3.0 Departures Not Requiring Prior NRC Approval

The departures from Tier 2 information summarized in this section of COLA Part 7 do not involve a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications. The departures:

- do not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated
- do not result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated
- do not result in more than a minimal increase in the consequences of an accident previously evaluated
- do not result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated
- do not create a possibility for an accident of a different type than any evaluated previously
- do not create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously
- do not result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered
- do not result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses
- do not result in a substantial increase in the probability of an ex-vessel severe accident such that a particular ex-vessel severe accident previously reviewed and determined to be not credible could become credible
- do not result in a substantial increase in the consequences to the public of a particular ex-vessel severe accident previously reviewed

Therefore, in accordance with Regulatory Guide 1.206, Section C.IV.3.3 and with 10 CFR 52, Appendix A, Section VIII.B.5, these departures do not require prior NRC approval or an exemption from 10 CFR 52, Appendix A.

STD DEP 1.1-1, Type of License Required

The reference ABWR DCD was submitted to receive a design certification. The COL applicant submits a site-specific DCD to receive a Class 103 combined operating license. This departure pertains to administrative matters and does not affect the function of any SSC.

STP DEP 1.1-2, Dual Units at STP 3 & 4

The reference ABWR DCD is based on a single-unit site. Because STP 3 & 4 is a dual-unit project on an existing site, some supporting systems described in the DCD are single systems that support two or more units. In addition, STP 3 & 4 share the main cooling reservoir with STP 1 & 2.

The systems shared by STP 3 & 4 include:

- Fire Protection Water Supply System - A single fire protection pump house and two storage tanks provide water for fire suppression to both units via piping in the yard.
- A common nonsafety-related communication system is required for multi-unit sites to provide plant wide communications.
- Makeup Water Preparation - A common nonsafety-related makeup water preparation system that utilizes a common raw water storage tank and a common demineralized water storage tank will supply water to the makeup water condensate system and makeup water purified system of both units. This system is discussed further in STP DEP 9.2-2.
- Hydrogen Gas Storage Facility - A single nonsafety-related bulk hydrogen gas storage facility will be used to store hydrogen compressed gas cylinders for two units. The bulk hydrogen storage facility will be located at least 100m from any safety-related building or structure to prevent damage to safety-related equipment due to a fire or explosion at the facility.
- An intertie is provided between the plant protection buses at the combustion gas turbines. The tie line has two normally open breakers and is only energized for testing and for emergency operation under station blackout conditions and as needed.
- A common plant grounding grid is used that extends the contact area to ground and meets the resistance-to-ground criterion. The system in electrically interconnected between units.
- Potable Water system is shared between STP 3 and 4 and the Sanitary Treatment system are shared between all four units on site as well as with common buildings. This is discussed further in STP DEP 9.2-8.

These changes establish an equivalent level of plant reliability and performance as described in the reference ABWR DCD. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change does not affect any safety function.

STD DEP 1.2-1, Control Building Annex

The Reactor Internal Pump (RIP) motor-generator sets and associated support components are relocated to a new, non-seismic I Control Building Annex adjacent to the Control Building. This is to prevent the possibility that the 13.8 kV, 5000 HP motor-generator sets could cause adverse EMI/RFI effects on the plant control networks located in the Control Building. This departure creates no new adverse effects and eliminates potential adverse effects that were identified for the standard design.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 1.2-2, Turbine Building

The Turbine Building design has changed because of the following:

- The turbine generator described in the reference ABWR DCD is now obsolete and the replacement will differ dimensionally. The turbine cycle equipment such as feedwater heaters and pumps also differ from the cycle equipment described in the DCD.
- The power generation heat sink described in the DCD (natural draft cooling tower) is being replaced by a cooling reservoir. This affects the sizing of the condenser and circulating water piping. The increase in floor area and addition of equipment as described affect the chiller size and addition/relocation of room coolers. The design now includes condensate booster pumps.
- The DCD medium voltage electrical system design is being replaced by a dual voltage design and requires relocation of major components into and within the Turbine Building.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 1AA-1, Shielding Design Review

Appendix 1AA of the reference ABWR DCD provides the integrated doses for environmental qualification of safety-related equipment. These doses have been re-evaluated in the STP 3 & 4 FSAR using similar regulatory guidance, but incorporating the results of design detailing. The doses for the ECCS pump rooms and the SGTS area increase compared to the original DCD values. Safety-related equipment will be qualified to the increased values as required.

This departure has been evaluated and determined to comply with the requirements of 10 CFR 52, Appendix A, Section VIII.B.5 as described previously. This change affects the conditions but is bounded by the safety analysis.

STD DEP 2.2-5, CRAC2 and MACCS Codes

This departure includes the use of another accident analysis computer code known as MACCS for the analysis of site-specific characteristics in the offsite dose assessment for STP 3 & 4. The reference ABWR DCD references the use of CRAC2, and the FSAR analysis supplements the existing DCD analysis. Since approval of the DCD, offsite dose methodology and computer codes have been improved, with the MACCS code considered the best available code for performing offsite dose analysis. Therefore MACCS is being included along with CRAC2. The NRC has approved the use of the MACCS2 for this type of analysis (NUREG/CR-6613).

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change represents an improvement in safety and has no adverse impact.

STD DEP 3.8-1, Resizing the Radwaste Building

Due to process changes to the radioactive waste treatments described in departures STD DEP 11.2-1 and 11.4-1, the dimensions and design analysis have changed from the DCD. The Radwaste Building minimum bearing capacity, shear wave velocity, and Poisson ratio have been revised to reflect the shallower Radwaste Building embedment.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 3B-1, Equation Error in Containment Impact Load

Reference ABWR DCD Appendix 3B, Section 3B.4.2.3 provides two equations for calculating the pulse duration for a flat target, one of which is:

$$T = (0.0016 \times W)$$

Where:

T= the duration of impact (seconds)

W= the width of the flat structure (meters)

The multiplying factor for W is incorrect because its dimensions are seconds/foot instead of seconds/meter as required in this case. This departure corrects the multiplying factor from 0.0016 seconds/foot to 0.0052 seconds/meter.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 3I-1, Environmental Qualification Conditions (Containment Spray)

The environmental qualification requirements for equipment located in the upper and lower drywell areas include the potential for wetting and submergence based on use of the containment cooling (spray) mode of the RHR system. Equipment located in the lower drywell must be qualified for submergence based on the ability to flood the lower drywell in event of a severe accident scenario. The design of the upper drywell includes provisions to prevent submergence in this area, but the equipment must be capable of performing the respective safety functions before, during, and after the initiation of the containment spray function. The density change and duration more accurately reflects the design parameters for containment spray operation in a post-LOCA environment, and still results in the equipment located in the upper drywell being completely wetted. Thus, there is no decrease in the capability of equipment located in the upper drywell to perform their respective safety functions.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change does not affect any safety or design function.

STD DEP 3I-2, Environmental Qualification - Radiation

This departure revises the “Integrated Dose-Gamma & Beta” values for the main steam tunnel and instrument rack rooms presented in Table 3I-17. The increases in these values are based on current results of post-accident radiation calculations and analysis. Those results showed increases in the integrated accident doses to the affected areas. Table 3I-17 was updated to ensure that equipment located in these rooms will meet their design requirements to operate in a post-accident environment. Therefore, this change ensures continued compliance with the regulatory requirements for safety-related equipment.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 4.5-1, Reactor Materials

Structural materials used in the control rod drive (CRD) mechanisms and reactor internals listed in Section 4.5 have been revised to reflect the actual ABWR design and materials used in production. All the components made from austenitic stainless steels in the original DCD are still made from austenitic stainless steels in the revised listings. In some cases, wrought material is specified instead of cast, or the product form specification has been changed. In some cases a higher strength material is called for (316 or XM-19 instead of 316L). The previous Ni-Cr-Fe Alloy 600 material is replaced with the ASME Code Case N-580-1 material for improved IGSCC resistance. Proprietary materials are identified for some components as well. The description of the experience base for the materials has been updated to no longer exclude Type XM 19 stainless steel and now covers 25 to 30 years. The paragraph discussing non-destructive examination (NDE) of wrought seamless tubular products was revised to delete reference to the peripheral fuel supports, which are not tubular products, and to address the fact that the CRD housings are reactor coolant pressure boundary components (ASME Code, Section III, Class 1) as well as core support structures (Class CS).

For components that are or contain ASME Code, Section III, Class 1 or Class CS components, the materials listed are permitted for use by the ASME Code, and are supplied meeting all applicable requirements of Subsection NB or NG. None of the changes of materials adversely affects the safety function of the component. Where equivalent materials are now listed for CRD components, the equivalent has demonstrated successful application and operation with no impact on design or safety function. Therefore, this departure does not adversely impact 1) any design function, 2) method of performing or controlling a design function, or 3) an evaluation for demonstrating that the intended design function will be accomplished.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change does not affect any safety or design function.

STD DEP 5.2-2, PSI/ISI NDE of the Reactor Coolant Pressure Boundary

A departure from DCD Subsections 5.2.4.2.2 and 5.2.4.3.1 is provided for PSI and ISI of welds in Reactor Coolant System piping to meet the requirements of ASME Section XI, Appendix VIII as mandated by 10 CFR 50.55a, rather than meeting the requirements of Regulatory Guide 1.150, Rev. 1.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 5.4-1, Reactor Water Cleanup System

The flow capacity of the two pumps and two filter demineralizers in the Reactor Water Cleanup System are doubled from 1% of rated feedwater flow to 2%. This will improve system performance, maintainability, and availability. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 5A-1, Delete Appendix on Complying with Regulatory Guide 1.150

This departure deletes the text of Appendix 5A, Method of Compliance for RG 1.150. NRC requirements for performance demonstration of ultrasonic examination of reactor pressure vessels for preservice and inservice inspections once addressed by RG 1.150 will be conducted in accordance with ASME Section XI, Appendix VIII as required by 10 CFR 50.55a. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 5B-1, Residual Heat Removal Flow and Heat Capacity Analysis

The K-Value* for the Residual Heat Removal heat exchangers is increased from 3.69×10^5 W/°C to 4.27×10^5 W/ C because the ultimate heat sink water temperature at STP 3 & 4 is 35°C rather than the ABWR DCD design of 29.4°C and because the limiting event for heat exchanger sizing is now the rapid cooldown required for a 17-day outage in accordance with the Utilities Requirement Document. Previously, the limiting event for heat exchanger sizing was a LOCA. This change improves system

* The K-Value, or K-Factor, is a method of determining the amount of heat transferred per unit of time based on the temperature difference across the heat exchanger without considering the heat exchanger area or other heat exchanger factors.

performance, maintainability, and availability. In addition, the reliability of the RWCU system to remove decay heat in the event that the normal residual decay heat removal is lost will be improved due to the increased capacity.
This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change represents an improvement in safety with no adverse impact and affects the function, but is bounded by the safety analysis.

STD DEP 6.2-3, Containment Penetrations and Isolation

From First-of-a-Kind-Engineering (FOAKE) efforts, design detailing allows further entries to Tables 6.2-7, 6.2-8, and 6.2-9.

- Table 6.2-7 identifies the containment isolation valves associated with the ABWR Primary Containment. Several adjustments to this table were identified during detailed design engineering based on equipment procurement, as well as changes to the equipment design.
- Table 6.2-8 identifies the ABWR Primary Containment Penetrations. During FOAKE, it was determined that this arrangement needed to be changed to meet US mechanical and electrical separation requirements. Changes were also necessary to satisfy electrical load carrying characteristics of currently existing electrical penetration assemblies.
- Table 6.2-9 contains the potential leakage paths from the Primary Containment to the environment. Corrections to this table included fields that were identified as requiring change based on changes to Table 6.2-8.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 6.6-1, Pre-Service and Inservice Inspection and Testing of Class 2 and 3 Components and Piping

Departures from Subsections 6.6.2.1 and 6.6.2.2 of the reference ABWR DCD:

- A sentence in Subsection 6.6.2.1 regarding RHR heat exchangers nozzle having 100% accessibility for PSI during fabrication is deleted because it is no longer applicable.
- A paragraph in subsection 6.6.2.2 indicates restrictions for the use of some piping system configurations to ensure that accessibility for ISI is maintained. However, if some of the restricted piping system configurations are used, an evaluation is required to ensure ISI accessibility is provided.
- A sentence is added for clarification at the end of the Subsection 6.6.2.2 requiring an evaluation to be performed where less than the minimum straight pipe is used.

- The comprehensive plant-specific PSI and ISI program plan will be developed and submitted at least 12 months prior to commercial power operation.
- Access requirements are incorporated in the applicable specifications as an integral part of the design process.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 6C-1, Containment Debris Protection for ECCS Strainers

A departure from Appendix 6C incorporates the new-stacked disk ECCS strainer design per Licensing Topical Report NEDC-32721P-A and guidance from URG. Additional mitigating features, such as use of reflective metal insulation (RMI) for large bore piping, Inservice Inspection Program as a Surveillance Requirement, temporary filters during post-construction system testing, and a foreign material exclusion program are introduced. Section 6C.5 and Tables 6C-1 and 6C-2 have been deleted since they are not applicable to the new strainer design.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but represents an improvement in safety and ensures that the design is bounded by the safety analysis.

STD DEP 7.1-1, References to Setpoints and Allowable Values

The NRC has changed requirements by reformatting the Technical Specifications since the reference ABWR DCD was published. In accordance with current requirements, GE plants can provide a single column format, which consist of only the allowable values (AV). NUREG-1434 provides a detailed discussion on the specifics regarding the new AV single column format. The setpoints are now maintained in plant-controlled documents outside the Technical Specifications. This led to changes in the wording where setpoints or other calculations other than AV appear in the Technical Specifications.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.1-2, ATWS DB for Startup Range Neutron Monitoring

Subsection 7.1.2 of the reference ABWR DCD described the safe shutdown systems I&C and the Neutron Monitoring System I&C. The STP 3 & 4 FSAR provides the following departures:

- DCD Subsection 7.1.2.4.1 states that the alternate and diverse method for inserting control rods is the fine motor control rod drive (FMCRD) electric motors. STP 3 & 4 FSAR states that the alternate method is the Automatic Rod Insertion (ARI) of the CRDS or using the ARI motor run-in function of the RCIS.

- DCD Subsection 7.1.2.4.1 states that the FMCRD motors shall be connected to the emergency diesel generators. The FSAR subsection clarifies that power for the stepping motor driver modules (SMDMs) that control the power to the FMCRD motors derive their power from a bus that can automatically receive power from the EDG, if necessary.
- STP 3 & 4 FSAR Subsections 7.1.2.6.1.1 (1) and 7.1.2.6.1.4 (1) add as a General Functional Requirement under the Safety Design Bases that the Startup Range Neutron Monitoring (SRNM) subsystem will provide ATWS permissive signals to the ESF Logic Control System.
- DCD Subsection 7.1.2.6.1.1 (2) states as a nonsafety-related design basis that the SRNM Subsystem shall be able to provide a continuous measure of the time rate of change of neutron flux (reactor period) over the range from -100 s to (-) infinity and (+) infinity to +10 s. The FSAR revises the upper period limit to +3 s.
- DCD Subsection 7.4.2.6.1.2 (1) describes the control and reference signal for the APRM System core flow-rate dependent trips as a flow measurement from the recirculation system and signal conditioning equipment. The FSAR states that the control and reference signal comes from converting a core plate differential pressure signal from the Recirculation Flow Control System into a core flow rate signal.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact and affects the function, but is bounded by the safety analysis.

STD DEP 7.1-3, Isolation of Automatic Traversing Incore Probe (ATIP)

ABWR DCD Subsection 7.1.2.6.1.5 described the operation of the ATIP. STP 3 & 4 FSAR Subsection 7.1.2.6.1.5 (2) 9 (d) adds a non-safety-related power generation design basis that the ATIP should provide an automatic function of retracting the ATIP and closing the containment isolation valves for the ATIP lines in response to an LDI signal.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.2-1, Neutron Monitoring System Connection to RTIF

Section 7.2 of the reference ABWR DCD describes implementation of the interface between the Neutron Monitoring System (NMS) and the Reactor Protection System (RPS). The STP 3 & 4 FSAR revises and clarifies that description as follows.

The DCD describes two-out-of-four (2/4) voting logic related to the NMS Startup Range Neutron Monitor (SRNM) and Average Power Range Monitor (APRM) trips, as being performed by the RPS using divisional SRNM and APRM signals from each of the four divisions of NMS. In the STP 3 & 4 FSAR, the logic is functionally identical. However, the 2/4 logic is performed by each division of the NMS instead of by the RPS. The resulting trip signals are then sent from each NMS division to its corresponding RPS division for execution of the RPS trip. As a result of this 2/4 voting logic moving from the RPS to the NMS, certain other associated functions are also moved as follows:

Bypasses associated with the NMS input channels are performed by the NMS, instead of the RPS, because this must logically occur ahead of the 2/4 voting function that now resides in the NMS. This eliminates the need to transmit NMS divisional input bypass signals to RPS, as described in the ABWR DCD.

- The ABWR DCD describes a manual, key lock non-coincident NMS trip disable switch for use during shutdown, refuel and startup modes. The ABWR DCD describes this switch as being provided by the RPS. This function is moved to the NMS in the STP FSAR, because of its logical association with the 2/4 voting logic, which now resides in the NMS.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.2-2, Description of Scram Actuating Relays

Subsection 7.2.1.1.4.1 (1) of the reference ABWR DCD describes multiplexers, digital trip modules, and the Essential Multiplexing System. The FSAR revises these terms to reflect the current design which includes data communication equipment, digital trip units, and Remote Digital Logic Controllers.

DCD Subsection 7.2.1.1.4.1 (3) describes normally closed relay contacts in the scram logic circuitry between the air header dump valve solenoids (back-up scram solenoids) and the power source (125 VDC) for the air header dump valve solenoids. The STP 3 & 4 FSAR subsection has revised the wording of the relay logic contact status from “closed” to “open” when the coil is “energized.” This departure ensures a clear description is provided for the Reactor Protection System.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.2-4, Manual Scram Monitoring

Subsection 7.2.1.1.4.2 (6) (c) of the reference ABWR DCD describes the two manual scram switches and the reactor mode switch as providing the means to manually initiate a reactor trip. The subsection also states that one bypass initiating variable is monitored in addition to the scram initiating variables. The FSAR subsections deletes the statement about monitoring initiating variables because it could be misinterpreted.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.2-6, RPS Instrumentation Ranges

Table 7.2-1 of the reference ABWR DCD provided specifications for Reactor Protection System Instrumentation. This standard departure provides new ranges for:

- Reactor Vessel High Pressure
- Drywell High Pressure
- Reactor Vessel Low Water Level 3
- Low Charging Pressure to Rod HCU Accumulators
- Turbine Control Valve Fast Closure

Continuing design has determined that the original ranges did not provide for optimal performance. The ranges are now updated to reflect a range of values appropriate for optimal performance.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-1, Time Intervals for Licensing Analysis

Subsections 7.3.1.1.1.1 and 7.3.1.1.1.4 of the reference ABWR DCD provide specific times for the High Pressure Core Flood System and the Low Pressure Flooder Subsystem to respond to accidents. Table 6.3-1 provides these same values in addition to other significant input variables used in the Loss-of-Coolant Accident analysis.

To ensure consistency of information within the DCD, the specific values have been deleted in these Chapter 7 subsections and a reference has been inserted to the Table 6.3-1. This ensures that all data relative to these inputs remain consistent with the accident analysis.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-2, Automatic Depressurization Subsystem (ADS) Operator

Subsection 7.3.1.1.1.2 of the reference ABWR DCD incompletely describes actuation of the automatic safety/relief valves as “with electrical power.” The valve utilizes pneumatic action for the relieving function, but the operating air is introduced via an electric signal to a solenoid valve. A more complete description of the actuation would be “electro-pneumatic.” The relief (power) mode of operation is initiated when an electrical signal is received at any of the solenoid valves located on the pneumatic actuator assembly. These valves also operate by mechanical function as described in this subsection. The STP 3 & 4 FSAR states “pneumatic action” as the actuation method to clearly describe the ADS function of the SRV.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-4, ADS Logic

Subsection 7.3.1.1.1.2 (3) (b) of the reference ABWR DCD describes the logic and sequencing for the ADS. The original description did not fully describe the conditions under which ADS could be initiated. The description identifies the two parameters required as Reactor Water Level and Drywell Pressure. The description could be misinterpreted as requiring both parameters simultaneously to initiate ADS. The actual logic has a bypass timer that initiates on Reactor Water Level (Level 1) that will initiate ADS without the presence of High Drywell Pressure after eight minutes (nominal). Subsection 7.3.2.1.1 discusses this timer, but does not provide the information that it is initiated by the Level 1.

The above subsections are amended in the STP 3 & 4 FSAR to state that the bypass timer is initiated by the Reactor Vessel Water Level (Level 1) input. Additionally, the 8-minute value is removed from Subsection 7.3.2.1.1 to ensure that there is no conflict with Tier 1 information regarding the settings for this timer.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-5, Water Level Monitoring

Subsection 7.3.1.1.1.2 (3) (b) of the reference ABWR DCD describes the equipment design for the ADS I&C using the terms “Low” and “Low-Low” when describing the initiation inputs from the Reactor Water Level instrumentation. These terms generally refer to Level 1.5 and Level 1, respectively, for this instrumentation. This instrumentation has initiating signals for other levels, such as 2, 3, 8, etc.

To ensure clarity of understanding for all users, terms such as “Low” and “Low-Low” will be replaced with the actual level nomenclature, e.g., “Level 1.5” and “Level 1,” in the STP 3 & 4 FSAR. This clarification is also added to Subsections 7.3.1.1.1.2 (3) (a), and 7.3.1.1.1.4 (3) (a) and (3) (d).

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-6, SRV Position Indication

Subsection 7.3.1.1.1.2 (3) (b) of the reference ABWR DCD describes the position indication provided in the main control room for the safety/relief valves. The description states that lights are provided when the solenoid-operated pilot valves are energized to open. It also states that linear variable differential transformers (LVDTs) are mounted on the valve operators.

As stated in the STP 3 & 4 FSAR subsection, the current design for main control room indication of safety/relief valve position is provided by a limit switch. ADS solenoid energized status is not indicated as this is not a direct indication of the safety/ relief valve position. The incorporation of the limit switch on the valve provides a direct, positive indication of the valve position that is more reliable than the original described LVDT. The requirement for position indication of the safety/relief valve is assured by this limit switch.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-8, Surveillance Test Controller

Subsection 7.3.1.1.1.2 (3) (g) of the reference ABWR DCD states that the instrument channels are “automatically verified at 10 minute intervals.” The STP 3 & 4 FSAR has replaced that phrase with “manually verified in accordance with Technical Specification requirements.”

DCD Subsection 7.3.1.1.1.2 (3) (g) also states that the Surveillance Test Controller (STC) as discussed in the Subsection 7.1.2.1.6 is applicable to the ADS.

To reduce operator burden and decrease outage time, an STC is provided as a dedicated instrument. The STC performs semi-automatic (operator-initiated) testing, including trip, initiation, and interlock logic. A separate test sequence for each safety system is operator-selectable. Testing will proceed automatically to conclusion after initiation by the operator. Surveillance testing is performed in one division at a time.

To ensure understanding of the testing frequency, the “10 minute” discussion is removed and verification in accordance with the “Technical Specification Requirements” is inserted in the STP 3 & 4 FSAR subsection.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact, and although it affects the function, it is bounded by the safety analysis.

STD DEP 7.3-9, Shutdown Cooling Operation

Subsection 7.3.1.1.1.4 (3) (e) of the STP 3 & 4 FSAR clarifies the reference ABWR DCD description of the RHR Shutdown Cooling Mode valve alignment during Low Pressure Flooder (LPFL) actuation signal. In the shutdown cooling mode of operation, the RHR System removes decay heat from the reactor core and is used to achieve and maintain a cold shutdown condition. In this mode, each division takes suction from the RPV via its dedicated suction line, pumps the water through its respective heat exchanger tubes, and returns the cooled water to the RPV. Each shutdown cooling suction valve automatically closes if reactor water level falls below level 3. These valves will not open on high reactor pressure. This information was not presented as clearly as it could have been in the DCD.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-10, ESF Logic and Control System (ELCS) Mode Automation

Subsection 7.3.1.1.1.4(3i) of the reference ABWR DCD states that the operator may control the RHR pumps and injection valves manually after LPFL initiation to use RHR capabilities in other modes if the core is being cooled by other emergency core cooling systems. STP 3 & 4 FSAR Subsection 7.3.1.1.1.4(3i) replaces that statement with an expanded description of the Mode switches in the main control room. In order to support the displays and to reduce operator burden, RHR has specific mode operation capability. This eliminates the possibility of operator error and supports the display requirements. For example, the Containment Spray Mode is initiated by first “arming” the logic and then “initiating” the operation. Mode-specific permissives are required for system alignment.

In addition, ELCS mode automatic logic changes are implemented for Figure 7.3-1, Sheets 2, 5, 7-11, 13 and 17 to assure that the HPCF “C” diverse hard-wired manual initiation function has priority over the normal automatic initiation logic for HPCF “C”. These changes assure proper implementation of the diverse hard-wired HPCF “C” manual initiation capability described in Appendix 7C.5.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-11, Leak Detection and Isolation System Valve Leakage Monitoring

Reference ABWR DCD Subsection 7.3.1.1.2 (3)(l) provides a description of the leak detection instrumentation provided for valve stem leak-off lines of large bore reactor coolant pressure boundary isolation valves. Originally, valve stem packing rings were mostly made of asbestos material, which was prone to shrinkage during service. The shrinkage could cause voids in the packing chamber, which leads to leakage. To counter frequent leaks, two sets of packing rings were provided with a leak-off line from the chamber between the packing rings. The leak-off was then routed to a collection sump, where leakage was identified in accordance with pressure boundary leakage requirements. While providing relief from leakage requirements, this arrangement did not resolve the issue of stem leakage.

To resolve the stem leakage issue, valves were specified in the FSAR to use one set of expanded graphite packing to seal the valve stem penetration. Expanded graphite has shown superior sealing properties, is less likely to induce corrosion and damage to the valve stem due to trace material, retain their form longer and avoid the formation of voids that could lead to leakage. Due to the valve packing changes, during the design evolution of the ABWR, the valve stem leak-off lines have been eliminated. The valve gland leak-off lines have been eliminated for the valves and the described instrumentation is no longer applicable. The large remote power operated valves, located in the Drywell for Main Steam, Reactor Water Clean Up, Reactor Core Isolation

Cooling and Residual Heat Removal Systems are affected by this change. A similar discussion is provided in STP 3 & 4 FSAR Subsection 5.2.5. The deletion of this section ensures the discussion of the Leakage Detection Instrumentation is consistent with the current design.

The improvements of valve packing have changed the way pressure boundary leakage from valves is assessed. With the reduction in leakage, which is a more reliable configuration, a leakage detection system is no longer needed. This conclusion results in the removal of the piping arrangement and the instrumentation for leakage detection.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change does not affect any safety or design function.

STD DEP 7.3-13, Containment Spray Logic

The reference ABWR DCD states that if Containment Spray has been initiated, then the system automatically realigns to the LPFL Mode if Reactor Vessel Water Level falls below Level 1. The changes to STP 3 & 4 FSAR Subsections 7.3.1.1.3 (3) (a), (b), and (c), and 7.3.2.3.1 emphasize that the LPFL mode has precedence over containment Spray when below Level 1, clarify the method by which the Drywell and Wetwell sprays can be initiated, and clarify the interlocks associated with this mode of RHR operation.

This departure clarifies the operation of the Containment Spray System and provides a better description of the operation of this mode of RHR. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-14, Residual Heat Removal Suppression Pool Cooling Logic

Subsection 7.3.1.1.4 (3) (b) of the reference ABWR DCD describes the logic and sequencing of the RHR Suppression Pool Cooling Mode. The FSAR includes the following departures:

- A description of the Suppression Pool Cooling Mode Switch has been added to Item (iv) to provide a more complete understanding of the initiation of this mode.
- Item (v) of this subsection has been augmented to state the SPC mode continues to operate until the operator closes the discharge valves. This operation is facilitated by the activation of another permitted mode of operation. This information has been added to ensure a complete understanding of the termination of this mode.
- Item (vi) has been added to this section to clarify that this mode only operates automatically when entered from the RHR Standby Mode.

This departure clarifies the operation of the Suppression Pool Cooling Mode of RHR and provides a better description of the operation of this mode of RHR. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52,

Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-15, Reactor Service Water Logic Interfaces

Subsection 7.3.1.1.7(3i) of the reference ABWR DCD provides information about the safety interfaces for the Reactor Coolant Water controls. This description is modified in the FSAR subsection as follows:

- The original information stated that only Division I and II provided flow signals to the Main Control Rooms. The current design provides flow signals for all three divisions (Div. I, II, and III) of RCW.
- This section also discusses the “RCW Hx A or D” differential pressure instrumentation. This equipment is actually the strainers on the suction side of the two RSW pumps in each division. Therefore, the nomenclature of this equipment is changed to “RSW pump Suction A or D.”

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.3-16, Testing Safety Relief Valve Solenoid Valves

Improved testing capabilities have been incorporated into the ABWR design than those described in Subsection 7.3.1.1.2 of the reference ABWR DCD. These improvements allow the testing to be performed at any pressure. Therefore, the restrictions that were discussed in the original DCD are no longer applicable and have been removed. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.4-1, Alternate Rod Insertion (ARI) Function Description

This departure re-writes most of the first paragraph of STP 3 & 4 FSAR Subsection 7.4.1.1. The original description in the reference ABWR DCD described the implementation of the ARI function for the following features. The revised STP 3 & 4 FSAR wording clarifies the descriptions of these features. It specifies the:

- ARI function is a diverse method for inserting control rods by either hydraulic insertion or Fine Motion Control Rod Drive (FMCRD) motor run-in by providing a more complete discussion of the function.
- Low-level signals from the safety systems (i.e., SSLC-ESF) and the RFC system for the ARI function are isolated. The interface of the isolated signals from safety system to the non-safety RFC system ensures that no safety related functions are affected.
- Two hard switches on the Main Control Room Panel located near the RCIS dedicated operator interface to clarify the manual initiation capability.

- Complete scope of the key components related to the ARI function.

This departure provides a clear and concise understanding of the ARI function, which is not required for safety, nor are its components considered Class 1E. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.4-2, Residual Heat Removal (RHR) Alarm

Subsection 7.4.2.3.1 of the reference ABWR DCD provides functional requirements for the reactor shutdown cooling mode of the RHR system. Item (3) of this section provides a list of alarms that apply to all modes of the RHR System. As a result of detailed design evolution, the STP 3 & 4 FSAR replaces the alarm for "RHR Logic Power Failure" with the more general alarm "ELCS Out of Service." The FSAR also clarifies that the only time the "Manual Initiation Armed" alarm is activated is when the RHR system is in the Low Pressure Flooder (LFPL) Mode of operation.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 7.6-1, Oscillation Power Range Monitor (OPRM) Logic

Subsection 7.6.1.1.2.2 of the STP 3 & 4 FSAR now states the

- OPRM trips logic is performed separately from the APRM trips logic
- OPRM function has its own inoperative trip when the channel has less than the required minimum operable cells, or there is an OPRM self-test fault, or the APRM instrument firmware/software timer has timed out, if there is a loss of power to the APRM instrument
- OPRM trip outputs also follow the two-out-of-four logic as the APRM but independent from the APRM trip outputs to the RPS

NEDO-33328, "Advanced Boiling Water Reactor (ABWR) APRM Oscillation Monitoring Logic," April 2007, provides the justification for the changes noted above.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 7.6-2, SPTM Subsystem of Reactor Trip and Isolation System

The reference ABWR DCD description for the Suppression Pool Temperature Monitoring (SPTM) System in Subsection 7.6.1.7.1 has been clarified in the STP 3 & 4 FSAR to add that SPTM System is part of the Reactor Trip and Isolation System (RTIS).

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.6-3, SPTM Sensor Arrangement

The reference ABWR DCD description for the SPTM System in Section 7.6.1.7.3 is clarified in the FSAR to better illustrate the approximate temperature sensor locations in relation to the SRVs. The STP 3 & 4 FSAR rewording states that the SRV discharge line quenchers are in direct sight of two sets of SPTM system temperature sensors.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.6-4, Range of Power Range Neutron Monitoring Operability

The reference ABWR DCD description for the Power Range Neutron Monitors (PRNM) in Subsection 7.6.2.1.1 stated that the PRNM provide information for monitoring the average power level of the reactor core and for monitoring the local power level when the reactor power is in the power range (above approximately 15% power). The FSAR clarifies the statement to indicate that the power range begins at approximately 5% power.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-1, RPV Water Level Instrumentation

Subsection 7.7.1.1 of the reference ABWR DCD implies that all instrument lines are flushed even when they do not need to be. A clarification indicates that only those instrument lines with a condensing chamber can have entrained non-condensable gasses. STP 3 & 4 FSAR Subsection 7.7.1.1 now states that the concern of non-condensable gas build-up in the water column in the reactor vessel reference leg water level instrument lines, i.e. the reactor vessel instrument lines at the elevation near the main steam line nozzles, has been addressed by continually flushing these instrument lines with water supplied by the Control Rod Drive (CRD) System for those instrument lines with a condensing chamber.

The original design intent was to have flushing only apply to lines with condensing chambers which was not clear in the original DCD. Subsection 7.7.1.1 of the FSAR provides this clarification.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-2, SRV Discharge Pipe Temperature Data Recording

There have been significant technological advances in data recording since the reference ABWR DCD was written. Subsection 7.7.1.1 of the STP 3 & 4 FSAR now states that the discharge temperatures of all the safety/relief valves are shown on an historian function in the control room.

Recording SRV discharge temperature data is now performed in a more accurate manner and is easily retrievable. The recorded data rate meets all design criteria. The data recorded remains the same along with the parameters.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-3, Feedwater Turbidity

The reference ABWR DCD discusses the measurement of feedwater turbidity, but there seems to be no practical manner in which to perform this measurement and it is not considered to have any safety significance. Therefore, it is being deleted. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-4, Automatic Power Regulator / Rod Control and Information System Interface

Section 7.7.1.2 (1) (a) (ii) of the reference ABWR DCD described the Power Generation and Control System (PGCS) as initiating control changes in the automatic rod movement mode. The STP 3 & 4 FSAR now clarifies that the APR is actually the direct controlling system that interfaces with the RCIS for accomplishing automatic rod movement mode and the PGCS interfaces only with APR for initiating various reactor power change control tasks.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-5, Rod Control and Information System (RCIS) Display

Subsection 7.7.1.2 (2) (b) of the STP 3 & 4 FSAR clarifies the wording of the reference ABWR DCD by providing more precise information about available display information at the RCIS dedicated operator interface on the main control panel.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-6, Rod Control and Information System Commands

Section 7.7.1.2 (1) (f) of the STP 3 & 4 FSAR revises the command description to clarify that there are REDUNDANT “command signals” from RFCS to RCIS for the ARI function. These changes are consistent with the details of RCIS IED (Figure 7.7-2).

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-7, Rod Control and Information System (RCIS) Design Details

Changes were made to the reference ABWR DCD RCIS system descriptions in FSAR Subsection 7.7.1.2 (2) to provided clarity, additional information, and provide a more complete design description. The changes addressed the following:

- “Rod Action Control Cabinet (RACC)” was changed to “Rod Action Control Subsystem (RACS) Cabinets” because the various major subsystem functions were segregated to different cabinets
- Allocation of various major RCIS subsystem functions into different cabinets
- Final Remote Communication Cabinet (RCC) implementation details
- Final Fine Motion Driver Cabinet (FMDC) implementation details
- Key additional RCIS-related panels/cabinets that were shown in the original RCIS IED Figure 7.7-2
- RCIS Multiplexing Network scope and terminology for the interfaces to non-RCIS scope essential and non-essential data communication function equipment require revision consistent with RCIS IED (Figure 7.7-2) and the associated ABWR LTR terminology

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-9, Selected Control Rod Run-In (SCRRI) Function

Subsection 7.7.1.2 of the reference ABWR DCD states that the Control Rod Drive (CRD) System provides for electromechanical insertion of selected control rods for core thermal/hydraulic stability control. The STP 3 & 4 FSAR adds that the CRD system also provides for mitigation of a loss of feedwater heating event. This change provided clarity with the additional information and a more complete design description showing the two functional needs for SCRRI.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-11, Rod Withdrawal Sequence Restrictions

The STP 3 & 4 FSAR significantly expands the DCD discussion of the ganged rod movement and ganged withdrawal sequence restrictions. The STP 3 & 4 FSAR provides complete descriptions of these clarifications:

- The RWM of the RCIS ensures adherence to certain ganged withdrawal sequence restrictions
- The ganged rod mode consists of one or two sets of fixed control rod gang assignments
- The system allows up to 26-rod gangs, for control rods in rod groups 1, 2, 3, and 4, to be withdrawn simultaneously when the reactor is in the startup or run mode
- The maximum allowable difference between the leading and trailing operable control rods
- Restrictions on withdrawal of rods in groups

These changes provide an updated design description showing the implemented system design. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-12, Rod Control and Information System Indication

STP 3 & 4 FSAR Subsection 7.7.1.2.1 (6) provides additional and more detailed design information regarding the following:

- The reference rod pull sequence is normally established before plant startup and stored in memory associated with the Plant Computer Function (PCF). The PCF allows modifications to be made to the RRPS through operator actions and provides compliance verification of the changes to the RRPS, with the ganged withdrawal sequence requirements.
- The RCIS provides the capability for an operator to request a download of the RRPS from the PCF. The new RRPS data is loaded into the RAPI Subsystem. Download of the new RRPS data can only be completed when the RCIS is in manual rod movement mode and when a permissive switch located at the RAPI-A panel is activated.
- The RCIS provides feedback signals to the PCF for successful completion of downloaded RRPS data for displaying on the non-safety display.
- A rod withdrawal block signal is generated whenever selected ganged rod movements differ from those allowed by the RRPS, when the RCIS is in automatic or semi-automatic rod movement mode.
- The RCIS activates an audible alarm at the operators panel for a RRPS violation.

These changes provide an updated design description showing the implemented system design. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-13, Optical Isolation

Changes are incorporated in the STP 3 & 4 FSAR Subsection 7.7.1.2.1 discussion of the Rod Block Function to remove the detailed description of the specific type of technology used for optical isolation of rod block signals received by the non-safety Rod Control and Information System (RCIS) from Class 1E systems. The reference ABWR DCD wording discusses the details of a specific technology that can be used for achieving optical isolation. However, the DCD description is overly restrictive in describing a specific type of optical isolation technology to be used for meeting the optical isolation of all rod block signals received by the RCIS from Class 1E systems. The description that all rod block signals from Class 1E systems provided to the RCIS are optically isolated is retained. Also, the description that the optical isolation provides complete isolation while keeping electrical failures from propagating into the RCIS and vice versa is also retained. The retained descriptions adequately cover the requirements to be achieved by using optical isolation of the rod block signals received by the RCIS from Class 1E systems.

This change is deemed necessary to prevent overly restrictive description wording of the type of technology that can be used for achieving suitable optical isolation of the RCIS rod block signals received from Class 1E systems.

This change to delete discussion of the specific type of isolation technology used for rod block signals received by the RCIS from Class 1E systems has no adverse impact on plant operation, safety or the functionality of the RCIS rod block functions.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-14, Rod Control and Information System Bypass

Changes are incorporated in the STP 3 & 4 FSAR Subsection 7.7.1.2.1 discussion of the Rod Control and Information System (RCIS) bypass capabilities:

- Changes to the description of capabilities provided for performing bypass of either the Synchro A or Synchro B position feedback signals for any individual control rod, including the description of RCIS logic that prevents simultaneous bypassing of both synchro signals for an individual control rod.
- Changes in the descriptions regarding the specific location and related operator interface where specific bypass functions can be performed (e.g., update of control rods to be placed in the “Inoperable” status can be performed at the RCIS Dedicated Operator Interface and descriptions of bypass permissive switch for performing certain bypass operations is added for clarity) and the operator interface where bypass status information is available are incorporated.

- Change in the maximum number of control rods that can be placed into the “inoperable” bypass condition only when the reactor mode switch is in REFUEL mode is incorporated (i.e., change required to support control rod maintenance activities during a planned refueling outage nominally every 18 months, instead of nominally every 12 months).
- Changes in the description of the Single/Dual Rod Sequence Restrictions Override (S/DRSRO) bypass to reflect that is applied to the one or two control rods associated with the same hydraulic control unit (HCU) when performing scram time surveillance testing (and is not a bypass that can be selected for specific individual control rods).
- Addition of a new section to more clearly distinguish the Single Channel RCIS Bypass features from the other RCIS bypass capabilities (i.e., synchro bypass, “Inoperable” bypass, and S/DRSRO bypass are RCIS bypass functions that do no bypass a single channel of the dual redundant RCIS channel equipment). Single Channel RCIS Bypass features are those RCIS bypass functions provided to allow bypass of single channel of dual channel RCIS equipment. The specific list of the available types of Single Channel RCIS Bypass features is also clarified by the changes incorporated.

These changes provide an updated design description showing the implemented system design and have no adverse impact on RCIS system operation, plant operation or safety. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change does not affect any safety or design function and has no adverse impact.

STD DEP 7.7-15, Scram Time Testing

Changes are incorporated in STP 3 & 4 FSAR Subsection 7.7.2.1.2 (12) to describe the detailed design implementation and RCIS equipment scope (i.e., the specific panels) and related interfaces provided for providing automatic recording of individual FMCRD scram timing data based upon the scram timing reed switches of each FMCRD and the associated capability for providing stored scram timing performance data to the Plant Computer Function (PCF).

Equivalent functionality for achieving the automatic scram time recording to that described in the reference ABWR DCD is provided by the revised design implementation described. The revised design implementation is based upon having dedicated Scram Time Recording Panel (STRP) equipment for automatic recording of the scram timing data instead of the data being automatically recording the Rod Action and Position Information Panel (RAPI) panel equipment. The recorded scram timing data of the STRP equipment is also provided to a separate Scram Time Recording and Analysis Panel (STRAP) that provides for storage of the scram timing data for all 205 control rods. The STRAP also provides for transfer of this stored data to the PCF.

The detailed changes reflect the design for implementation of the RCIS scram time recording functionality described in the DCD. There is no change in the basic functionality intended for automatic recording of scram timing performance (and the capability to provide such stored data to the Plant Computer Function) described in the DCD. However, the detailed description of the specific RCIS equipment used for providing this RCIS functionality has been changed to reflect the revised detailed design implementation.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-17, Rod Control and Information System (RCIS) Interface Description

Subsection 7.7.1.2.2 of the reference ABWR DCD describes the interfaces associated with RCIS:

- Control Rod Drive System
- Recirculation Flow Control System
  - Selected Control Rod Run In and Rod Block Functions
  - RFCS Core Flow Signal to RCIS
  - RCIS Signals to RFCS
  - RFCS Hard-Wired Signals to RCIS
- Feedwater Control System
- Neutron Monitoring System
- Reactor Protection System
- Plant Computer Functions
- Automatic Power Regulator System

There are a number of changes associated with this STP 3 & 4 FSAR subsection due to the large number of interfaces with the RCIS. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-19, Rod Control and Information System Maintenance

Subsection 7.7.1.2.4 of the reference ABWR DCD stated that special tools are not required for removal or repair of modules or cards. This section is amended in the STP 3 & 4 FSAR to state that a special lifter tool is required for performing maintenance of the combined Inverter Controller/Stepping Motor Driver Module in the Fine Motion Digital Controllers. This lifter tool is required due to the weight of the modules.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-20, Recirculation Flow Control Logic

Subsection 7.7.1.3 (1) of the reference ABWR DCD describes automatic operation of the Recirculation Flow Control System as only available above 70% power. Subsection 7.7.1.3 (4) provides a more complete description by stating the 70% limit is for a "rod pattern where rated power accompanies 100% flow." This subsection provides further information concerning manual and automatic operation for other rod patterns and power levels. Therefore, the statement "if the power level is above 70% rated" is removed from 7.7.1.3 (1).

FSAR Subsection 7.7.1.3 (4) is further enhanced as follows:

- Operation below approximately 25% has been described in lieu of previous information about operation below 70%,
- Load follow capability has been enhanced to include the specific interfacing systems required for this mode of operation in lieu of the original "main turbine regulator control" and
- Terminology for the "main turbine pressure regulator" is changed to "APR" and "semi-automatic mode" is changed to "core flow mode".

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-21, Feedwater Flow Transmitters

The first paragraph of subsection 7.7.1.4 (7) of the reference ABWR DCD describes the feedwater lines as using two transmitters to supply the flow input to the Feedwater Control System. The STP 3 & 4 FSAR changes the number of transmitters to three because the Feedwater Control System uses a Triplicated Fault Tolerant Digital Controller; therefore, three transmitters are used to supply the feed flow input for each line. This arrangement ensures the performance of the system under failure conditions.

The second paragraph of the DCD states that the feedpump suction flow is sensed at a single flow element upstream of each feedpump. That is, each feedpump (total of three) has the suction flow measured resulting in three transmitters being utilized for this purpose. The STP 3 & 4 FSAR subsection describes the use of three transmitters in each application of the various feedwater flow inputs to the Feedwater Control System.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-22, Automated Thermal Limit Monitor (ATLM) Description

The description of the ATLM setpoint and rod block action in reference ABWR DCD Subsections 7.7.1.5 (7) (c) and (7) (e), and 7.7.1.5.1 of have been expanded in the STP 3 & 4 FSAR to further describe the interface of the systems and the application. The FSAR states that when an ATLM setpoint update is requested, after calculating the power distribution within the core, the computer sends data to the ATLM of the RCIS on the calculated fuel thermal operating limits and corresponding initial LPRM values. The ATLM monitors various functions and issues rod block signals to prevent violation of the fuel operating limits.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-23, Automatic Traversing Incore Probe (ATIP) Function

Subsection 7.7.1.5.1 of the reference ABWR discusses inputs from the “automatic fixed incore probe (AFIP)” to be used for gain adjustment factors for Local Power Range Monitoring. The STP 3 & 4 FSAR explains that this function is provided by the ATIP rather than the AFIP in the US ABWR.

Subsection 7.7.1.6.1 (2) of DCD states that the ATIP is non-safety-related, but the STP 3 & 4 FSAR expands that description to include that this sub-system of the Neutron Monitoring System has no safety function, but the system does contain safety-related components. The ATIP System is provided with either low reactor water level or high drywell pressure signal to initiate TIP withdrawal followed by closure of the ball valves and purge line valves to ensure containment isolation.

Subsection 7.7.1.6.1 (4) of the DCD states that the ATIP equipment is tested and calibrated using heat balance data and procedures described in the instruction manual. The STP 3 & 4 FSAR states that only the procedures from the instruction manual are required for the calibration of this equipment.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-24, Steam Bypass and Pressure Control Interfaces

Subsection 7.7.1.8 (7a) of the reference ABWR DCD states that an external signal interface for the Steam Bypass and Pressure Control (SB&PC) System is narrow range dome pressure signals from SB&PC System to the Recirculation Flow Control System. STP 3 & 4 FSAR Subsection 7.7.1.8 (7a) states that the “narrow range dome pressure signals” are replaced by “validated dome pressure signals.” The signals are validated based on the value of the pressure and the number of signals that are in the valid range.

Based on pressure demand, the SB&PC System calculates position error and servo current for each turbine valve. Therefore, Subsections 7.7.1.8 (7h) and (7i) of the STP

3 & 4 FSAR list these signals as external signal interfaces being sent from the SB&PC to the Turbine Bypass System. This clarifies which is the sending unit and which is the receiving unit.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-25, Fuel Pool Cooling and Cleanup System Logic

The logic and associated alarm (annunciator) and indication information shown on Sheets 2, 3, 6, 7, and 8 of STP 3 & 4 FSAR Figure 7.7-14 are revised to reflect the actual design implementation for this non-safety system. In addition, heat exchanger discharge temperature high status signals and a fuel pool temperature high status signal are added to provide associated annunciator and indication information.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 7.7-27, RCIS Table Deletion

Table 7.7-1 of the reference ABWR DCD provides the environmental conditions for the Rod Control and Information System (RCIS) module operation environment, consisting of temperature, relative humidity, atmospheric pressure, radiation levels, and seismic acceleration. There is no reference to this table in DCD Section 7.7. DCD Subsection 7.7.1.2.5 refers the reader to Section 3.11, which provides the requirements for nonsafety-related equipment subject to adverse environments. Therefore, Table 7.7-1 is deleted in the STP 3 & 4 FSAR because the information is duplicated elsewhere in the FSAR.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 8.2-1, Electrical Site-Specific Power and Other Changes

Licensing Topical Report (LTR) NEDO-33335, “Plant Medium Voltage Electrical System Design,” was submitted to the NRC by General Electric Company in May 2007. Due to the changes contained in the LTR, the non-safety and safety-related medium voltage buses numbering conventions were changed. Figure 8.2-1, Sheets 1-7, have been revised to show the new bus numbers and equipment location in the turbine building. Reference subsections were added to the interface requirements to direct the reader to those sections in which the requirements are incorporated.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 8.3-3, Electrical Equipment Numbering

NEDO-33335 requires other site-specific changes that were not provided as part of the LTR. These changes include diesel generator loading and other drawing changes listed below.

- Table 8.3-1 was updated to identify the site-specific changes (i.e., CT Fans, UHS, HECW Chillers) as a result of performing load study calculations, diesel generator sizing and CTG sizing calculations.
- Increased the number of sheets of Figure 8.3-1 from three to four as a result of re-drawing the single lines to add site-specific power centers and motor control centers.
- Figure 8.3-1, Sheets 1-4, were revised to incorporate site-specific load changes which were identified during the process of performing load study calculations, diesel generator sizing and CTG sizing calculations.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 8A.1-1, Regulatory Guidance for the Lightning Protection System

This departure provides a change from the reference ABWR DCD in STP 3 & 4 FSAR Section 8A.1.2 to acknowledge availability of SRP and regulatory guidance for the lightning protection system. It adds a reference to RG 1.204, November 2005, which is cited in NUREG-0800, Section 8.1, Rev. 3. It also adds references to the applicable sections of IEEE Standards 666-1991, 1050-1996, and C62.23-1995.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.1-1, Update of Fuel Storage and Handling Equipment

Standard Departure 9.1-1 includes the following specific changes:

9.1 Fuel Storage and Handling

The spent fuel storage rack capacity was clarified to be <u>a minimum of</u> 270% to match the description provided in Tier 1 Subsection 2.5.6 and to be consistent with the response to NRC certification question 410.33. In Subsection 9.1.3.3, the maximum 270% has been clarified to be the capacity used for the bounding heat load evaluation. For a pool having a capacity larger than 270%, the additional capacity may not be utilized without revision to the bounding heat load evaluation.

The last paragraph was deleted because the new fuel storage racks are revised for dry storage in a fuel vault and are a different design than the spent fuel storage. This requires different analyses and support structures than for the spent fuel racks. Separate discussions are provided for new fuel storage and spent fuel storage.

9.1.1.1 Nuclear Design

Subsection 9.1.6 was changed to Subsection 9.1.6.1 to provide the specific reference number to COL License information.

9.1.1.1.3 Mechanical and Structural Design

The reference to Subsection 9.1.2.1.3 was deleted because it was desired to have a stand-alone description for new fuel storage. Most of the information added to this section previously existed in Subsection 9.1.2.3 and is not a technical change from the DCD. The new or revised information includes the following:

- Changes related to dry vs. wet storage include deleting a liner, and adding a drain and curb to preclude accidental flooding of the new fuel storage racks. Although measures are provided to preclude flooding, COL License Information Item 9.1 (Subsection 9.1.6.1) will demonstrate that Keff is maintained less than 0.95 with the new fuel racks flooded with unborated water or with the addition of fire fighting foam.
- The new fuel rack design uses the load combinations described in SRP 3.8.4 Appendix D instead of the DCD description of load combinations.
- The discussion of rack overturning due to horizontal loads was updated and reference to uplift from vertical loads was deleted.
- The supporting gap around new fuel is clarified as being between the fuel and rack instead of between the spent fuel and support tube.

9.1.1.1.4 Thermal-Hydraulic Design

The reference to thermal-hydraulic design for new fuel storage was deleted because it is not applicable to the new fuel dry storage.

9.1.1.1.5 Material Considerations

The reference to Subsection 9.1.2.1.5 was deleted because it was desired to have a stand-alone description for new fuel storage. The information added to Subsection 9.1.1.1.5 previously existed in Subsection 9.1.2.1.5 and is not a technical change from the DCD.

9.1.1.3.2 Structural Design

Anchoring/support details for the new fuel racks were updated to reflect current ABWR practice for new fuel storage.

9.1.1.3.3 Protection Features of the New-Fuel Storage Facilities

Subsection 9.1.1.3.3 is clarified to note that the auxiliary hoist on the Reactor Building crane <u>can</u> be used (vs. <u>is</u> used) for some new fuel movements. The intent is to use the telescoping grapple on the refueling machine for most movements. Refer to Subsection 9.1.4.1 for additional discussion.

A reference to the “rechanneling” area was corrected by substituting “fuel preparation machine” area.

9.1.2.1.2 Storage Design

The spent fuel storage rack capacity was clarified to be a minimum of 270% to match the description provided in Tier 1 Subsection 2.5.6 and to be consistent with the response to NRC certification question 410.33. In Subsection 9.1.3.3, the maximum 270% has been clarified to be the capacity used for the bounding heat load evaluation. For a pool having a capacity larger than 270%, the additional capacity may not be utilized without revision to the bounding heat load evaluation.

9.1.2.1.3 Mechanical and Structural Design

Active vacuum breaker valves in potential siphon paths have been replaced by locating passive vent holes in each pool recirculation line.

The spent fuel rack design uses the load combinations described in SRP 3.8.4, Appendix D, instead of the previous DCD description of load combinations.

Language implying there is only one acceptable dynamic analysis method was clarified. Refer also to the COL License Information Item in Subsection 9.1.6.2.

Reference to the AISI code for compressive stability of light gauge structures was eliminated.

9.1.2.1.5 Material Considerations

The missing temperature unit for 16°C was inserted.

9.1.2.3.2 Structural Design and Material Compatibility Requirements

Spent fuel rack anchoring/support details were updated to reflect current ABWR practice.

9.1.3 Fuel Pool Cooling and Cleanup:

9.1.3.1 Design Bases

An acronym for Residual Heat Removal was provided along with the clarification that FPC load is a heat load.

9.1.3.2 System Description:

The word Closed was deleted from “Reactor Building Closed Cooling Water System” for consistency throughout DCD.

The discussion of an RHR loop being available for meeting Mode 4/5 ECCS operability requirements was deleted because this discussion is more appropriately addressed in the Technical Specifications and associated Bases.

The discussion of fuel pool cleanup system performance was supplemented and clarified to add suspended solids removal capability, total corrosion product metal below 30 ppb, and a flow rate of two water changes per day.

9.1.3.3 Safety Evaluation

In previous sections, the spent fuel storage rack capacity was clarified to be a minimum of 270% to match the description provided in Tier 1 Subsection 2.5.6 and to be consistent with the response to NRC certification question 410.33. In this section the maximum 270% has been clarified to be the capacity used for the bounding heat load evaluation. For a pool having a capacity larger than 270%, the additional capacity may not be utilized without revision to the bounding heat load evaluation.

Clarified that the makeup water supply to the fuel pool is from the Condensate Storage and Transfer System.

Revised the valve arrangement for isolating the filter-demineralizers from FPC and SPCU to replace one of the four block valves with a check valve.

Updated the COL License Item in Subsection 9.1.6.9.

9.1.4 Light Load Handling System (Related to Refueling)

Changes in this subsection were made to update the equipment and special tools utilized in ABWR refueling operations, including the inspection of new fuel. The Refueling machine is described as Seismic Category I. Outdated equipment (vacuum sipper, jib crane, and fuel assembly sampler) that is no longer utilized was deleted. The specific changes are noted in Subsection 9.1.4.

Other changes in this subsection not specifically related to equipment or special tools involved in refueling are:

9.1.4.1 Design Bases

Clarified that the minimum water level for shielding is the limit above the top of Active fuel (TAF).

9.1.4.2.1 Spent Fuel Cask

Revised this subsection to reflect that information related to a spent fuel cask is within the scope of STP 3&4 and will be the subject of updates to the FSAR when movement of fuel from the spent fuel pool becomes necessary.

9.1.5 Overhead Heavy Load Handling Systems (OHLH)

Changes were made to update OHLH utilized in ABWR refueling operations, including the addition of ASME NOG-1 as a technical standard for the Type I Reactor Building crane. The description and use of the under vessel rotating platform was also updated. The specific changes are noted in Subsection 9.1.4.

Tables and Figures

Tables 9.1-9, 9.1-10 and 9.1-12 were not changed. The remaining tables were revised to reflect revisions made in the text and other additional changes as shown. Table changes are presented as new tables with all changes incorporated.

Figures are revised or deleted as noted.

STD DEP 9.2-1, Reactor Building Cooling Water System

The Reactor Building Cooling Water (RCW) System heat exchanger design capacity for divisions A and B is increased from 47.73 GJ/h to 50.1 GJ/h each, and division C is increased from 44.38 GJ/h to 46.1 GJ/h. The increased RCW heat exchanger design capacity values are based on meeting the LOCA heat loads with a performance margin of 20% to allow for fouling. This also provides a greater heat removal capability during RHR operation. These changes represent a conservative increase in the ability of the system to perform its safety and power generation heat removal design functions.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STP DEP 9.2-2, Makeup Water Preparation System

Changes specific to the operation of the Makeup Preparation Water (MWP) System are:

- The flow capacity of each division of the MWP System has been doubled from 45 m^3/h to 90 m^3/h.
- The storage capacity for demineralized water has been increased from 760 m^3 to at least 5320 m^3.
- The MWP System is capable of providing demineralized water at the reference ABWR DCD specified flow rate of 135 m^3/h per unit, but for periods of short duration. Average sustainable flows will be lower as needed to meet demands.
- The MWP System is designed to supply makeup water to the Ultimate Heat Sink (UHS) basin and the Fire Protection system on an as needed basis. New interfaces to the UHS basin and the Fire Protection System provide an additional makeup water supply. The MWP system interfaces do not serve any safety functions. The UHS and Fire Protection System are designed with adequate storage to serve all their safety related functions without the supply of makeup water.
- The capacity of the MWP System to provide water to the Potable and Sanitary Water System has been doubled from 45 m^3/h to 90 m^3/h for instantaneous flows and the source is well water, not filtered water. The potable water is supplied unfiltered directly from the wells in accordance with state and local codes and regulations. This is consistent with the STP 1 & 2 Potable Water System.
- Demineralized water prover tanks have been added to increase the storage capacity and monitor water quality and sulfuric acid chemical feed tanks have been added to further reduce fouling and scaling in the reverse osmosis filter membranes.

Increased capacities of various tanks/basin provide more flexibility to accommodate peak demands for the MWP system. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change is an improvement with no adverse impact, and affects the function, but is bounded by the safety analysis.

STP DEP 9.2-3, Turbine Building Cooling Water System

The heat removal capacity of each of the three heat exchangers in the Turbine Building Cooling Water System is increased from 68.7 GJ/h to 114.5 GJ/h and the flow rate of each of the three pumps is increased from 3405 m^3/h to 4550 m^3/h due to increased heat loads caused by alterations to Turbine Island equipment (e.g., number of pumps and increased non-essential chiller size). This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact, and affects the function, but is bounded by the safety analysis.

STP DEP 9.2-5, Reactor Service Water (RSW) System

During preparation of the STP 3 & 4 FSAR, it was identified that the RSW flow rate specified in the reference ABWR DCD needs to be increased in order for the site-specific RSW system to accomplish its safety and power generation design bases. Increasing the RSW flow rate results in the following changes to Subsection 9.2.15:

- RSW system pipe sizes in Figure 9.2-7, Sheets 1-3, are increased
- RSW flow rate to the RCW heat exchangers in Table 9.2-13 is increased from 1,800 m^3/h to 3,290 m^3/h
- RSW pump head in Table 9.2-13 is increased from 0.34 MPa to 0.38 MPa

RSW heat exchanger flow (heat removal requirement) has been increased due to the calculated heat load from RCW System. This flow will be accommodated by higher capacity pumps and larger pipe diameter.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change represents an improvement in safety with no adverse impact and affects the function, but is bounded by the safety analysis.

STD DEP 9.2-7, HVAC Normal Cooling Water System

This departure reflects a design change to correct inconsistencies in reference ABWR DCD Tables 9.2-6 and 9.2-7, and Figure 9.2-2 such that the nonsafety-related HVAC Normal Cooling Water (HNCW) system waterside heat removal rate is greater than or equal to the airside cooling duty heat loads. The capacity and flow rate for each HNCW chiller are also increased to include the revised heat loads. This will make the airside and waterside heat removal design capacities consistent.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 9.2-8, Potable and Sanitary Water System

This is another dual-unit change such that the potable water subsystem is capable of supplying both STP 3 & 4 and the sewage treatment subsystem is capable of treating sanitary wastes collected from all four units located at the site. This increase in system capacity ensures flexibility and reliability for future needs at the site. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.3-1, Radwaste Drain Materials

Exposed (free run) carbon steel piping in the Radwaste Collection System is replaced with stainless steel piping to significantly reduce the amount of contaminated corrosion products, the load on the liquid radwaste system, and the solid radwaste shipment volume. This is consistent with NRC and industry initiatives for radwaste volume reduction.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.3-2, Breathing Air System

The Service Air System (SAS) in the reference ABWR DCD supplied the Breathing Air System (BAS) as well. A separate nonsafety-related BAS will be implemented at STP 3 & 4 with the SAS providing a backup breathing air supply via a cross-connect valve. The BAS will supply the Turbine Island, Nuclear Island, and Radwaste Building. The usually separated BAS will significantly reduce the amount of potentially contaminated service air that enters the BAS and the oil free breathing air compressors will preclude an oil fire in the breathing air lines. Therefore, this stand-alone design is considered safer for personnel protection.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 9.4-1, Service Building HVAC System

This site-specific departure modifies the reference ABWR DCD for the Service Building HVAC System. It revises the outside inlet air monitoring instrumentation design by removing the provisions for toxic gas monitors and the Technical Support Center (TSC) alarm for high toxic gas concentration. The toxic gas monitors and the TSC alarm can be deleted from the design based on site-specific evaluation of on-site and off-site mobile and stationary sources of toxic gases in accordance with Regulatory Guide 1.78.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 9.4-2, Control Building HVAC System

This standard departure provides for changes from the reference ABWR DCD of the smoke removal mode of operation of the Control Building HVAC System described in FSAR Subsections 6.4.4.2, 9.4.1.1.4 and 9.5.1.1.6 as described below:

- FSAR Figure 9.4-1, sheets 1 and 2 are revised to include a control room main air supply duct bypass line around the air-handling unit with two motor operated dampers for each of the two control room habitability area HVAC divisions.

- FSAR Figure 9.4-1, sheets 3 through 5 are revised to include a control building air supply bypass line with two motor operated dampers around the air-handling unit in each of the three safety-related equipment HVAC areas.
- FSAR Sections 9.4.1.1.4 and 9.5.1.1.6 are revised to describe how the dampers (described in item 1 and 2 above) operate during the smoke removal mode.

Each air supply bypass line and damper arrangement as described above is required to provide a balanced air flow such that smoke is exhausted and not transported into other areas of the control building. This air balance during smoke removal mode of operation is required because of the large mismatch between the air inlet supply (80,000m^3/h) and the air exhaust (10,000 m^3/h total; 5,000 m^3/h for each exhaust fan).

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 9.4-3, Service Building HVAC System

The Service Building HVAC System described in the reference ABWR DCD had two subsystems, the Clean Area HVAC System and the Controlled Area HVAC System. This standard departure described in STP FSAR Subsection 9.4.8 deletes the subsystems and consolidates the Service Building HVAC System to supply air to both the Clean Area and the Controlled Area. The Service Building HVAC System is included as a load powered by the Combustion Turbine Generator that can be manually loaded by the operator. This allows the Technical Support Center to be habitable under accident conditions.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 9.4-4, Turbine Island HVAC System

Further design detailing to accommodate the effects of other departures necessitates the following changes:

- Provide additional supply/exhaust air flow to accommodate additional floor area added at Elevation 5300 mm of the Turbine Building
- Relocated Electrical Building into Turbine Building that was previously located in separate Electrical Annex Building
- Incorporate changes in equipment quantity and arrangement (number of pumps in condensate, reactor feedwater and heater drain systems have been increased from 3 to 4 trains.)
- Additional Condensate Booster Pumps

- Provide adequate cooling based on the changes in heat loads in the revised Turbine Building arrangement

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.4-5, Radwaste Building Ventilation

This standard departure aligned the system described in the FSAR text with the figures depicting the system and eliminated HVAC equipment supporting the radwaste incinerator, which was deleted. The radwaste control room HVAC description was modified to be consistent with Figure 9.4-10 and the description of control room systems operation was clarified to demonstrate proper control room boundary pressurization.

A dedicated air conditioning system for electrical, HVAC equipment rooms and other areas was added as a result of design evolution.

Operation control of the exhaust air system from the radwaste process areas is augmented to automatically route the exhaust air through the filtration equipment upon detection of airborne radioactivity in the exhaust airflow, this will provide control of radioactivity release from the building and in the mean time reduce the replacement frequency of the filter banks of the air filtration equipment.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact, and affects the function, but is bounded by the safety analysis.

STD DEP 9.4-6, Control Building HVAC System

The reference ABWR DCD contains one flow element/flow switch (FE/FS) in the common discharge duct of each emergency filtration unit which is used to automatically start the standby emergency filtration unit in the event of operating unit low flow or fan failure. This departure changes the number, location and logic of these FEs/FSs. Instead of one FE/FS per division installed in the common discharge duct, a FE/FS is to be installed on the discharge side of each emergency filtration unit fan (two fans per redundant division, 4 total for CRHA HVAC System). Within each redundant division, a two-out-of-two logic signal is required to automatically initiate switchover to the standby division. Utilization of 2 FEs/FSs in this manner places the system in conformance with Technical Specification 3.3.7.1.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 9.5-1, Diesel Generator Jacket Cooling Water System

The reference ABWR DCD conformed to the inspection and testing requirements for the Diesel Generator Jacket Cooling Water System in Regulatory Guide (RG) 1.108, which was withdrawn in August 1993. Those requirements were integrated into RG 1.9. RG 1.9, Rev. 4 endorses IEEE-387, which addresses qualification, preoperational and periodic testing of the diesel generators. References to RG 1.108 are deleted and STP 3 & 4 meet the requirements of RG 1.9, Rev. 4.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.5-2, Lower Drywell Flooder Fusible Plug Valve

The reference ABWR DCD contained specific engineering design details about the fusible plugs based on an old design concept and patent application, but the actual fusible plugs were never been built and tested. The changes made to the STP 3 & 4 FSAR describe the fusible plugs in more generic terms to the system design requirements and incorporate design experience from actual design and test results:

- Clarified that 260°C is the nominal temperature for fusible plugs to open.
- Specified the opening temperature as 260°C ± 10°C.
- Added clarification of isolation valve contained in each piping line in the lower drywell.
- Revised complete specific design details about fusible plug configuration, with more generic functional and operational characteristics.
- Clarified that the fusible plug valves are not ASME Code components
- Clarified that the temperature of the surrounding air in the drywell is the measurement point for the opening temperature
- Deleted specific design detail of the original fusible plug
- Revised testing information and expanded the requirement to permit the functions of the fusible plugs to be tested separately, if applicable

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.5-3, System Description - Reactor Internal Pump Motor-Generator Sets

This standard departure consists of several changes to the technical description of the non-safety Motor-Generator (MG) Set equipment that provides power to connected reactor internal pumps (RIPs). These changes are being made to clarify the original DCD technical descriptions or to reflect changes in the actual equipment design implementation details that have evolved since the original DCD descriptions were written.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 9.5-4, Lighting and Servicing Power Supply System

Reference ABWR DCD Subsection 9.5.3 provides for the use of mercury lamps (or equivalent) for high ceilings, except where breakage could introduce mercury into the reactor coolant system. This standard departure replaces the mercury lamps with high-pressure sodium (HPS) lamps. All references to mercury lamps have been replaced with HPS lamps. This standard departure is being taken because the Federal Energy Policy Act of 2005 bans the use of mercury vapor ballasts manufactured or imported after January 1, 2008.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change does not affect any safety or design function.

STP DEP 9.5-6, Diesel Generator Fuel Oil Storage and Transfer System

This site-specific departure addresses the following design changes from the reference ABWR DCD:

- The sample connection for the Fuel Oil Storage Tank is relocated slightly above grade elevation. The fill connection is relocated at grade elevation and the vent is extended to an elevation that exceeds the maximum flood level at STP 3 & 4.
- The fuel oil storage tanks are relocated in concrete vaults underground. Stick gauge access and a gravity drain from the bottom of the tank will be added. Piping will be routed underground in concrete tunnels between the storage tanks and the Reactor Building. Cathodic protection is deleted because piping and tanks will not be directly buried.
- Locked closed isolation valves have been added to the fill and sample lines.
- A second transfer pump for the Diesel Generator Fuel Oil System has been added and the pumps have been relocated inside the 7-day storage tank as a result of the STP 3 & 4 flood level.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 9.5-7, Fire Protection - House Boiler Area of the Turbine Building

An electrically-heated house boiler will replace the fuel oil-heated boiler. Therefore, fuel oil will not be a part of the combustible loading in that room. Replacing the fuel oil-heated boiler with an electrically-heated boiler represents an improvement from a fire protection standpoint, as it decreases the combustible loading in room 247 and eliminates a potential open flame ignition source in this plant area. The combustible categories “lubricants” and “cables” remain and the combustible loadings will be quantified by a fire hazards analysis.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.1-1, Turbine Pressure Description

The reference ABWR DCD description of inlet pressure at the turbine main steam valves in Section 10.1 is correct for BWRs when the turbine inlet pressure is controlled by the pressure regulator, such that turbine inlet pressure varies linearly with reactor power level. When reactor dome pressure is controlled by the pressure regulator, the turbine inlet pressure is determined by the steam line pressure drop. In this case, reactor vessel pressure is linear, while the pressure at the turbine inlet varies as a function of steam flow and steam line pressure drop. At approximately 70% power, the turbine inlet pressure is higher than the pressure at 100% power. In the STP 3 & 4 FSAR, the description is changed to the following:

The inlet pressure at the turbine main steam valves reflects reactor power, steam line flow and pressure regulator programming, but never exceeds the pressure for which the turbine components and steam lines are designed.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.1-2, Steam Cycle Diagram

Figure 10.1-1 of the reference ABWR DCD reflects the steam and power conversion system consisting of four condensate pumps, a prescribed number of filters and demineralizers, three feedwater pumps, two heater drain tanks, a typical multipressure condenser design, and a main turbine with single stage reheat. For STP 3 & 4, four condensate booster pumps are added to this system, with three filters and six demineralizers, four reactor feedpumps, four heater drain pumps, one heater drain tank, and a turbine design with two stages of reheat. These changes are made to improve the overall cycle efficiency, plant reliability, and availability. Figure 10.1-1 is replaced to indicate these features.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.1-3, Rated Heat Balance

Figure 10.1-2 of the reference ABWR DCD heat balance diagram reflects the turbine and steam cycle design as indicated in Figure 10.1-1 of the DCD. This figure is replaced in its entirety due to the changes in Figure 10.1-1 and the new GE turbine design as described in STP 3 & 4 FSAR Section 10.2. The changes have no impact on safety or transient analysis assumptions. The inlet feedwater temperature and flow remain the same as those in the DCD.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.1-4, Valves Wide Open Heat Balance

Figure 10.1-3 of the reference ABWR DCD heat balance diagram reflects the turbine and steam cycle design as indicated in Figure 10.1-1 of the DCD for turbine valve wide open conditions. This figure is replaced in its entirety due to the changes in Figure 10.1-1 and the new GE turbine design as described in STP 3 & 4 FSAR Section 10.2. The changes have no impact on safety or transient analysis assumptions. The inlet feedwater temperature and flow remain the same as those in the DCD.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.2-1, Turbine Design

The steam turbine generator upon which the departures for STP 3 & 4 are based is GE's latest design for BWR applications with output in the 1400 - 1600 MWe range. This design incorporates the latest features to deliver enhanced performance, reliability, availability, and maintainability. Compared to the product that formed the basis of the reference ABWR DCD, the following are the significant technical differences in the latest GE turbine design:

- Two stages of reheat in the steam cycle
- Intermediate Stop and Intercept Valves instead of Combined Intercept Valves

The changes have no impact on safety or transient analysis assumptions. The two-stage reheat improves turbine steam cycle efficiency. Separate intermediate stop valves and control valves provide for enhanced performance, reliability, and maintainability.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.2-2, Turbine Rotor Design

In sections related to turbine rotor integrity, the reference ABWR DCD considered rotors of built-up construction. Today, GE's standard is the use of monoblock rotor forgings. Clarification has been provided in the STP 3 & 4 FSAR to enhance the description of turbine overspeed, design speed and their relationship to turbine rotor integrity.

The changes have no impact on safety or transient analysis assumptions. The monoblock rotor design greatly reduces the probability of turbine missiles due to overspeed, improves reliability and reduces maintenance.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.2-3, Turbine Digital Control

Significant advancements in machine protection and reliability have resulted from the advent and widespread acceptance of digital turbine controls in modern power plants. Fully redundant and diverse electronic overspeed monitoring and control has been applied over four generations of GE digital controls. In the Mk VIe, all critical protective functions are triplicate throughout, using software and hardware implemented fault tolerance techniques. Each controller contains its own power supply, processor and I/O. Emergency overspeed control goes further by employing dedicated triplication on diverse hardware with firmware based coding. Electronic overspeed in this implementation allows for full online testability without lockout of any protective function - significantly reducing the possibility of tripping during testing. Most major components of the electronic overspeed monitoring and control system are located in low radiation areas and are set up for safe, online troubleshooting and maintainability of mission critical components. GE's digital control system is designed for:

- Full compatibility with new turbine and plant level technologies yielding improvement in overall turbine performance.
- Enhanced turbine running and tripping reliability.
- Direct connection to all sensor types, eliminate failure prone interface hardware while allowing more precise diagnostics and online repair. This results in reduced mean-time-to-repair (MTTR) and increased system availability.
- Increased I/O capacity with remote mounted I/O blocks - signals are digitized closer to the source, minimizing field wiring and noise susceptibility.

The changes have no impact on safety or transient analysis assumptions. The triplicated modular redundant digital controller increases plant availability, because a single failure will not result in a turbine trip and plant shutdown. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.2-4, Bulk Hydrogen Storage

Subsection 10.2.2.2 of the reference ABWR DCD states that bulk hydrogen for the generator is stored outside but near the turbine building. Bulk hydrogen for STP 3 & 4 will be stored well away from the power block buildings. Storing the bulk hydrogen away form the power block buildings reduces the probability of inadvertent explosion or fire causing damage to the buildings. This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change is an improvement with no adverse impact.

STD DEP 10.3-1, Main Steam Line Drains

Subsection 10.3.2.1 of the reference ABWR DCD states that the drains from the steamlines inside containment are connected to the steamlines outside the containment to permit equalizing pressure across the MSIVs during startup and following a steamline isolation. STP FSAR Subsection 10.3.2.1 expands that discussion state that the Main Steam System also serves as the “alternate leakage path” to contain the radioactive steam which passes the main steam isolation valves before they close to isolate the reactor under emergency conditions. The discussion provides the details of design that provide the alternate leak path.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 10.4-1, Turbine Gland Seal Steam

A nonsafety-related gland seal evaporator (GSE) is added to the reference ABWR DCD Turbine Gland Steam System to supply sealing steam to the main turbine shaft seal glands and various turbine valve stems, including the turbine bypass and main turbine stop-control valve stems. Clean condensate water is supplied to the GSE, which can be heated by either main steam or steam from the feedwater heater drain tank. The GSE will provide isolation from the potentially contaminated heating steam and the clean steam supplied to the gland seal system. The gland seal steam that can be supplied from the electrically heated auxiliary steam system is unaffected by the addition of the GSE.

The addition of the GSE will allow operational flexibility and minimize the use of the auxiliary boiler during plant startup and shutdown. Furthermore, the gland seal steam is condensed in the gland seal condenser and the non-condensable gases are discharged to the environment. The use of the clean steam for gland sealing will minimize dose release to the environment and ALARA concerns.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.4-2, Main Condenser

The main condenser design described in the reference ABWR DCD utilizes three independent multi-pressure single-pass shells, with each shell containing at least two tube bundles, and series circulating water flow. STP 3 & 4 will utilize three condenser shells cross-connected to equalize the pressure, with each shell containing four tube bundles, and parallel circulating water flow. The changes to the main condenser are being made to optimize the design for the site and do not alter the design functions specified in the DCD.

This site-specific departure will provide four 25% capacity circulating water pumps discharging into a common header. This departure will also provide water box vacuum priming equipments not specifically included in the reference ABWR DCD. These equipments have been added to enhance the operation of the CWS. They will be used for filling the condenser water boxes and tube side of the condenser, removing accumulated air and other gases, and maintaining the condenser full during all modes of operation.

In addition, this departure eliminates the warm water recirculation operating mode to mitigate ice effects, along with deleting the associated warm water recirculation components. Based on site meteorological data, it has been determined that the mode of operation and associated components to mitigate the effects of ice in the circulating water are not required. The CWS does not serve or support any safety function and has no safety design bases. The changes being made to the CWS do not alter the design functions specified in the DCD. The site-specific changes to the CWS are being made to optimize the design for the site.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.4-3, Main Condenser Evacuation System

This site-specific departure adds an additional mechanical vacuum pump, so the design now consists of two vacuum pumps, and changes the source of motive steam supplying the steam jet air ejectors during power operation.

The mechanical vacuum pump system establishes an initial vacuum in the condenser during the initial phase of startup. The vacuum pump may also be put into service when the desired rate of air and gas removal exceeds the capacity of the Steam Jet Air Ejectors. Only one mechanical vacuum pump is required for operation. The additional mechanical vacuum pump is added to serve as a backup. The second vacuum pump will enhance reliability during power operation and increased flow capacity during startup will reduce time to achieve required condenser vacuum. This will reduce the time to draw condenser vacuum, thus reduce startup time and enhance secondary system operation.

The site-specific design uses main steam as the main source to drive the Steam Jet Air Ejectors instead of utilizing cross-around steam with main steam as a backup. This eliminates possible transient effects, such as partial loss of condenser vacuum or inadequate steam dilution of radiolytically generated hydrogen, which might occur during a switchover from cross-around steam to main steam.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 10.4-4, Condensate Purification System

The site-specific departure includes the following changes:

- Under normal conditions, all six mixed bed ion exchange demineralizer vessels will be operated instead of leaving one in standby. A standby demineralizer is not needed, since one vessel can be isolated and the remaining five demineralizers can support rated power operation.
- The DCD design requires the CPS flow controllers and sequences to be at least dual redundant and the vessel flow signals and bypass arranged such that the condensate system flow will be uninterrupted even in the presence of a single failure. For STP 3 & 4, flow controllers are not used to control demineralizer vessel flows.
- In the DCD design, double isolation valves are provided in the bypass line to prevent unpolished condensate from leaking through the bypass line. In STP 3 & 4, one isolation valve is used in the bypass line.

The system changes as described in STP 3 & 4 FSAR Subsection 10.4.6, along with that described in the DCD, have been shown to be reliable in the maintenance of reactor water chemistry in operating ABWRs.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 10.4-6, Load Rejection Capability

Because the ABWR standard design has a turbine bypass system capacity of 33% of nuclear boiler rated flow, it can accommodate a 33% load reduction without reactor trip by full opening of the bypass valves. It can also accommodate a turbine trip from 33% power or below without reactor trip. Turbine trip or generator load rejection from power levels above 33% will result in a reactor trip, with attendant opening of SRVs if the trip is from sufficiently high power levels. Subsection 10.4.4.2.3 of the STP 3 & 4 FSAR has been clarified regarding this point.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 10.4-7, Turbine Bypass Hydraulic Control

STP 3 & 4 Figure 10.4-9 is revised to indicate the use of valve position transmitters, one hydraulic accumulator for each bypass valve, the addition of the fast-acting solenoid valve, and the interface with the Steam Bypass and Pressure Control System for positioning of the bypass valves.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 11.2-1, Liquid Radwaste Process Equipment

This section of the reference ABWR DCD including all subsections, figures, and tables (except for P&IDs) is replaced completely due to a departure in the design of the liquid radioactive waste system. The departure includes the use of mobile technology and deletes the forced-circulation concentrator system. The following liquid waste management system (LWMS) description reflects the changes to the system that have been generated by this standard departure.

The Liquid Radwaste System is composed of three subsystems designed to collect, treat, and recycle or discharge different categories of waste water. The three subsystems are the Low Conductivity (LCW) Subsystem, High Conductivity (HCW) Subsystem, and Detergent Waste Subsystem.

The LCW subsystem collects and processes clean radwaste (i.e., water of relatively low conductivity). Equipment drains and backwash transfer water are typical of wastes found in this subsystem. These wastes are collected, filtered for removal of insolubles, demineralized on a mixed resin, deep-bed demineralizers for removal of solubles, processed through a second polishing demineralizer, and then routed to condensate storage unless high conductivity requires recycling for further treatment. A second LCW filter, arranged in parallel with the first, is also provided.

The HCW subsystem collects and processes dirty radwaste (i.e., water of relatively high conductivity and solids content). Floor drains are typical of wastes found in this subsystem. These wastes are collected, chemically adjusted to a suitable pH for evaporation, and concentrated in a forced-circulation concentrator with a submerged, steam-heated element to reduce the volume of water containing contaminants and to decontaminate the distillate. The distillate is demineralized to remove any soluble contaminants that could potentially be carried over from the concentrator.

The ABWR radwaste system utilizes submerged-feed, forced circulation concentrators. Chemical addition and sampling equipment are provided for feed pretreatment to prevent excessive fouling and subsequent high carryover, and to protect the concentrator from corrosion. Concentrator feeds are concentrated to the required specific gravity and discharged to the solids handling equipment.

The detergent waste subsystem collects and processes detergent wastes from personnel showers and laundry operations. Normally, detergent wastes are collected in the detergent tank and processed through a detergent filter and discharged.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 11.4-1, Radioactive Solid Waste Update

Described below are Solid Waste Management System (SWMS) modifications addressed in this standard departure:

The solidification system and the incinerator system are deleted because equipment operation and maintenance difficulties negatively impact the effectiveness of these processes. The compactor system is deleted as well.

A second spent resin storage tank is added to provide the capability to keep the spent resins from the Condensate Purification System and the spent resins from the LWMS mobile systems ion exchangers in separate spent resin storage tanks for radioactive decay and storage. This segregation allows the used condensate polishing resin from the Condensate Purification System may be used in the HCW demineralizer in the high conductivity waste subsystem. The reuse of the condensate resin helps to minimize the generation of radioactive waste.

The SWMS mobile system consists of equipment modules, complete with all subcomponents, piping and instrumentation and controls necessary to operate the subsystem. Solid wet radwaste processing is performed using mobile dewatering processing subsystem. The mobile dewatering processing subsystem is comprised of dewatering fillhead assembly, dewatering pump skid, waste control valve, control console and dewatering container. The mobile dewatering processing subsystem includes the adequate shielding required between the radiation sources of the modules and access and service areas in the radwaste building. Components are in module(s) designed for installation and replacement due to component failure and/or technology upgrade.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STP DEP 11.5-1, Process and Effluent Radiation Monitoring and Sampling System

There are several changes that have been made for this system:

- Functional Requirements set forth in the reference ABWR DCD will be met, but implementation of design and specific equipment is vendor-based.
- References to specific detector types, such as digital gamma sensitive Geiger-Mueller or ionization chamber or scintillation detector, were deleted. Specific detector types will be selected later in the project based on state of the art and availability.
- Trip functionality for radiation monitors has been modified such that downscale (low) and inoperative are combined into one trip circuit rather than two separate circuits. Thus, each radiation monitor has three trip circuits: two upscale and one downscale/inoperative. Each trip is determined by the radiation monitor and then sent to the main control room for visual display.

- As for radiation units, Sievert is preferred to using Gray. Sieverts specifically address absorbed radiation dose in human tissue while Gray refers to radiation dosage in any material.
- Recorders have been removed because data recording is performed by trending software in the Digital Control and Instrumentation System. The units are measured in MBq/cm^3 for consistency in dynamic detection ranges and expected activity.
- Valve control from the main control room is performed from displays and not by using switches.
- STP 3 & 4 will not have an incinerator for burning low-level radwaste, so the incinerator stack discharge radiation monitor is not required. Sections and references to this monitor have been removed.
- References to specific calibration techniques and maintenance procedures are removed. These techniques and methods, such as calibration reproducibility, error, precision, and timelines for maintenance, are specific to site procedures or are supplied by the equipment vendors.
- FSAR Table 11.5-1 provides estimated channel ranges based on existing plants. Channel ranges will only be finalized after analyses and calculations are complete.
- Warning alarms are provided in the text of the specific section for each radiation monitor and do not need to be provided in the table. Table 11.5-2 and Table 11-5- 3 provide expected activity, dynamic detection ranges and sensitivity. Dynamic detection ranges are calculated based on the radionuclides and the sensitivity of the radiation monitor. As the sensitivities are vendor provided, the dynamic detection range is estimated. Sensitivities are not included in the table as they are vendor provided.
- The current Offgas System has the offgas bypass valve closing prior to the offgas discharge valve. The bypass valve is closed on a high channel trip while the discharge valve closes on a high-high or downscale/inoperative trip.
- For Control Building HVAC Radiation Monitoring, a high-high or downscale/inoperable provides a signal to the Control Building HVAC System to initiate Post Radiation Release Operating Mode. In this mode, the contaminated air is rerouted. This is done by closing the exhaust dampers and initiating the emergency air filtration system. Stopping the area exhaust fans is not part of the emergency air filtration system.
- The High-High alarm for the Gland Seal Condenser Exhaust is added to be consistent with DCD IBDs.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The changes:

- do not affect any safety or design function,
- have no adverse impact,
- are bounded by the safety analysis.

STD DEP 12.3-1, Cobalt Content in Stainless Steel

This departure revises the requirements for the material specification for the stainless steel component exposed to reactor coolant with specific reference to the cobalt content in the stainless materials.

The vendors supplying the material cannot reasonably achieve the cobalt limits in all cases. GEH/STP has taken a graded approach to cobalt concentrations, with the material in the core receiving the least amount of cobalt. The cobalt concentrations are allowed to increase with the distance from the core. The overall cobalt limit for all reactor vessel material is 0.05 wt percent. Lower target values (aim limits) are provided to the material vendor as goals to trend for.

During the ABWR Certification process the average annual occupational exposure calculation was performed. The reduced cobalt loadings were not considered in that estimate. Therefore, based upon the method used and the assumptions made to evaluate the occupational exposure, materials procured with a 0.05 wt percent maximum cobalt requirement with lower ALARA target values of cobalt for radiologically significant areas will have no adverse affect on the estimated occupational exposure.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change affects the function, but is bounded by the safety analysis.

STD DEP 12.3-2, Deletion of CUW Backwash Tank Vent Charcoal Filter

This departure deletes the statement in Subsection 12.3.1.4.1 which states that the vent off the CUW backwash tank is fitted with a charcoal filter canister to reduce the emission of radioiodines into the plant atmosphere. A review of the system diagrams for the CUW system show no such filter as part of the approved design. The current design intent is for the CUW backwash tank to be vented into the Reactor Building HVAC System exhaust, which eventually exits the plant via the plant stack as a monitored release.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 12.3-3, Steam Tunnel Blowout Panels

This departure revises the statement in subsection 12.3.1.4.4 which states “The blowout panels for the steam tunnel are located in the relatively inaccessible upper section of the RHR heat exchanger shielded cubicle which are controlled access areas." The approved design does not have blowout panels in the steam tunnel, but instead identifies that the main steam tunnel is vented to the turbine building. This departure is taken to allow FSAR Section 12.3 to agree with the subsections noted above.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 12.3-4, Alarm Capability for Area Radiation Monitors (ARMs)

This departure revises STP 3 & 4 FSAR Tables 12.3-3, 12.3-6 and 12.3-7, and Figures 12.3-56, -57, -58, -60, and -62. The ARMs installed at STP will have an alarm capability. Five additional monitors are required in the Reactor Building and will be added to the appropriate drawing.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 14.2-1, Control Rod Drive Friction Testing Requirement

The DCD requirement for performing control rod drive (CRD) friction testing at rated pressure is deleted. CRD friction testing is a traditional requirement performed on older BWR designs with CRDs positioned using hydraulic pressure. The ABWR employs a design in which normal rod positioning is accomplished by an electric motor. Mechanical binding (friction) of an ABWR CRD will result in blade separation from the ball nut which would be detected by permanently installed instrumentation. Thus ABWR CRDs are easily monitored for performance degradation during normal CRD withdrawal and periodic friction testing is not required.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 18.4-1, Main Generator Synchronization Control Relocation

The controls required for the synchronization of the main generator have been relocated from the control console to the main control panel. Most synchronizations are expected to be performed via the plant computer as part of the Power Generation Control System and more critical tasks were allocated control console space. The main generator controls are now located on the main control panel near the in-plant electrical distribution system and the emergency diesel generator controls.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 19.3-1, Evaluation of Common Cause Failures

ABWR Standard Safety Analysis Report (SSAR) Chapter 19.D.8.6 documents the results of a PRA sensitivity analysis on common cause failure of selected mechanical systems performed by GE in response to a request from the NRC during the ABWR certification process. The final paragraph in SSAR Chapter 19.D.8.6 summarizes the results of the sensitivity analysis and indicated that the common cause factors evaluated will be added to the plant PRA model in any future revised basic quantification of the ABWR. The common cause factors were added to the ABWR plant model used to quantify the effects of plant-specific factors for South Texas Project Units 3 & 4. The addition of the common cause terms represents a departure from the PRA described in the reference DCD.

This departure has been evaluated and determined to comply with the requirements of 10 CFR 52, Appendix A, Section VIII.B.5 as described previously. The change has no adverse impact.

STD DEP 19.7-1, Control Rod Drive Improvements

Subsection 19.7.2, item 4 of the reference ABWR DCD discusses Control Rod Drive Improvements. The second paragraph seems to indicate that the Fine Motion Control Rod Drive (FMCRD) brake design had to be fully testable on an annual basis.

However, the FMCRD electro-mechanical brake is a Class 1E safety-related component with a 10-year Environmental Qualification replacement life. Brake performance characteristics testing is performed every 10 years when a replacement/new brake is installed. Hitachi recommends approximately 20 motor sub-assembly units, including the brake, to be tested during the 18-month refueling outages. STP 3 & 4 FSAR Subsection 19.7.2 will reflect these changes.

This departure has been evaluated and determined to comply with the requirements in 10 CFR 52, Appendix A, Section VIII.B.5, as described previously. The change has no adverse impact.

STD DEP 19I.7-1, Atmospheric Control System Bypass Analysis

Appendix 19I of the reference ABWR DCD discusses the seismic margins analysis that evaluated the capability of the plant and equipment to withstand a large earthquake of two times the safe shutdown earthquake. Section 19I.7 of the DCD states that the seismic margins PRA for the Atmospheric Control System 50 mm crosstie valves requires the opening of two normally closed motor-operated valves to create a containment bypass path. This analysis has been changed in the STP 3 & 4 FSAR to reflect the design of air-operators on these valves. Hence, this analysis is the same as for the main purge valves.

This departure has been evaluated and determined to comply with the requirements of 10 CFR 52, Appendix A, Section VIII.B.5 as described previously. The change has no adverse impact.