components include low-efficiency filters, high-efficiency filters, and postfilters; high-efficiency particulate air (HEPA) filters; charcoal adsorbers; and isolation dampers. A previous version of DCD Tier 2, Section 9.4.1.2.3.1, "Main Control Room/Technical Support Center HVAC Subsystem," under the section entitled "Abnormal Plant Operations," stated that when high gaseous radioactivity is detected and the HVAC subsystem is operable, both supplemental air filtration units automatically start to pressurize the MCR and TSC to at least 0.32 cm (0.125 in.) wg. The normal outside air makeup duct and the MCR and TSC toilet exhaust isolation dampers close. In addition, if ac power is unavailable for more than 10 minutes or if high-high particulate or iodine radioactivity is detected in the MCR supply air duct, which would lead to exceeding GDC 19 operator dose limits, the plant safety and monitoring system automatically isolates the MCR from the normal MCR/TSC HVAC subsystem. In the event of a loss of the normal plant ac electrical system, the MCR/TSC ventilation subsystem is automatically transferred to the onsite standby diesel generators.

13.3.3.3.2 Requests for Additional Information

In RAI 472.003, the staff asked the following:

> [DCD Tier 2,] Section 9.4.1.2.1.1 indicates that radiation monitors are located inside the main control room upstream of the supply air isolation valves and that these monitors isolate the main control room [from] the nuclear island non-radioactive ventilation system on high-high particulate or iodine radioactivity concentrations. Does this include isolating the technical support center as well?

In its response to RAI 472.003, the applicant stated the following:

> No, only the main control room is isolated on a high-high signal. At that time, the main control room emergency habitability system is placed into operation to protect the main control room operators. Please refer to "Abnormal Plant Operation" portion of DCD [Tier 2, Section] 9.4.1.2.3.1, which provides details as to the operation of the main control room and technical support center HVAC subsystem during abnormal events involving high and high-high signals.
>
> Also see [DCD Tier 2, Section] 18.8.3.5 "Technical Support Center Mission and Major Tasks" for discussions of the technical support center (TSC) including habitability and evacuation during emergencies.

The staff conducted a telephone conference on April 9, 2003, with the applicant to discuss issues associated with TSC habitability and relocation of TSC functions to the EOF under emergency conditions. Supplemental comments to RAI 472.003 that emerged from this conference include the following:

The staff has reviewed Westinghouse's response to RAI 472.003 dealing with technical support center ventilation (i.e., habitability). The response referred to the Design Control Document (DCD) sections that covered TSC ventilation and habitability. While this answered the specific RAI question, it did not address apparent incorrect statements and inconsistencies in the system design, or the justification for relocation of TSC function to the emergency offsite [sic] facility (EOF) rather than to the main control room. Below are two questions pertaining to DCD Section 18.8.3.5, and an additional question pertaining to use of the EOF when the TSC becomes uninhabitable:

1. [DCD Tier 2, Section] 18.8.3.5 states that "Consistent with NUREG 0737 . . . the technical support center has no emergency habitability requirements." In accordance with NUREG-0737, the TSC is a "vital area" and should comply with radiological habitability requirements of General Design Criteria (GDC) 19 for the duration of an accident. Please provide justification for why the TSC has no emergency habitability requirements.

2. [DCD Tier 2, Section] 18.8.3.5 states (in italics) that "The TSC complies with the habitability requirements of Reference 27 [i.e., Supplement 1 to NUREG-0737] when electrical power is available." First, Supplement 1 requires the same radiological habitability requirements as GDC 19, and thus, this statement contradicts (1), above; and second, the reference to "when electrical power is available" is but one, of two, triggering events that would automatically isolate the Main Control Room from the TSC. The second trigger is "High-high" particulate or iodine radioactivity in MCR air supply" (see [DCD Tier 2, Section] 6.4.4, page 6.4-9). Please provide justification for the inconsistencies.

3. In the event a relocation of the TSC to the EOF is allowed, rather than to the MCR (as required by NUREG-0696 guidance), how will the physical location of the EOF be addressed, as it relates to TSC support functions? There is currently a trend of utilities attempting to consolidate their EOFs for multiple plants. The physical location aspect is not addressed in the DCD, including whether the NRC would allow it. The implication is that the EOF could be anywhere, and as such, the transferred TSC functions could be anywhere.

The applicant responded with Revision 1 to RAI 472.003, which includes the following information regarding the three questions asked by the staff:

1&2 The nuclear island nonradioactive ventilation system (VBS) maintains habitability in the TSC to the requirements of GDC 19 for normal and accident scenarios as long as electrical power is available and radiation levels do not exceed a predetermined, "high-high" threshold. The VBS has two safety-related functions. The first is to monitor the air coming into the MCR and the second is to isolate the MCR envelope during a loss of electrical power of more than 10 minutes or upon a "high-high"

radiation signal. As this system has no safety-related AC electrical system, it is not credited as meeting GDC 19 for the protection of the MCR operators. The safety-related MCR emergency habitability system (VES) is credited as meeting GDC 19 for the protection of the MCR operators. Thus, Westinghouse agrees that the statement, "Consistent with NUREG-0737 . . . the technical support center has no emergency habitability requirements," is confusing. The statement will be removed from [DCD Tier 2, Section] 18.8.3.5 in the next revision of the DCD. See the [DCD] Revision: section below for detail changes.

[DCD Tier 2, Section 18.8.3.5 was subsequently revised to delete the sentence: "The technical support center has no emergency habitability requirements."]

In the event of high radiation, the VBS operates in a recirculation mode filtering the air in the MCR and the TSC. In this mode, the VBS is designed to provide a capability similar to that of the engineered safety features (ESF) systems in operating plants with respect to air filtration and adsorption. Should a "high-high" radiation signal or if a station blackout of more than 10 minutes occur, the VBS stops, isolates the main control room envelop and the VES begins operation to protect the main control room operators. If the system has power and is operating, it will prevent a "high-high" radiation signal. This is the reason [DCD Tier 2, Section] 18.8.3.5 states, "The TSC complies with the habitability requirements of Reference 27 [i.e., Supplement 1 to NUREG-0737] when electrical power is available."

In practical terms, the TSC does have emergency habitability capabilities comparable to those of operating plants as long as electrical power is available either from offsite power or from the onsite diesel generators. See the response to item 3 below, for a discussion on the probability of losing both offsite power and the onsite diesel generators.

3. The AP1000 design philosophy for the MCR and TSC habitability is the same as for the AP600. Discussions of this design were provided in AP600 RAIs 100.10 and 100.33. In a very limited number of instances, the TSC may become uninhabitable. As stated in the [DCD Tier 2, Section] 18.8.3.5, even in the low probability case of a station blackout, the TSC will still most likely remain habitable. The doors to the TSC can be opened to aid with ventilation and control of room temperature for the two hours that the workstations continue to operate. The TSC workstations are powered from the non-Class 1E uninterruptable [sic] power supplies, therefore plant monitoring capability from the TSC exists for two hours following a station blackout. (The probability of a station blackout is discussed in the AP1000 Probability Risk Assessment. The probability of a station blackout occurring is 8.57×10^{-4}. The probability of

non-recovery within 2 hours is specified in the EPRI ALWR Utility Document as 0.37.)

To ensure that the functions of the TSC are not impeded, Westinghouse states in DCD [Tier 2, Section] 13.3 that staffing of the EOF for the AP1000 will occur consistent with current operating practice and revision 1 of NUREG-0654/FEMA-REP-1. In the unlikely event of a loss of offsite power and loss of all onsite AC power, the Combined License applicant shall immediately activate the EOF rather [than] bringing it to standby status. As stated in DCD [Tier 2, Section] 18.8.3.5 a communicator is assigned to the MCR as part of the emergency staff. The communicator is responsible for providing direct interface between the TSC and the MCR operators. If the TSC function has been transfered to the EOF, then the communicator provides the direct interface between the EOF and the MCR operators. The Combined License applicant is responsible for the EOF design, including the specification of its location(s) (DCD [Tier 2, Section] 18.2.6), emergency planning, and associated communication interfaces among the MCR, the TSC, and the EOF (DCD [Tier 2, Section] 13.3). Westinghouse has committed to providing a TSC communicator in the MCR for the unlikely event that the TSC becomes uninhabitable. When the Combined license applicant establishes the emergency plan and associated communication interfaces among the MCR, the TSC, and the EOF; the NRC will have an opportunity to review that plan, including the total number of TSC support personnel that will be sent to the MCR in the event that the TSC becomes uninhabitable as well as the location of the EOF.

13.3.3.3.3 TSC as a Vital Area

According to Section 2.6 of NUREG-0696, the purpose of the TSC is to provide direct management and technical support to the control room during an accident. Section II.B.2 of NUREG-0737 states that any area which will, or may, require occupancy to permit an operator to aid in the mitigation of, or recovery from, an accident is designated as a “vital area,” and the control room and TSC must be included among those areas to which access is considered vital after an accident. Further, the design dose rate for personnel in a vital area should be such that doses do not exceed the guidelines of GDC 19 during an accident. GDC 19 requires that radiation protection be adequate to ensure that the dose to personnel does not exceed 0.05 Sv (5 rem) whole body, or its equivalent to any part of the body, for the duration of the accident. In addition, Subsection 8.2.1.f of Supplement 1 to NUREG-0737 states that the TSC will be provided with radiological protection and monitoring equipment necessary to assure that radiation exposure to any person working in the TSC would not exceed 0.05 Sv (5 rem) whole body, or its equivalent to any part of the body, for the duration of the accident. These guidelines form the basic radiological habitability criteria for the TSC.

Section H.1 of NUREG-0654/FEMA-REP-1, Revision 1, calls for establishment of a TSC in accordance with NUREG-0696. Section 2.6 of NUREG-0696 states that because the TSC is to provide direct management and technical support to the control room during an accident, it shall have the same radiological habitability as the control room under accident conditions. In addition, the TSC ventilation system shall function in a manner comparable to the control room

ventilation system. If the TSC becomes uninhabitable, the TSC plant management function shall be transferred to the control room.

As discussed above, the applicant stated in a previous version of DCD Tier 2, Section 18.8.3.5, that the TSC has no emergency habitability requirements and that this is consistent with NUREG-0737. However, Section II.B.2 of NUREG-0737 designates the TSC as a vital area governed by the related radiation protection criteria of GDC 19 during an accident. Thus, the statement that the TSC "has no emergency habitability requirements" is not consistent with NUREG-0737. In its additional response to RAI 472.003, the applicant acknowledged the apparent inconsistency was "confusing" and the statement was removed from DCD Tier 2, Section 18.8.3.5. In addition, the applicant further stated that "[i]n practical terms, the TSC does have emergency habitability capabilities comparable to those of operating plants as long as electrical power is available either from offsite power or from the onsite diesel generators."

In the AP1000 DSER, the staff stated that despite the removal of the statement that the TSC has no emergency habitability requirements from DCD Tier 2, Section 18.8.3.5, the design of the ventilation systems for the TSC and MCR did not provide the TSC with the same radiological habitability as the MCR under all accident conditions. The staff further stated in the DSER that the AP1000 TSC emergency habitability capabilities did not comport with the TSC emergency habitability criteria of NUREG-0696, NUREG-0737, and Supplement 1 to NUREG-0737. As such, the staff identified the inability of the TSC to provide emergency habitability under accident conditions as Open Item 13.3-1.a in the DSER.

In response to DSER Open Item 13.3-1.a, the applicant stated in its July 7, 2003, letter the following:

> The TSC is designed to meet GDC 19 limits during accident conditions. This is consistent with the guidance of NUREG-0696, section 2.6, Habitability, and NUREG-0737. The DCD states that the VBS meets GDC 19 under the "Abnormal Plant Operation" heading of DCD [Tier 2, Section] 9.4.1.2.3.1. "The main control room/technical support center HVAC equipment and ductwork that form an extension of the main control room/technical support center pressure boundary limit the overall infiltration (negative operating pressure) and exfiltration (positive operating pressure) rates to those values shown in [DCD Tier 2,] Table 9.4.1-1. Based on these values, the system is designed to maintain operator doses within allowable General Design Criteria (GDC) 19 limits."
>
> The AP1000 ventilation system serving the TSC exceeds the guidance of NUREG-0696 as it is redundant, instrumented in the control room and is automatically activated. NUREG-0696, Section 2.6 states, "The TSC ventilation system need not be seismic Category I qualified, redundant, instrumented in the control room, or automatically activated to fulfill its role."
>
> NUREG-0696 guidance does not suggest that the TSC meet habitability requirements all of the time. Section 2.6 of the NUREG states, "If the TSC becomes uninhabitable, the TSC plant management function shall be transferred to the control room." The existence of this statement is acknowledgment that there may be times when the TSC

> habitability could be challenged. This acknowledgment [sic] is logical given the fact that the ventilation system redundancy and qualification guidance of NUREG-0696 are less stringent than those for the control room ventilation system.
>
> Based on the above, Westinghouse believes that AP1000 meets the NUREG-0696, section 2.6 guidance to ". . . have the same radiological habitability as the control room under accident conditions." Westinghouse also believes that it has met all applicable requirements and guidance associated with providing TSC habitability.

The staff discussed Open Item 13.3-1.a with the applicant during a public meeting on July 10, 2003. In regard to the issue of whether the TSC, as a vital area, must have the same radiological habitability as the MCR under all accident conditions, it was determined that the applicable plant conditions for which GDC 19 limits apply are the AP1000 defined, Condition IV "limiting faults" (or DBAs). In DCD Tier 2, Section 15.0.1, "Classification of Plant Conditions," the applicant states the following, in part:

> The ANSI 18.2 (Reference 1[1]) classification divides plant conditions into four categories according to anticipated frequency of occurrence and potential radiological consequences to the public. The four categories are as follows:
>
> - Condition I: Normal operation and operational transients
> - Condition II: Faults of moderate frequency
> - Condition III: Infrequent faults
> - Condition IV: Limiting faults
>
> The basic principle applied in relating design requirements to each of the conditions is that the most probable occurrences should yield the least radiological risk, and those extreme situations having the potential for the greatest risk should be those least likely to occur.

The eight Condition IV limiting faults (DBAs) are listed in DCD Tier 2, Section 15.0.1.4, "Condition IV: Limiting Faults," which states the following, in part:

> Condition IV events are faults that are not expected to take place, but are postulated because their consequences include the potential of the release of significant amounts of radioactive material. They are the faults that must be designed against, and they represent limiting design cases. Condition IV faults are not to cause a fission product release to the environment resulting in doses in excess of the guideline values of 10 CFR Part 100. A single Condition IV event is not to cause a consequential loss of required functions of systems needed to cope with the fault, including those of the emergency core cooling system and the containment. The following faults are classified in this category:

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[1]American National Standards Institute N18.2, "Nuclear Safety Criteria for the Design of Stationary PWR Plants," 1973.

Conduct of Operations

- Steam system piping failure (major)
- Feedwater system pipe break
- Reactor coolant pump shaft seizure (locked rotor)
- Reactor coolant pump shaft break
- Spectrum of RCCA ejection accidents
- Steam generator tube rupture
- LOCAs resulting from a spectrum of postulated piping breaks within the reactor coolant pressure boundary (large break)
- Design basis fuel handling accidents

The applicant's reference to DCD Tier 2, Section 9.4.1.2.3.1, and specifically to the discussion under the subsection entitled "Abnormal Plant Operation," is relevant, in that the eight DBAs constitute the limiting design accidents (or faults) that are considered for purposes of ensuring TSC habitability (i.e., meeting GDC 19 limits) rather than for all accident conditions. Specifically, the design of the MCR/TSC HVAC equipment and ductwork is such that the doses in the TSC would be maintained within allowable GDC 19 limits, assuming the continued operation of the nuclear island nonradioactive ventilation system (VBS). The MCR emergency habitability system (VES) is considered the design-basis emergency ventilation system for the MCR, and is not designed to be the emergency ventilation system for the TSC.

The staff stated in a conference call with the applicant on July 29, 2003, that the applicant should explicitly state in the DCD that when VBS is operating it is designed to maintain the TSC within allowable GDC 19 limits for the DBAs. This was reflected in applicant's July 31, 2003, letter, in which applicant provided the following additional response to DSER Open Item 13.3-1a, regarding TSC habitability:

> Westinghouse will revise DCD [Tier 2, Section] 9.4.1.2.3.1 as identified in the "Design Control Document (DCD) Revision:" portion of this response to address the NRC comment. DCD [Tier 2, Section] 9.4.1.2.3.1 has also been revised to clarify that in the event of a loss of the plant ac electrical system, the VBS supplemental air filtration system can be manually transferred to the onsite standby diesel generators.

The staff reviewed DCD Tier 2, Section 9.4.1.2.3.1 and noted that it has been revised to include the following under Abnormal Plant Operation:

> ...The main control room/technical support center HVAC equipment and ductwork that form an extension of the main control room/technical support center pressure boundary limit the overall infiltration (negative operating pressure) and exfiltration (positive operating pressure) rates to those values shown in [DCD Tier 2,] Table 9.4.1-1. Based on these values, the system is designed to maintain personnel doses within allowable

> General Design Criteria (GDC) 19 limits during design basis accidents in both the main control room and the technical support center.
>
> If ac power is unavailable for more than 10 minutes or if "high-high" particulate or iodine radioactivity is detected in the main control room supply air duct, which would lead to exceeding GDC 19 operator dose limits, the protection and safety monitoring system automatically isolates the MCR from the normal main control room/technical support center HVAC subsystem by closing the supply, return, and toilet exhaust isolation valves. Main control room habitability is maintained by the main control room emergency habitability system, which is discussed in [DCD Tier 2,] Section 6.4.

The staff finds this to be acceptable. Therefore, Open Item 13.3-1.a is resolved.

13.3.3.3.4 Isolation of MCR from TSC

In DCD Tier 2, Section 18.8.3.5, the applicant states that "[t]he TSC complies with the habitability requirements of Reference 27 [i.e., Supplement 1 to NUREG-0737] when electrical power is available." The reference to "when electrical power is available" is but one, of two, triggering events that would automatically isolate the MCR from the TSC. The second triggering event is "high-high particulate or iodine radioactivity in MCR air supply duct" (see DCD Tier 2, Section 6.4.4, "System Safety Evaluation"). The second triggering event was not reflected in a previous version of DCD Tier 2, Section 3.1.2, "Protection by Multiple Fission Product Barriers," which stated under Criterion 19, "Control Room," that "[i]f the normal main control room ventilation system is inoperable or if no ac power sources are available, the emergency control room habitability system automatically isolates the main control room and provides operator habitability requirements." If, for example, electrical power was available, while at the same time high-high particulate or iodine radioactivity was in the MCR air supply, the MCR would automatically isolate from the TSC. As such, the TSC would no longer be able to ensure compliance with the radiological protection requirements of GDC 19 and, therefore, the TSC would be unable to comply with the radiological habitability criteria of Supplement 1 to NUREG-0737 (i.e., Reference 27). Hence, the statement that the TSC complies with the habitability requirements of Supplement 1 to NUREG-0737 when electrical power is available was considered incomplete.

Addressing this concern, the applicant stated the following in its additional response to RAI 472.003:

> Should a "high-high" radiation signal or if a station blackout of more than 10 minutes occur, the VBS stops, isolates the MCR envelop and the VES begins operation to protect the MCR operators. If the system has power and is operating, it will prevent a "high-high" radiation signal. This is the reason DCD [Tier 2, Section] 18.8.3.5 states, "The TSC complies with the habitability requirements of Reference 27 [i.e., Supplement 1 to NUREG-0737] when electrical power is available."

This response was somewhat confusing. Either a high-high radiation signal or loss of power can trigger the isolation of the MCR envelop. This means that isolation can only occur on a

high-high radiation signal, even without loss of power. The statement that "[i]f the system has power and is operating, it will prevent a 'high-high' radiation signal" implies that a high-high radiation signal will never occur, except upon loss of power. The high-high radiation signal as a trigger to automatically isolate the MCR is, therefore, not needed, since the isolation already occurs upon loss of power. Subsequent high-high radioactivity would be inconsequential because the MCR would have already been isolated from the TSC upon loss of power, with potential loss of TSC habitability. The staff requested that the applicant resolve these habitability concerns. This was Open Item 13.3-1.b in the DSER.

In response to DSER Open Item 13.3-1.b, the applicant stated in its July 7, 2003, letter the following.

> As stated in the response to DSER Open Item 13.3-1.a., Westinghouse believes that AP1000 meets all applicable requirements and guidance associated with providing TSC habitability. As for VBS operation, Westinghouse provides the following discussion, which hopefully will clarify how the system, including isolation signals, is intended to function.
>
> The only events that would shutdown VBS would be a loss of power or multiple failures to the redundant systems. These events are no different than the events that would cause the HVAC systems serving the TSC in a conventional plant to shutdown. A "high-high" radiation signal would not occur if VBS is operating properly. If VBS is operating properly, it is filtering the air, as well as providing a positive pressure in both the MCR and the TSC which precludes a "high-high" signal from being generated. In the case where there is a loss of power, VBS would isolate the MCR after a period of 10 minutes. The 10 minute delay allows for the high probability that the on-site standby diesel generators will start, thereby restoring power to the plant and to VBS. The delay also minimizes isolating the control room and actuating VES when it is not necessary. Should there be a coincident high radiation event during the loss of power event however, VBS would not delay 10 minutes, but would instead immediately isolate the main control room. Therefore, the only time that the "high-high" isolation is "needed" is in the 10 minute period following a loss of power to the VBS. It is however good engineering practice to provide diverse parameters to actuate safety systems. Thus, the statements in the DCD, which identify that isolation of the MCR envelope can occur with either a "high-high" radiation signal or loss of power and; that the TSC complies with the habitability requirements of Supplement 1 to NUREG-0737 when electrical power is available are correct and consistent with the design.
>
> Westinghouse is not proposing specific word changes to the DCD at this time to address VBS operation. However, we are amenable to such word changes if it helps to resolve this issue.

In applicant's July 7, 2003, letter (above) they stated that "[s]hould there be a coincident high radiation event during the loss of power event however, VBS would not delay 10 minutes, but would instead immediately isolate the main control room." The staff indicated in the July 29, 2003, telephone conference with applicant that this statement seemed to indicate that there was an additional (i.e., third), previously unidentified, triggering event (for MCR isolation/VES

actuation). The applicant clarified at that time that the "high radiation event" meant a coincident "high-high" radioactivity signal; and not the "high" gaseous radioactivity detected signal in the MCR supply air duct (as described in DCD Tier 2, Section 9.4.1.2.3.1, under "Abnormal Plant Operation"), which would automatically start the pressurization of the MCR and TSC. This was reflected in applicant's July 31, 2003, letter where applicant stated the following.

> Westinghouse will [revise] the DCD as identified in the "Design Control Document (DCD) Revision:" portion of this response to improve the consistency of the description of the VES triggering events. Please note that there is no "third" triggering event leading to the actuation of VES. The "high radiation event" referred to in our earlier response to the DSER open item and contained in the phrase "a coincident high radiation event during the loss of power event" is not meant to describe actuation logic, but rather a generic condition in which high radiation exists.

The applicant committed to the following DCD Revisions:

DCD Tier 2, Section 1.9.4.2.3, "New Generic Issues," Issue 83 - Control Room Habitability; revise the 1st and 2nd paragraphs under AP1000 Response as follows:

> Habitability of the main control room is provided by the main control room/technical support center HVAC subsystem of the nonsafety-related nuclear island nonradioactive ventilation system (VBS). If ac power is unavailable for more than 10 minutes or if "high-high" particulate or iodine radioactivity is detected in the main control room supply air duct, which would lead to exceeding General Design Criteria 19 operator dose limits, the protection and safety monitoring system automatically isolates the main control room and operator habitability requirements are then met by the main control room emergency habitability system (VES). The safety-related main control room emergency habitability system supplies breathable quality air for the main control room operators while the main control room is isolated.
>
> In the event of external smoke or radiation release, the nonsafety-related nuclear island nonradioactive ventilation system provides for a supplemental filtration mode of operation, as discussed in [DCD Tier 2,] Section 9.4. In the unlikely event of a toxic chemical release, the safety-related main control room emergency habitability system has the capability to be manually actuated by the operators. Further, a 6-hour supply of self-contained portable breathing equipment is stored inside the main control room pressure boundary.

DCD Tier 2, Section 3.1.2, "Protection by Multiple Fission Product Barriers," Criterion 19 - Control Room; revise the 3rd and 4th paragraphs under AP1000 Compliance as follows:

> The main control room is shielded by the containment and auxiliary building from direct gamma radiation and inhalation doses resulting from the postulated release of fission products inside containment. Refer to Chapter 15 for additional information on accident conditions. The main control room/technical support center HVAC subsystem of the nuclear island nonradioactive ventilation system (VBS) allows access to and occupancy of the main control room under accident conditions as described in [DCD Tier 2,

Section] 9.4.1. Sufficient shielding and the main control room/technical support center HVAC subsystem provide adequate protection so that personnel will not receive radiation exposure in excess of 5 rem whole-body or its equivalent to any part of the body for the duration of the accident.

If ac power is unavailable for more than 10 minutes or if "high-high" particulate or iodine radioactivity is detected in the main control room supply air duct, which would lead to exceeding General Design Criteria 19 operator dose limits, the protection and safety monitoring system automatically isolates the main control room and operator habitability requirements are then met by the main control room emergency habitability system (VES). The main control room emergency habitability system also allows access to and occupancy of the main control room under accident conditions. The emergency main control room habitability system is designed to satisfy seismic Category I requirements as described in [DCD Tier 2,] Section 3.2; the system design is described in [DCD Tier 2,] Section 6.4.

DCD Tier 2, Section 6.4, "Habitability Systems"; revise the 3rd paragraph as follows:

If ac power is unavailable for more than 10 minutes or if "high-high" particulate or iodine radioactivity is detected in the main control room supply air duct, which would lead to exceeding General Design Criteria 19 operator dose limits, the protection and safety monitoring system automatically isolates the main control room and operator habitability requirements are then met by the main control room emergency habitability system (VES). The main control room emergency habitability system is capable of providing emergency ventilation and pressurization for the main control room.

DCD Tier 2, Section 6.4.3.2, "Emergency Mode"; revise the 1st paragraph as follows:

Operation of the main control room emergency habitability system is automatically initiated by either of the following conditions:

- "High-high" particulate or iodine radioactivity in the main control room supply air duct
- Loss of ac power for more than 10 minutes

DCD Tier 2, Section 6.4.4 "System Safety Evaluation"; revise the 3rd from last paragraph as follows:

Automatic transfer of habitability system functions from the main control room/technical support center HVAC subsystem of the nuclear island nonradioactive ventilation system to the main control room emergency habitability system is initiated by either of the following conditions:

- "High-high" particulate or iodine radioactivity in MCR air supply duct
- Loss of ac power for more than 10 minutes

DCD Tier 2, Section 9.4.1.2.3.1, “Main Control Room/Technical Support Center HVAC Subsystem”; revise the last sentence of the 2nd paragraph under Abnormal Plant Operation as follows: (Note: The second to last sentence is also shown below. It has no changes but is included for contextual purposes only.)

> The main control room/technical support center HVAC equipment and ductwork that form an extension of the main control room/technical support center pressure boundary limit the overall infiltration (negative operating pressure) and exfiltration (positive operating pressure) rates to those value shown in [DCD Tier 2,] Table 9.4.1-1. Based on these values, the system is designed to maintain personnel doses within allowable [GDC] 19 limits during design basis accidents in both the main control room and the technical support center.

DCD Tier 2, Section 9.4.1.2.3.1; revise the last sentence of the 3rd paragraph under Abnormal Plant Operation as follows:

> If ac power is unavailable for more than 10 minutes or if “high-high” particulate or iodine radioactivity is detected in the main control room supply air duct, which would lead to exceeding GDC 19 operator dose limits, the protection and safety monitoring system automatically isolates the main control room from the normal main control room/technical support center HVAC subsystem by closing the supply, return, and toilet exhaust isolation valves. Main control room habitability is maintained by the main control room emergency habitability system, which is discussed in [DCD Tier 2,] Section 6.4.

DCD Tier 2, Section 9.4.1.2.3.1; revise the last sentence of the 3rd to last paragraph under Abnormal Plant Operation as follows:

> Power is supplied to the main control room/technical support center HVAC subsystem by the plant ac electrical system. In the event of a loss of the plant ac electrical system, the main control room/technical support center ventilation subsystem can be transferred to the onsite standby diesel generators.

DCD Tier 1, Section 2.7.1, “Nuclear Island Nonradioactive Ventilation System”; revise the last sentence of 1st paragraph under Design Description as follows:

> In addition, the VBS isolates the HVAC penetrations in the main control room boundary on “high-high” particulate or iodine radioactivity in the main control room supply air duct or on a loss of ac power for more than 10 minutes. This action supports operation of the main control room emergency habitability system (VES).

The above proposed revisions clarify the details associated with the VES triggering events and provide for consistency of the descriptions throughout the document. The staff has verified that these revisions have been incorporated in the DCD. As such, the staff finds this to be acceptable. Therefore, Open Item 13.3-1.b is resolved.

Conduct of Operations

13.3.3.3.5 TSC Evacuation

Because of the unique design of the AP1000, the habitability system for the TSC is not the same as for the MCR under all conditions. At currently operating reactors, the TSC habitability system is either the same as for the control room, or the TSC has been provided a separate habitability system. At these sites, should the TSC become uninhabitable, occupants are usually evacuated to either the control room or another location onsite where habitability can be established. Not having the TSC in the same habitability envelope as the MCR, as discussed above, increases the likelihood that the TSC will have to be evacuated due to either loss of ac power sources, or high-high particulate or iodine radioactivity in the MCR air supply.

In DCD Tier 2, Section 18.8.3.5 the applicant had stated that should TSC habitability be challenged, TSC personnel and functions would be transferred to the EOF where habitability is not dependent on plant systems, and with communication and data transfer links to the MCR to provide essential exchange of information. Consequently, the EOF would have to be activated and staffed early, in order to ensure that the functions and support provided to the MCR by the TSC are not impeded. This proposed arrangement was reflected in an earlier version of DCD Tier 2, Section 13.3.1 with the following COL information item (i.e., COL action item).

> Combined License applicants referencing the AP1000 certified design will address the activation of the emergency operations facility consistent with current operating practice and NUREG-0654/FEMA-REP-1 except for a loss of offsite power and loss of all onsite AC power. For this initiating condition, the Combined License applicant shall immediately activate the emergency operations facility rather than bringing it to a standby status.

In regard to TSC communications, DCD Tier 2, Section 1.8, “Interfaces for Standard Design,” states that communications systems and equipment outside the annex building (which includes the TSC) are site-specific elements and are outside the scope of the AP1000 standard plant, and that the DCD is based upon the COL applicant providing adequate external communications.

The staff does not agree with this approach because the physical location of the EOF was not addressed, as it related to the EOF serving as an alternate TSC. In addition, the distinction between transferring the TSC plant management function to the EOF upon loss of TSC habitability, rather than to the MCR (per Section 2.6 of NUREG-0696), was not discussed.

In the applicant’s additional response to RAI 472.003 (Revision 1), the use of EOF as an alternate TSC was justified by the capabilities of the EOF, as well as when it would be activated. In addition, the applicant stated that the EOF design, including location, EP and communications is the COL applicant’s responsibility. Staff responded in the DSER, saying that the TSC design requirements could not be ignored based on unknown compensatory measures, and that if the EOF is the alternate TSC, its location would need to be evaluated against the following guidance criteria from Section 2.2 of NUREG-0696.

> The onsite TSC is to provide facilities near the control room for detailed analyses of plant conditions during abnormal conditions or emergencies by trained and competent

> technical staff. During recent events at nuclear power plants, telephone communications between the facilities were ineffective in providing all of the necessary management interaction and technical information exchange. This demonstrates the need for face-to-face communications between TSC and control room personnel. To accomplish this, the TSC shall be as close as possible to the control room, preferably located within the same building. The walking time from the TSC to the control room shall not exceed 2 minutes. This close location will facilitate face-to-face interaction between control room personnel and the senior plant manager working in the TSC. This proximity also will provide access to information in the control room that is not available in the TSC data system.

Resolution of the above discussion, pertaining to the TSC habitability and utilization of the EOF as an alternate TSC, was Open Item 13.3-2 in the DSER.

In its July 7, 2003, response to Open Item 13.3-2, the applicant stated the following:

> As stated in the response to DSER Open Item 13.3-1, Westinghouse believes that AP1000 meets all applicable requirements and guidance associated with providing TSC habitability. Upon re-reviewing the regulations and guidance associated with the transfer of TSC functions in the event that the TSC becomes uninhabitable, Westinghouse will revise the DCD to be consistent with the guidance of NUREG-0696, Section 2.6, "Habitability." In that case, the TSC plant management function will be transferred to the main control room. The EOF will not be used as an alternate TSC.
>
> Also, as the TSC personnel and functions are not going to be transferred to the EOF, the COL requirement to activate the EOF when both onsite and offsite ac power is lost will be removed from the DCD. The AP1000 DCD will be revised as shown below in the, "Design Control Document (DCD) Revision" section of this open item.

The last paragraph of DCD Tier 2, Section 13.3, was revised as follows:

> Staffing of the emergency operations facility occurs consistent with current operating practice and with revision 1 of NUREG-0654/FEMA-REP-1.

The 2nd paragraph of DCD Tier 2, Section 13.3.1, "Combined License Information Item," was revised as follows:

> Combined license applicants referencing the AP1000 certified design will address the activation of the emergency operations facility consistent with current operating practice and NUREG-0654/FEMA-REP-1.

This is COL Action Item 13.3.3.3.5-1.

Conduct of Operations

The 7th paragraph of DCD Tier 2, Section 18.8.3.5, was revised as follows:

> Should habitability be challenged within the TSC due to lack of cooling or a high radiation level resulting from a beyond-design-basis accident, the plant management function of the TSC is transferred to the main control room.

The 8th [9th] paragraph of DCD Teir 2, Section 18.8.3.5, was revised as follows:

> The combined license applicant is responsible for the EOF design, including the specification of its location ([DCD Tier 2, Section] 18.2.6) and emergency planning, and associated communication interfaces among the main control room, the TSC, and the EOF (Section 13.3).

Finally, the 11th (i.e. next to last) paragraph of DCD Tier 2, Sec 18.8.3.5 was deleted.

The above proposed revisions adequately address the possible evacuation of the TSC. In addition, the associated TSC habitability issue is adequately addressed above. The staff verified the changes had been incorporated into the DCD. As such, the staff finds this to be acceptable. Therefore, Open Item 13.3-2 is resolved.

13.3.3.3.6 Summary of TSC Habitability Issues

The staff concludes that the information provided in the DCD pertaining to habitability of the TSC is consistent with the guidance criteria identified in RG 1.101, which endorses Revision 1 of NUREG-0654/FEMA-REP-1, and through it NUREG-0696, NUREG-0737, and Supplement 1 to NUREG-0737. As such, the staff finds that this meets the applicable requirements of 10 CFR 50.34(f)(2)(xxv), 10 CFR 50.47(b)(8) and (b)(11), and Subsection IV.E.8 of Appendix E to 10 CFR Part 50.

13.3.3.4 Postaccident Sampling and Analysis

In accordance with 10 CFR 50.47(b)(9), the COL applicant must employ adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition. To address this regulation, the NRC has concluded that source term information should be obtained and analyzed promptly to continuously assess and refine dose assessments and confirm or modify initial protective action recommendations.

The requirements of 10 CFR 52.79(b) state that a COL application must contain the technically relevant information required of applicants for an operating license under 10 CFR 50.34. The requirements of 10 CFR 50.34(f)(2)(viii) state that the COL applicant must provide a capability to promptly obtain and analyze samples from the reactor coolant system and containment that may contain accident source term radioactive materials, without radiation exposures to any individual exceeding 0.05 Sv (5 rem) to the whole body or 0.5 Sv (50 rem) to the extremities. Materials to be analyzed and quantified include certain radionuclides that are indicators of the degree of core damage (e.g., noble gases, radioiodines and cesiums, and nonvolatile isotopes), hydrogen in the containment atmosphere, dissolved gases, chloride, and boron concentrations.

13.3.3.4.1 Model Safety Evaluation

On October 31, 2000, the NRC published a Federal Register notice (65 FR 65018), entitled "Notice of Availability for Referencing in License Amendment Applications—Model Safety Evaluation on Technical Specification Improvement to Eliminate Requirements on Post Accident Sampling Systems Using the Consolidated Line Item Improvement Process." The model safety evaluation states that the information provided by the PASS, described in NUREG-0737, "Clarification of TMI Action Plan Requirements," is either unnecessary or is effectively provided by other indicators of process parameters or measurement of radiation levels. Sampling of various radionuclides is not required to support emergency response decisionmaking during the initial phases of an accident because the information provided by PASS is either unnecessary or is effectively provided by other indications of process parameters or measurement of radiation levels. Therefore, it is not necessary to have dedicated equipment to promptly obtain the various samples identified in the model safety evaluation.

However, information about the radionuclides existing postaccident could be of significant benefit in addressing public concerns and planning for long-term recovery operations. In addition, radionuclide sampling information could also be useful in classifying certain types of events that could cause fuel damage without having an indication of overheating on core exit thermocouples. Licensees could satisfy this function by developing contingency plans to describe existing sampling capabilities and what action (e.g., assembling temporary shielding) may be necessary to obtain and analyze highly radioactive samples from the reactor coolant system, containment sump, and containment atmosphere. These contingency plans must be available for use by a licensee during an accident. Finally, the model safety evaluation states that each licensee should verify that it has, and will make a regulatory commitment to maintain (or make a regulatory commitment to develop and maintain), contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, containment sump, and containment atmosphere.

DCD Tier 2, Section 1.9.5.2.9, "Post-Accident Sampling System," states that the PASS is a subsystem of the primary sampling system and that the primary sampling system is designed to conform to the guidelines of the model safety evaluation report on eliminating PASS requirements from technical specifications for operating plants. DCD Tier 2, Section 1.9.3, "Three Mile Island Issues," under (2)(viii), "Post-Accident Sampling (NUREG-0737 Item II.B.3)," states that the AP1000 sampling design is consistent with the approach in the model safety evaluation report and not the guidance outlined in NUREG-0737 and RG 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident" (Revision 3, May 1983). The primary sampling system design is consistent with contingency plans to obtain and analyze highly radioactive postaccident samples from the reactor coolant system, the containment sump, and the containment atmosphere.

DCD Tier 2, Section 9.3.3.1.2.2, "Post-Accident Sampling," states that the primary sampling system does not include specific postaccident sampling capability. However, there are contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, containment sump, and containment atmosphere. These plans include the procedures to

analyze, during the later stages of accident response, reactor coolant for boron, containment atmosphere for hydrogen and fission products, and containment sump water for pH. The primary means of containment atmosphere hydrogen analysis is the hydrogen analyzer, which is not part of the postaccident sampling capabilities.

An earlier version of DCD Tier 2, Section 13.3.1, had provided the following COL information item (i.e., COL action item):

> To initially and continuously assess the course of an accident for emergency response purposes, Combined License applicants referencing the AP1000 certified design will address the capability for promptly obtaining and analyzing grab samples of reactor coolant and containment atmosphere and sump in accordance with the guidance of Item II.B.3 of NUREG-0737.

This COL information item, which was removed from subsequent AP1000 DCD Tier 2, Section 13.3.1 revisions, was the same as that which was provided in Section 13.3 of the standard safety analysis report (SSAR) for the Westinghouse AP600 standard design and appears as COL Action Item 13.3-3 in the NRC's AP600 FSER in September 1998. Appendix C to 10 CFR Part 52, entitled "Design Certification Rule for the AP600 Design," was published in the Federal Register on December 23, 1999 (64 FR 72002, 72015). The NRC staff issued the FSER related to certification of the AP600 standard plant design in September 1998 (NUREG-1512, 63 FR 48772). At that time, the PASS guidance in NUREG-0737 (Section II.B.3) was applicable. As discussed above, the model safety evaluation published on October 31, 2000, eliminated various emergency response PASS sampling requirements in Section II.B.3 of NUREG-0737. As such, this COL action item in DCD Section 13.3.1 did not reflect the model safety evaluation, and was inconsistent with the other DCD sections that refer to the model safety evaluation and its acceptance of the use of contingency plans.

13.3.3.4.2 Radiation Exposure

DCD Tier 2, Section 9.3.3, "Primary Sampling System," states that the primary sampling system includes equipment to collect representative samples of the various process fluids, including reactor coolant system and containment air, in a manner that adheres to as low as is reasonably achievable (ALARA) principles during normal and post-accident conditions. In addition, DCD Tier 2, Section 12.4.1.8, "Post-Accident Actions," states the following:

> Requirements of 10 CFR 52.79(b) relative to plant area access and post-accident sampling (10 CFR 50.34(f)(2)(viii)[)] are included in [DCD Tier 2,] Section 1.9.3. If procedures are followed, the design prevents radiation exposures to any individual from exceeding 5 rem [0.05 Sv] to the whole body or 50 rem [0.5 Sv] to the extremities.

The staff concludes that the information provided in the AP1000 DCD pertaining to controlling radiation exposures to individuals involved in postaccident sampling is acceptable and meets the applicable requirements of 10 CFR 50.34(f)(2)(viii), 10 CFR 50.47(b)(8), 10 CFR 50.47(b)(9), and 10 CFR 50.47(b)(11).

13.3.4 Overall Emergency Planning Findings

The following sections summarize the EP findings.

13.3.4.1 Emergency Planning Responsibilities (see Section 13.3.2 of this report)

The staff concludes that the COL applicant referencing the AP1000 design will be the primary party addressing EP, and that EP information submitted in the application will largely depend on plant- and site-specific characteristics. As such, the staff finds that COL Action Item 13.3-1 is acceptable, in that it complies with the requirements set forth in 10 CFR 52.79(d) and the applicable portions of 10 CFR Part 50. It is consistent with the extent to which certain EP design features, facilities, functions, and equipment are more appropriately addressed by the COL applicant.

13.3.4.2 General Description of Facilities (see Section 13.3.3.1 of this report)

The staff concludes that the information provided in the DCD pertaining to the TSC, OSC, and decontamination room is consistent with the guidance identified in RG 1.101. As such, the staff finds this information meets the applicable requirements of 10 CFR 50.34(f)(2)(xxv), 10 CFR 50.47(b)(8), 10 CFR 50.47(b)(11), and Subsections IV.E.3 and IV.E.8 to 10 CFR Part 50, Appendix E.

13.3.4.3 Technical Support Center Size (see Section 13.3.3.2 of this report)

The staff concludes that the information provided in the DCD pertaining to TSC size is consistent with guidance identified in RG 1.101. Specifically, the size conforms with the specifications of NUREG-0696 and is sufficient to accommodate and support NRC and licensee predesignated personnel, equipment, and documentation, in conformance with Supplement 1 to NUREG-0737. As such, the staff finds that this information meets the applicable requirements of 10 CFR 50.47(b)(8) and Subsection IV.E.8 to 10 CFR Part 50, Appendix E.

13.3.4.4 Technical Support Center Habitability (see Section 13.3.3.3 of this report)

The staff concludes that the information provided in the DCD pertaining to habitability of the TSC is consistent with the guidance identified in RG 1.101. As such, the staff finds that the DCD meets the applicable requirements of 10 CFR 50.34(f)(2)(xxv), 10 CFR 50.47(b)(8) and (b)(11), and Subsection IV.E.8 to 10 CFR Part 50, Appendix E.

13.3.4.5 Postaccident Sampling and Analysis - Radiation Exposure (see Section 13.3.3.4.2 of this report)

The staff concludes that the information provided in the AP1000 DCD pertaining to controlling radiation exposures to individuals involved in postaccident sampling is acceptable and meets the applicable requirements of 10 CFR 50.34(f)(2)viii), 10 CFR 50.47(b)(8), 10 CFR 50.47(b)(9), and 10 CFR 50.47(b)(11).

13.4 Operational Review

In DCD Tier 2, Section 13.4, the applicant stated that the COL applicant is responsible for operational review. In DCD Tier 2, Section 13.4.1, the applicant included a statement that a COL applicant referencing the AP1000 certified design will address each operational review. The staff finds this to be acceptable. This is COL Action Item 13.4-1.

13.5 Plant Procedures

In DCD Tier 2, Section 13.5, the applicant stated that the COL applicant is responsible for plant procedures. The applicant referred to WCAP-14690, Revision 1, "Designer's Input to Procedure Development for the AP600," issued June 1997, which provides input to the COL applicant for developing plant procedures, including information on the development and design of the AP1000 emergency response guidelines and emergency operating procedures. In DCD Tier 2, Section 13.5.1, the applicant stated that a COL applicant referencing the AP1000 certified design will address plant procedures for the following areas:

- normal operation
- abnormal operation
- emergency operation
- refueling and outage planning
- alarm response
- maintenance, inspection, test, and surveillance
- administration
- operation of post-72-hour equipment

The staff finds this to be acceptable. This is COL Action Item 13.5-1.

13.6 Security

The staff evaluated the security features of the AP1000 design as described in (1) AP1000 Security Assessment, Revision 1, March 2004 (safeguards information) and (2) DCD Tier 2, Section 1.2, "General Plant Description." The application was reviewed against the following requirements:

- 10 CFR 73.34, "Contents of applications; technical information"

- 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage"

- 10 CFR 70.51, "Material balance, inventory, and records requirements"

The staff had not completed its review of the applicant's security program when the DSER was issued. Specifically, the staff had not reviewed the AP1000 Security Assessment Revision 1,

dated March 2004. Completion of the security review was identified as Open Item 13.6-1 in the DSER.

13.6.1 Preliminary Planning

DCD Tier 2, Section 13.6.13.1, "Security Plans, Organization, and Testing," states that the comprehensive security plan is the responsibility of the COL applicant. The staff finds this approach acceptable. Because the COL application must include a physical security plan, safeguards contingency plan, and guard training and qualification plan, a preliminary planning submission is not necessary for the design certification.

While not required for the AP1000 design certification process, the applicant recognized the new security requirements that the NRC imposed by order on operating power reactors and assessed the AP1000 design against these requirements. DCD Tier 2, Section 13.6.1, "Preliminary Planning," states the following:

> As a result of the events of September 11, 2001, the NRC issued orders to power reactor licensees titled 'Interim Compensatory Measures [ICM's] for High Threat Environment' ([DCD] Reference 4). On April 29, 2003, the NRC also issued a revised 'Design Basis Threat [DBT] for Radiological Sabotage for Operating Power Reactors' ([DCD] Reference 5). An assessment of the impact of [the orders and ICMs] is provided in the AP1000 Security Assessment ([DCD] Reference 6) that has been submitted under separate cover in accordance with 10 CFR 73.21. The AP1000 Security Assessment Document provides an assessment of how References 4 and 5 are addressed in the AP1000, and identifies the applicable requirements in References 4 and 5 that are addressed by the Combined License applicant for an AP1000.

The staff reviewed the information and positions taken in the noted AP1000 Security Assessment, and found this approach to be acceptable. Because the COL application must include physical security, safeguards contingency, and training and qualification plans, many of the security requirements in 10 CFR 73.55 are not required for the design certification.

13.6.2 Security Plan

DCD Tier 2, Section 13.6.2,"Security Plan," states the following:

> The comprehensive physical security program is the responsibility of the Combined License applicant and will be addressed in the security plan, contingency plan, and guard training plan provided by the Combined License applicant.

The staff finds this approach to be acceptable. The staff noted that a future COL applicant must address the physical security contingency and guard training and qualification plan in accordance with 10 CFR 50.34. This is COL Action Item 13.6.2-1.

Conduct of Operations

The COL applicant must provide site-specific physical security, contingency response, and guard training and qualification plans in accordance with 10 CFR 50.34 and 10 CFR 73.55. DCD Tier 2, Section 13.6.13.1, states the following:

> At least 60 days before loading fuel, the Combined License applicant will confirm that the security systems and programs described in its physical security plan, safeguards contingency plan, and training and qualification plan have achieved operational status and are available for the [NRC] staff's inspection. Operational status means that the security systems and programs are functioning. The determination that operational status has been achieved will be based on tests conducted under realistic operating conditions of sufficient duration to demonstrate that :
>
> - the equipment is operating;
> - procedures have been developed, approved, and implemented; and
> - personnel responsible for security operations and maintenance have been appropriately trained and have demonstrated their capability to perform their assigned duties and responsibilities.

The staff finds this approach to be acceptable. The COL applicant must (1) address the testing and maintenance in accordance with 10 CFR 73.55(g), (2) address general criteria for security personnel in accordance with 10 CFR Part 73, Appendix B, (3) develop security procedures in accordance with 10 CFR 73.55(b)(3) and (4) ensure only appropriately trained persons perform security job duties in accordance with 10 CFR 73.55(b)(4)(i). This is COL Action Item 13.6.2-2.

13.6.3 Plant Protection System

DCD Tier 2, Section, 13.6.3.1, "Introduction," states the following:

> A physical protection system and security organization is provided to protect the AP1000 from radiological sabotage, as required by 10 CFR 73.55. To achieve this objective, the physical protection system:
>
> - Includes a security organization
> - Locates vital equipment within vital areas
> - Controls points of personnel, vehicle, and material access into the vital areas,
> - Annunciates alarms in a continuously manned central alarm station and at least one other continuously manned alarmed station that is physically separated from the central alarm station
> - Provides for continuous communications between the security officers and the continuously manned alarmed stations

- Provides for testing and maintenance of the alarms, communications, and physical barriers

- Responds to threats of radiological sabotage in accordance with a developed contingency plan.

The staff finds this approach to be acceptable because a future COL applicant must address these requirements in its comprehensive security plan. All of these requirements are covered by other COL action items.

13.6.4 Physical Security Organization

DCD Tier 2, Section 13.6.4, "Physical Security Organization," states the following:

> The description of the site-specific physical security organization is the responsibility of the Combined License applicant. The size and capabilities of the physical security organization's armed response team are established by a vulnerability analysis and protective strategy development prepared by the Combined License applicant.

The staff finds this approach to be acceptable. The applicant for a combined license must address the physical security organization, as required by 10 CFR 73.55(b), in its comprehensive security plan, submitted in accordance with 10 CFR 50.34 and 10 CFR Part 73. This is COL Action Item 13.6.4-1.

13.6.5 Physical Barriers

13.6.5.1 Protected Area

DCD Tier 2, Section 13.6.5.1, "Protected Area," states the following:

> The definition of the protected area is the responsibility of the Combined License applicant.

The staff finds this approach to be acceptable. The COL applicant must define the parameters of the protected area and isolation zones as required by 10 CFR 73.55(c)(2) through (c)(3). This is COL Action Item 13.6.5.1-1.

13.6.5.2 Vital Areas

DCD Tier 2, Section 13.6.5.2, "Vital Areas," states the following:

> Vital equipment is located within designated vital areas. The AP1000's vital equipment is further encompassed by a shield building, a reinforced concrete and steel structure surrounding containment, and by portions of the reinforced concrete perimeter and interior wall of the auxiliary and annex buildings. Access points to the vital areas are locked and alarmed with active intrusion detection

> systems. The vital areas and a listing of the vital equipment are provided in [DCD] Reference 6.

The plant layout drawings in DCD Tier 2, Section 1.2, "General Plant Description," and the vital area designations on the layout drawings in the AP1000 Security Assessment, Revision 1, indicate proposed vital areas that include the MCR and the central alarm station. These drawings also designate the security power supply to be located within a vital area.

The staff finds that these measures satisfy the requirements of 10 CFR 73.55(c)(1), (e)(1) and (d)(7)(i)(D) and are acceptable.

13.6.5.3 Bullet Resisting Barriers

DCD Tier 2, Section 13.6.5.3, "Bullet Resisting Barriers," states the following:

> The doors, walls, floor, and ceiling of the main control room and the continuously manned alarm stations are designed to meet the bullet resisting criteria of UL 752, High Power Rifle Rating, including resistance to a level 4 round.

The layout drawings in DCD Tier 2, Figures 1.2-9 and 1.2-18 and Revision 1 to the AP1000 Security Assessment indicate that neither the MCR, central alarm station, nor the secondary alarm station contain windows. The staff finds that these measures satisfy the requirements of 10 CFR 73.55(c)(6) and (e)(1) and are acceptable.

DCD Tier 2, Section 13.6.5.3, further states:

> The Combined License applicant is responsible for the detail design and bullet resistance of the structure that isolates the individual responsible for the last access control function for admission to the protected area.

This is already covered by COL Action Item 13.6.13.2-1.

13.6.5.4 Vehicle Barrier System

DCD Tier 2, Section 13.6.5.4, "Vehicle Barrier System," states the following:

> The Combined License applicant is responsible for the definition, location, and the detailed design of the AP1000 Vehicle Barrier System.

The staff finds this approach to be acceptable. This is COL Action Item 13.6.5.4-1.

13.6.6 Access Requirements

DCD Tier 2, Section 13.6.6, "Access Requirements," states the following:

> Positive control features will be implemented to provide authorization for personnel and vehicles entering the vital areas. The Combined License applicant is responsible for the following access control features:
>
> - means for positive identification of authorized personnel entering the protected and vital areas
> - means for searching individuals, packages, and materials for firearms, explosives, and incendiary devices. This may be accomplished using detection devices such as metal detectors, explosive detectors, and x-ray machines.
>
> The AP1000 design certification scope includes:
>
> - access portals entering the vital areas are identified and unmanned portals are provided with alarm annunciation in the continuously manned alarm stations
> - vital area ingress and egress are designed to interface with other plant requirements and not impair plant operations during emergency conditions.

The staff finds this approach to be acceptable. The COL applicant must address the specific access control measures required by 10 CFR 73.55(d). This is COL Action Item 13.6.6-1.

13.6.7 Detection Aids

DCD Tier 2, Section 13.6.7, "Detection Aids," states the following:

> The design of the detection aids is the responsibility of the Combined License applicant.

The staff finds this approach to be acceptable. The COL applicant must ensure that all detection aids meet all the requirements within 10 CFR 73.55. This is COL Action Item 13.6.7-1.

13.6.8 Security Lighting

DCD Tier 2, Section 13.6.8, "Security Lighting," states the following:

> The AP1000 security lighting is the responsibility of the Combined License applicant.

The staff finds this approach to be acceptable. The COL applicant must ensure that the design of the security lighting meets the requirements of 10 CFR 73.55. This is COL Action Item 13.6.8-1.

13.6.9 Security Power Supply System

DCD Tier 2, Section 13.6.9, "Security Power Supply System," states the following:

> The security equipment that supports critical monitoring functions, such as intrusion detection, alarm assessment, and the security communications system, receives power from the security-dedicated uninterruptible power supply (UPS) system. Switchover to the uninterruptible power supply system is automatic and does not cause false alarms on annunciation modules. The uninterruptible power supply system is capable of sustaining operation for a minimum of 24 hours. The final design of the security power supply system is the responsibility of the Combined License applicant.

The staff finds this approach to be acceptable. The COL applicant must ensure that the final design of the security power supply system meets the requirements of 10 CFR 73.55(f)(4). This is COL Action Item 13.6.9-1.

13.6.10 Communications

DCD Tier 2, Section 13.6.10, "Communications," states the following:

> The final design of the security communications system will be addressed by the Combined License applicant. Two two-way communications paths are provided between the control room and the alarm stations within the AP1000. A single act of sabotage cannot sever both communications paths. Security force members with responsibilities to respond to acts of sabotage have the capability for continuous two-way communications with the alarm stations and with each other. The centralized communications equipment and radio antennas are located in a controlled area so that they will remain operable during a radiological sabotage event. Non-portable security communications equipment can be powered from the security power supply system so that it remains operable in the event of the loss of normal power.

The staff finds this approach to be acceptable. The COL applicant must ensure that the final design of the security communications system meets the requirements of 10 CFR 73.55(f). This is COL Action Item 13.6.10-1.

13.6.11 Testing and Maintenance

DCD Tier 2, Section 13.6.11, "Testing and Maintenance," states the following:

> The Combined License applicant must address testing and maintenance aspects of the plant security system.

The staff finds this approach to be acceptable. The COL applicant must ensure that testing and maintenance aspects of the plant security system meet the requirements of 10 CFR 73.55(g). This is COL Action Item 13.6.11-1.

13.6.12 Response Requirements

DCD Tier 2, Section 13.6.12, "Response Requirements," states the following:

> The Combined License applicant must address response requirements of the plant security system.

The staff finds this approach to be acceptable. The COL applicant must ensure that response requirements of the plant security system meet the requirements of 10 CFR 73.55(h). This is COL Action Item 13.6.12-1.

13.6.13 Combined License Information Items

13.6.13.1 Vital Equipment

DCD Section 13.6.13.2, "Vital Equipment" states the following:

> Combined License applicants referencing the AP1000 certified design will verify that the as-built location of vital equipment is inside the vital areas identified in Reference 6 [AP1000 Security Assessment].

The AP1000 Security Assessment, dated March 2004, indicates that the location of vital areas is within the DCD scope. The staff verified that the DCD locates the vital equipment within vital areas.

The staff finds the approach provided in the DCD to be acceptable. As required by 10 CFR 73.55(c)(1), vital equipment must be located only in a vital area located within a protected area, necessitating passage through two physical barriers for access. This is COL Action Item 13.6.13.1-1.

13.6.13.2 Plant Security System

DCD Tier 2, Section 13.6.13.3 states the following:

> Combined License applicants referencing the AP1000 certified design will address site-specific information related to the design, maintenance, and testing of the plant security system, including definition of the protected area; definition of control points for personnel, vehicle, and material access into the protected areas; detail design and bullet resistance of the structure that isolates the individual responsible for the last access control function for admission into the protected area; detection and alarm design features; security lighting; security

> power supply including the interfaces to the UPS system; and communication system.

The staff finds this approach to be acceptable. The COL applicant must describe the design features mentioned above in its COL application in sufficient detail for the staff to review their acceptability in light of the applicable requirements of 10 CFR 73.55. This is COL Action Item 13.6.13.2-1.

13.6.13.3 Material Control

A Westinghouse letter dated February 4, 2004, titled "Transmittal of Revised Responses to AP1000 DSER Open Items," addressed material controls. The letter stated, "Combined License applicants referencing the AP1000 certified design must address specific material control measures as required by 10 CFR Part 70 and the guidance provided in Reference 7." Reference 7 is American National Standards Institute (ANSI) N15.8, "Nuclear Material Control Systems for Nuclear Power Plants," issued 1974.

The staff finds this approach to be acceptable. The COL applicant must address specific material control measures as described in 10 CFR 70.51(c). These measures must satisfy the guidance of ANSI N15.8-1974. This is COL Action Item 13.6.13.3-1.

13.6.14 Other Security Issues

DCD Tier 2, Section 1.9.1.3, "Division 5 Regulatory Guides - Materials and Plant Protection," states the following:

> Regulatory Guide 5.12, "General use of Locks in the Protection and Control of Facilities and Special Nuclear Materials," provides guidelines for the selection and use of commercially available locks in the protection and facilities and special nuclear material. The guidance of this RG is considered appropriate for the AP1000 design.

DCD Tier 1, Section 3.3, Item 18, states "[t]he locks utilized for the protection of vital areas are manipulative resistant." Manipulation resistant is a key term to describe the type of locks specified as acceptable for use within the RG 5.12. The staff finds this measure satisfies the general requirement of 10 CFR 73.55(a) and is acceptable.

13.6.15 Conclusions

The staff concluded that there were no design features described in DCD Tier 2, Section 13.6, "Security," which would prevent the establishment and maintenance of an onsite physical protection system and security organization that would have as its objective to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to public health and safety, as required by 10 CFR 73.55. Therefore, Open Item 13.6-1 is resolved.