Nuclear Operating Company

South Texas Project Electric Generating Station 4000 Avenue F – Suite A Bay City, Texas 77414

September 8, 2009
U7-C-STP-NRC-090133

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Request for Additional Information

Attached are the responses to the NRC staff questions included in Request for Additional Information (RAI) letter numbers 183, 210 and 211 related to Combined License Application (COLA) Part 2, Tier 2, Sections 9.2.1, 9.4.1, 9.4.3 and 17.6S. This submittal completes the response to these RAI letters.

The thirteen (13) attachments to this letter address the responses to the RAI questions listed below:

09.02.01-1	09.04.01-1	09.04.03-1	17.06-1
09.02.01-2			17.06-2
09.02.01-3			
09.02.01-4			
09.02.01-5			
09.02.01-6			
09.02.01-7			
09.02.01-8			
09.02.01-9			

When a change to the COLA is indicated, it will be incorporated in the next routine revision of the COLA following the NRC acceptance of the RAI response.

There are no new commitments in this letter.

D091
NRO

STI 32531637

If you have any questions, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 9/8/09

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

jaa

Attachments:
1. RAI 09.02.01-1
2. RAI 09.02.01-2
3. RAI 09.02.01-3
4. RAI 09.02.01-4
5. RAI 09.02.01-5
6. RAI 09.02.01-6
7. RAI 09.02.01-7
8. RAI 09.02.01-8
9. RAI 09.02.01-9
10. RAI 09.04.01-1
11. RAI 09.04.03-1
12. RAI 17.06-1
13. RAI 17.06-2

cc: w/o attachment except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Division for Regulatory Services
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspections Unit Manager
Texas Department of State Health Services
P.O. Box 149347
Austin, TX 87814-9347

C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

*Steven P. Frantz, Esquire
A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave. NW
Washington D.C. 20004

*George F. Wunder
*Tom Tai
*Raj Anand
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George F. Wunder
*Tom Tai
*Raj Anand
Loren R. Plisco
U. S. Nuclear Regulatory Commission

Steve Winn
Eddy Daniels
Joseph Kiwak
Nuclear Innovation North America

Jon C. Wood, Esquire
Cox Smith Matthews

J. J. Nesrsta
R. K. Temple
Kevin Pollo
L. D. Blaylock
CPS Energy

RAI 09.02.01-1

QUESTION:

Standard Review Plan 9.2.1, Station Service Water System, Sections II and III, and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)", provide guidance on the specific information that should be included in the application for evaluation by the staff. The applicant is required to address system interface requirements.

The DCD Tier 2, Section 9.2.16.2.5, Instrumentation and Alarms (Interface Requirements) required the following to be addressed in the COL application: (1) the TSW pump status shall be indicated in the main control room, (2) the TSW pump trip shall be alarmed and the automatic start of the standby pump shall be annunciated in the control room, and (3) an alarm in the control room shall indicate high differential pressure on across the duplex filter. The COL did not provide a corresponding section in the application to address these interface requirements, nor could the staff find this information in any other sections of the COL application. The COL applicant is asked to provide the required interface requirements information to confirm the following (1) the TSW System pump status is indicated in the main control room, (2) the TSW system trip is alarmed and the automatic startup of the standby pump is annunciated in the main control room, and (3) high differential pressure across the duplex filters is alarmed in the main control room.

RESPONSE:

In Rev 2 of the COLA, a supplement for Section 9.2.16.2 titled "Portions Outside the Scope of ABWR Standard Plant" was provided which replaces the corresponding DCD section in its entirety. As part of that replacement, Section 9.2.16.2.5 was inadvertently omitted. The COLA will be revised as shown in the attached markup of Rev 2 of the COLA to add Section 9.2.16.2.5 exactly as it appears in the DCD. Changed areas of the COLA are highlighted with gray shading.

The attached COLA markup also includes the COLA markup which is required in the response to RAI 09.02.01-2 which requires adding Section 9.2.16.2.6 to the COLA.

9.2.16.2.4 Safety Evaluation (Interface Requirements)

STP DEP 9.2-10

The following site-specific departure addresses the COL License Information item in this subsection.

As demonstrated by multiple means in Subsection 3.4.1.1.2.5, a break in the TSW line will not result in flooding of safety-related structures, systems, and components.

9.2.16.2.5 Instrumentation and Alarms (Interface Requirements)

TSW System pump status shall be indicated in the main control room.

TSW System trip shall be alarmed and the automatic startup of the standby pump shall be annunciated in the main control room.

High differential pressure across the duplex filters shall be alarmed in the main control room.

9.2.16.2.6 Tests and Inspections (Interface Requirements)

All major components are tested and inspected as separate components prior to installation, and as an integrated system after installation to ensure design performance. The systems are preoperationally tested in accordance with the requirements of Chapter 14.

The components of the TSW System and associated instrumentation are accessible during plant operation for visual examination. Periodic inspections during normal operation are made to ensure operability and integrity of the system. Inspections include measurements of cooling water flows, temperatures, pressures, water quality, corrosion-erosion rate, control positions, and setpoints to verify the system condition.

RAI 09.02.01-2

QUESTION:

Standard Review Plan 9.2.1, Station Service Water System, Sections II and III, and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)", provide guidance on the specific information that should be included in the application for evaluation by the staff. The applicant is required to address system interface requirements.

The DCD Tier 2, section 9.2.16.2.6, Tests and Inspections (Interface Requirements) specifies testing and inspection requirements for the TSW system: (1) The TSW system major components to be tested individually prior to installation and as an integrated system after installation. Preoperational tests are performed in accordance with Chapter 14 of the COL and (2) TSW system components and instrumentation are accessible for examination during plant operation. Periodic inspections are made during plant operations for operability and system integrity. The DCD specifies the types of measurements to be made during periodic rounds. The COL did not provide a corresponding section in the application to address these interface requirements, nor could the staff find this information in any other sections of the COL application. The NRC staff requests the applicant to provide the required interface requirements information to address the TSW testing and inspection interface requirements: (1) TSW system components are tested individually prior to installation and as an integrated system after installation, (2) Preoperational test are performed in accordance with COL Tier 2 Section 14, (3) the components of the TSW System are accessible during plant operations for visual examination, and (4) plant inspections include measurements of cooling water flows, temperatures, pressures, water quality, corrosion-erosion rate, control positions, and setpoints to verify the system conditions.

RESPONSE:

In Rev 2 of the COLA, a supplement for Section 9.2.16.2 titled "Portions Outside the Scope of ABWR Standard Plant" was provided which replaces the corresponding DCD section in its entirety. As part of that replacement, Section 9.2.16.2.6 was inadvertently omitted. The COLA will be revised as shown in the markup of Rev 2 of the COLA provided in the response to RAI 09.02.01-1.

RAI 09.02.01-3

QUESTION:

Standard Review Plan 14.3, Inspection, Tests, Analyses, and Acceptance Criteria, and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)", provide guidance on the specific information that should be included in the application for evaluation by the staff. The applicant must address inspections, tests, analyses, and acceptance criteria (ITAAC) in the Combined License (COL) application.

The staff found that the proposed ITAAC in South Texas Plant COL application Tier 2, Part 9, Section 3.0, Site Specific ITAAC, to be inadequate. The Turbine Service Water (TSW) System instrumentation, leak isolation features, and the Turbine Building (TB) design configuration required to prevent flooding of the TB which then could result in flooding of safety related systems, structures, and components (SSC) are not addressed in the ITAAC.

In the staff's evaluation of the Tier 2 COL, Section 9.2.16.2.4, Safety Evaluation (Interface Requirements) for the TSW System, Section 3.4.1.1.2.5 of the Tier 2 COL was reviewed to determine if a break in the TSW System piping could result in flooding that could affect safety related SSCs. As indicated in the evaluation of the TSW floods, the design includes system isolation signals from leak detectors in the TSW System equipment room. In the event that system isolation fails due to leak detector failure, there are other means to prevent the leak from crossing into other safety related buildings. The first is a closed and alarmed door connecting the passage from the TB to the service building. The second is the radwaste tunnel seal at both ends of the tunnel to prevent water from entering the tunnel. In the event a large hydrostatic head could occur in the TB, a large non-water tight truck door is at grade, providing a release point for any flooding water. The staff views these described measures to be important design features that require verification through tests and inspections to ensure that safety related SSCs are protected from potential TSW System pipe breaks and resulting flooding. The NRC staff requests the applicant to provide an ITAAC item to verify through tests and inspections that the leak detection instrumentation, system isolation, and other described design features provide the TB flood protection described in the COL.

RESPONSE:

As described below, the ABWR DCD contains provisions, including design considerations and ITAAC, to ensure that a break in the TSW System piping will not result in flooding that could affect safety-related SSCs. Therefore, the requested addition of a new ITAAC item is not warranted, and furthermore would not be consistent with the NRC's provisions on finality of standard design certifications contained in 10 CFR 52.63.

The Turbine Building design description contained in ABWR DCD (Tier 1), Section 2.15.11, specifies provisions on flood conditions in the Turbine Building to prevent potential impacts on safety-related SSCs. These provisions include watertight penetrations between the Turbine Building and the tunnel connecting the Radwaste Building, Turbine Building, Control Building,

and Reactor Building. In addition, these ABWR DCD Tier 1 design provisions include the following:

> *Flood conditions in the T/B* [Turbine Building], *except for the electrical building, are prevented from propagating into the Control Building (C/B) via the Service Building* [S/B]. *This is achieved by locating the access from the T/B to the S/B at or above grade level and providing a flood control doorway at the access location.*

The ABWR DCD (Tier 1), Table 2.15.11, includes an ITAAC (Item 1) that requires verification that the as-built Turbine Building conforms with the basic configuration described in the ABWR DCD (Tier 1), Section 2.15.11, as discussed above. Thus, the ABWR DCD (Tier 1) already includes an ITAAC item that will verify that Turbine Building flood conditions, including but not limited to those resulting from a postulated break in TSW System piping, would not adversely affect safety-related SSCs. Therefore, the requested addition of a new ITAAC item for postulated Turbine Building flood conditions is not warranted.

Furthermore, as indicated above, the requested additional ITAAC would not be consistent with the NRC's provisions on finality of standard design certifications contained in 10 CFR 52.63. Specifically, the ABWR DCD (Tier 2), Section 3.4.1.1.2.5, discusses the system isolation signals for leak detectors and the non-watertight truck door. During the original development of Tier 1 for the ABWR DCD, those elements were not elevated to Tier 1 status. That determination has finality in accordance with 10 CFR 52.63.

No COLA revision is required as a result of this RAI response.

RAI 09.02.01-4

QUESTION:

Standard Review Plan Section 9.2.1, "Station Service Water System," Sections II and III, and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provide guidance on the specific information that should be included in the application for evaluation by the staff. The applicant should provide minimum system heat transfer requirements for normal plant operations, shutdown, and accident conditions.

In Section 9.2.15.2.1 of the ABWR Design Control Document (DCD), the Combined License (COL) applicant is required to address a safety design bases interface requirement to provide the temperature increase and pressure drop across the heat exchangers served by the reactor service water (RSW) system. In the South Texas Plant COL application FSAR, Section 9.2.15.2.1, item (1) the applicant referenced Table 9.2-4d, "Design Characteristics," for reactor building cooling water system components which only provides the heat exchanger design temperature (71 degrees C) and not the required temperature increase. It appears that this information (temperature increase) is however provided in Table 9.2-17, "Design Data for Reactor Service Water," so the reference to Table 9.2-4d in the COL application appears to be incorrect of the COL application. Also, the pressure drop across the reactor building cooling water (RCW) heat exchangers that are cooled by the RSW system were not provided, instead the applicant committed to provide this information following procurement, but before installation of equipment, in Table 9.2-17. The COL applicant is asked to clarify where the required temperature increase information to address this interface requirement is to be found in the COL application. Additionally, the applicant is asked to provide the required pressure drop across the RCW heat exchangers in the COL application.

RESPONSE:

In Section 9.2.15.2.1, the reference provided for the temperature increase for the RCW heat exchanger was incorrect. The correct reference should have been Table 9.2-17.

The required pressure drop across the RCW heat exchanger will be available after RCW heat exchanger procurement award, and receipt of final vendor drawings and data. This information will be available per the Current Design Report Date in Table 1 of RAI 03.09.03-3.

As a result of this RAI response, COLA Revision 2, Part 2, Tier 2, Subsection 9.2.15.2.1(1) will be revised as shown below with changes indicated by gray shading.

9.2.15.2.1 Safety Design Bases (Interface Requirements)

The following site-specific supplement addresses COL License information Items 1 through 6 in this subsection. Additional interface requirements from DCD Tier 1, Subsection 2.11.9 (Items (2), (4), (5), and (7)) are included under Item 7:

(1) The design characteristics for the Reactor Building Cooling Water System Heat Exchangers (RCW Heat Exchangers) are provided in Tables 9.2-4d and 9.2-17. The pressure drop across the heat exchangers will be provided following procurement, but before installation of equipment, in Table 9.2-17 (COM 9.2-1).

RAI 09.02.01-5

QUESTION:

Standard Review Plan Section 9.2.1, "Station Service Water System," Sections II and III, and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provide guidance on the specific information that should be included in the application for evaluation by the staff. The applicant should provide design information to conclude that the service water system pumps have sufficient available net positive suction head at the pump suction locations with low water levels.

In Section 9.2.15.2.1 of the ABWR Design Control Document (DCD), the Combined License (COL) applicant is required to address safety design bases interface requirement 2 to provide the required and available net positive suction head for the reactor service water (RSW) pumps at pump suction locations considering anticipated low water levels. The South Texas Project COL application FSAR, Section 9.2.15.2.1, Item 2, states that the available NPSH referenced to the pump centerline is approximately 17 meters (55.65 feet) considering all losses. The required NPSH was not provided but a commitment was made to provide this information following RSW pump procurement, but before installation, in Table 9.2.17. The staff requests the applicant to provide the required available net positive suction head data for the RSW pumps in the COL application. The COL applicant needs to conclude that the STP design ensures that RSW pumps have sufficient NPSH at the pump suction locations with anticipated low water levels.

RESPONSE:

As noted in Part 2, Tier 2, Subsection 9.2.15.2.1(2) of Rev 2 of the COLA, the RSW pump purchase documents will specify that the NPSH required at the pump centerline shall be less than the NPSH available for all operating modes of the RSW pump.

The required NPSH for the RSW pumps at pump suction locations considering anticipated low water levels will be available after RSW pump procurement award, and receipt of final vendor drawings and data. This information will be available per the Current Design Report Date in Table 1 of RAI 03.09.03-3.

No COLA change is required as a result of this response.

RAI 09.02.01-6

QUESTION:

Standard Review Plan (SRP) Section 9.2.1, "Station Service Water System," Sections II and III, and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provide guidance on the specific information that should be included in the application for evaluation by the staff. The applicant needs to address inspections, tests, analyses, and acceptance criteria (ITAAC) in the Combined License (COL) application.

The staff found that the proposed site specific ITAAC in South Texas Plant COL application Part 9, Section 3.0, "Site Specific ITAAC," Table 3.0-5, "Reactor Service Water (RSW)," to be inadequate. The RSW pumps net positive suction head (NPSH), required and available, requires verification through a site specific ITAAC item prior to plant startup. The staff reviewed the site specific ITAAC in Part 9, Section 3.0, Table 3.0-5. The staff found no specific ITAAC item to assure that the pump design is adequate in regards to NPSH. The NRC staff requests the applicant to provide the site specific ITAAC to verify, through test and verification, the NPSH requirements for the RSW pumps.

RESPONSE:

STPNOC will add a site-specific ITAAC to verify, through test and verification, the NPSH requirements for the RSW pumps. The new site-specific ITAAC is shown in the following markup of the STP Units 3 and 4 COLA, Part 9, Table 3.0-5.

COLA Part 9, Inspections, Tests, Analyses, Acceptance Criteria, Table 3.0-5

Table 3.0-5 Reactor Service Water System (RSW)

Design Requirement	Inspections, Tests, Analyses	Acceptance Criteria
6. ~~Not Used.~~ The RSW pumps have sufficient NPSH available at the pumps.	6. ~~Not Used.~~ Inspections, tests and analyses will be performed upon the as-built system. NPSH tests of the pumps will be performed in a test facility. The analyses will consider the effects of: – Pressure losses for pump inlet piping and components. – Suction from the UHS basin with water level at the minimum value. – Maximum pressure drop through the perforated plate installed above the suction line intake. – Design basis fluid temperature (35°C). – UHS basin and corresponding return to the cooling towers at atmospheric pressure.	6. ~~Not Used.~~ The available NPSH exceeds the NPSH required by the pumps.

RAI 09.02.01-7

QUESTION:

Standard Review Plan Section 9.2.1, "Station Service Water System," and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provide guidance on the specific information that should be included in the application for evaluation by the staff. SRP 9.2.1, Section III.5 specifies having a commitment for venting and filling of systems and to maintain operating procedures for the avoidance of water hammer.

In Section 9.2.15.2.1 of the ABWR Design Control Document (DCD), the Combined License (COL) applicant needs to provide RSW system low point drains and high point vents. All divisions are to be maintained full of water to prevent water hammer when not in service except during maintenance. The COL application, FSAR Section 9.2.15.2.1, Item 6 indicates that system low point drains and high point vents have been provided in the design. Item 6 of Section 9.2.15.2.1 also states that the divisions are to be maintained full of water to prevent water hammer when not in service except when undergoing maintenance. The applicant however does not identify that operating procedures will be prepared for filling, draining, and maintaining the RSW system full of water to prevent the occurrence of a water hammer event. The NRC staff requests the applicant to specify in the FSAR the development and use of specific operating procedures for draining, filling, and operating the RSW full of water, except when undergoing maintenance, to prevent the occurrence of a water hammer event in the system.

RESPONSE:

The development and use of specific operating procedures for draining, filling, and operating the RSW full of water, except when undergoing maintenance, to prevent the occurrence of a water hammer event in the system, are provided in Section 13.5.3.4.5 of Part 2, Tier 2, of Rev 2 of the COLA. In order to clarify that these procedures are intended to prevent the occurrence of water hammer, Part 2, Tier 2, Subsection 13.5.3.4.5 will be revised as shown in the following markup of Rev 2 of the COLA. The changed portion is highlighted in gray shading.

13.5.3.4.5 System Operating Procedures

Instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation, returning to service following testing (if not contained in the applicable testing procedure), and other instructions appropriate for operation of systems and prevention of water hammer will be delineated in System Operating Procedues. As discussed in Section A3 of ANSI/ANS-3.2, typical System Operating Procedures are listed below:

RAI 09.02.01-8

QUESTION:

Standard Review Plan Section 9.2.1, "Station Service Water System," and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provide guidance on the specific information that should be included in the application for evaluation by the staff. Information should be presented in the FSAR concerning the anti-siphon capability of the service water system.

The Design Control Document, Tier 1, Section 2.11.9, "Interface Requirements," item (5), states that if required by the elevation relationships between the ultimate heat sink and the reactor service water (RSW) system components in the control building (CB), the RSW system shall have anti-siphon capability to prevent a CB flood after an RSW system break and after the RSW pumps have been stopped. FSAR Section 9.2.15.2.1 addressed this DCD Tier 1 interface requirement by stating that anti-siphon capability is not required. However, the COL application does not provide sufficient information to form a basis for this conclusion. The staff could not locate information, such as elevation data in the DCD or the COL application drawings, to support the conclusion that anti-siphon measures are not required. The staff requests the COL applicant to provide a basis, such as site elevations or other design features that would justify the conclusion that anti-siphon capability is not required to prevent a CB flood after an RSW system break and after the RSW pumps have been stopped.

RESPONSE:

The design of the Ultimate Heat Sink (UHS) and elevation relationships between the UHS and RSW system components in the Control Building do not require anti-siphon capability to prevent a CB flood due to an RSW system pipe failure. As described in COLA Section 19R.4.4, the UHS is at an elevation higher than the Control Building RCW/RSW rooms such that draining of UHS water through the RSW system to the RCW/RSW rooms is possible. Elevation relationships of the UHS and RSW pumps are shown in COLA Figures 1.2-35 and 1.2-36. As described in COLA Part 2, Sections 19R.1(3), 19R.4.4, and 19R.5.4.1 and COLA Part 7, Chapter 3, STP DEP 19R-1 Description, potential flooding of the RCW/RSW rooms is mitigated by flood level detection with redundant sensors which automatically trip the affected RSW pumps and close the associated RSW isolation valves within the affected division.

The original concept for RSW design was to use vertical RSW pumps, per DCD Figure 9.2-7. Anti-siphon measures would be appropriate for vertical pump discharge piping which extends above the UHS water surface, where a vacuum could form in the discharge piping after the RSW pumps are tripped, allowing the UHS basin to drain through a failed RSW pipe via a siphon effect. However, the RSW design for STP 3&4 utilizes horizontal centrifugal pumps located in the RSW pump house, below the water surface elevation in the UHS basin. The RSW pump suction and discharge piping are below the UHS water elevation, and there will be a positive static pressure within the RSW piping during postulated RSW pipe failures after the RSW pumps

are tripped. Also, as depicted in COLA Figure 9.2-7, the RSW return piping to the UHS cooling towers extends above the UHS water surface. Thus, anti-siphon measures are not required for this design. Rather, active closure of RSW isolation valves is relied upon to mitigate potential flooding within the RCW/RSW rooms in the Control Building.

There are no changes to the COLA as a result of this RAI response.

RAI 09.02.01-9

QUESTION:

Standard Review Plan Section 9.2.1, "Station Service Water System," and Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," provide guidance on the specific information that should be included in the application for evaluation by the staff.

Tier 2 DCD, Section 9.2.15.2.2, interface requirement (1) requires the RSW system to be able to function during abnormally high or low water levels and that steps are taken to prevent organic fouling of the system, including trash racks and provisions for biocide treatment. Thermal backwashing is to be provided where infestations of microbial growths can occur. FSAR Section 9.2.15.2.2 provides the site specific information related to this interface requirement, specifically operation during abnormally high or low water levels and the use of biocide treatments. However, this section makes no statement concerning the inclusion of trash racks in the design. The need for thermal backwashing to control microbial infestations is also not addressed. The staff requests the applicant to provide further information to comprehensively address the power generation interface requirement (1) of Tier 2 DCD, Section 9.2.15.2.2.

RESPONSE:

STP 3&4 does not have trash racks, bar grates or thermal backwashing provisions in the Reactor Service Water (RSW) or Ultimate Heat Sink (UHS) systems. Trash racks are typically used for water systems in which suction is taken from a lake, river or ocean, where aquatic life or large debris can be pulled into the system. This feature is not necessary for STP 3&4 since the primary makeup water for the RSW and UHS systems is provided from wells, which are free of aquatic life and large debris. The secondary makeup water source is from the Turbine Service Water system, which utilizes strainers to remove debris from the makeup water. A perforated plate exists above the RSW pump suction sump, for investment protection purposes, to preclude any large debris from entering the RSW loop that could damage or plug-up downstream equipment (i.e. pumps, heat exchangers, etc.).

The STP 3&4 RSW system design does not include thermal backwashing. This feature is typical in water systems to assist in the control of microbial growth. However, chemical treatment of the UHS basin water will be sufficient for the control of microbial growth.

To clarify the STP 3&4 design regarding trash racks and thermal backwashing for the RSW system, FSAR Subsection 9.2.15.2.2(1) will be revised. The revision to this COLA Part 2, Tier 2 subsection is shown below, with changes from COLA Rev. 2 highlighted in gray shading.

> The RSW System is designed to function during abnormally high and low water levels at the RSW pump suction. The minimum basin water level to ensure a 30-day post accident supply with no makeup is 23.55 meters MSL. The RSW pumps are designed to provide adequate flow and head at low water level of 5.18 meters MSL. To prevent biological fouling and microbial infestations, a biocide treatment is implemented using an intermittent injection upstream of the RSW pump. Thermal backwashing will not be utilized. Trash racks are not required due to the lack of large debris in the sources of makeup water.

RAI 09.04.01-1

QUESTION:

HVAC potential contamination issues

In order to meet the objectives of 10 CFR part 20.1406, state in the appropriate sections of 9.4 of the FSAR provisions that are made to monitor and collect condensate that may form at coolers or in HVAC ducts that may contain contamination. Regulatory Guide 4.21 provides guidance in this regard. Include provisions made to monitor, contain, and control contaminated liquid and gaseous effluents that may form or be carried through all the underground HVAC ducts and piping. Include the information in the FSAR as appropriate.

RESPONSE:

(Note: This question is associated with RAI No. 3108 Rev.2 which directly references Standard Review Plan (SRP) Section 09.04.01-Control Room Area Ventilation System).

The condensate drain from the Control Room Area HVAC System cooling coils is non-contaminated and would be directed to the non-radioactive drain system (to minimize the generation of radioactive liquid waste during normal operation). There are no underground HVAC ducts or piping.

As discussed in the response to RAI 12.03-12.04-3, the ABWR design was certified prior to issuance of 10 CFR 20.1406 and therefore the ABWR DCD was not required to describe design features provided to comply with this regulation.

However, for ventilation systems that are expected to be contaminated, the ABWR design generally directs condensate from cooling coils of these HVAC systems to floor drains associated with the radioactive drain system (see for example DCD sections 9.4.5.2.2.1, .2 and .3 and 9.4.5.3.2).

Regulatory Guide (RG) 4.21 describes acceptable methods to meet 10 CFR 20.1406. Ventilation systems are addressed in Appendix A-1, paragraph y, as follows:

> To prevent uncontrolled release through ventilation systems, condensation from all coolers handling potentially contaminated air should be collected and routed to a monitored liquid effluent discharge.

For STP 3 and 4, both the radioactive and non-radioactive drain systems feature monitored effluent streams (also see the response to RAI 09.03.03-5).

Programmatic aspects associated with meeting 10 CFR 20.1406 for the Radioactive Drain System are discussed in RAI 12.03-12.04-3 referenced above.

There are no COLA changes required as a result of this response.

RAI 09.04.03-1

QUESTION:

Changing the Site Parameters in STP DEP T1 5.0-1:

(A) In STP COL Tier 2, Section 9.4.6.1.2, the summer and winter indoor design temperature conditions are removed under STP DEP T1 5.0-1. Provide justification for removing the information.

(B) According to the DCD, the Radwaste Building HVAC System design is based on an outdoor summer maximum temperature of 46°C (114.8°F). However, the departure has modified it to "1% exceedance site temperature" for the STP, i.e., 32.8°C (91°F). Provide justification for using the "1% exceedance site value" as the outdoor design temperature, instead of 46°C (114.8°F) as certified in the ABWR DCD. It appears that the STP site temperatures do exceed 40C (104°F) during May and June. Provide a basis for using the 1% exceedance site temperatures as the summer and winter outdoor design conditions for STP.

RESPONSE:

(A) The Radwaste Building, some of the Radwaste management systems, and the Radwaste Building HVAC systems have all been redesigned. Although the Radwaste Building HVAC system departure (STD DEP 9.4-5) is a standard departure, the system at STP has been designed to STP site-specific outdoor ambient temperatures for a non-safety related HVAC system (see additional discussion in (B) below). The discussion of summer and winter indoor design temperature conditions for the redesigned (STP) Radwaste Building HVAC system was relocated to the bulleted items under STD DEP 9.4-5 in COLA Part 2, Tier 2, Subsection 9.4.6.1.2.

(B) Use of 1% exceedance site-specific maximum dry bulb temperature of 32.8°C and minimum dry bulb temperature of 2.1°C for STP 3 & 4 is based upon the classification and function of the HVAC System. The Radwaste Building HVAC System is non-safety related.

The 1% exceedance temperatures are commonly used for design of non-safety-related HVAC systems, which is in accordance with the standard industry practice. The reason for using these temperatures is that the duration of outdoor temperatures exceeding the 1% exceedance value is short. Temperature swings of short duration have minimum impact on personnel comfort and equipment performance. The 1% exceedance value is approximately equivalent to a total of 88 hours per year during summer and a total of 88 hours per year during the winter and (when exceeded) lasts for approximately 1 to 2 hours a day. Designing the non-safety- related HVAC systems for temperatures lower than 1% exceedance values for a short duration of 1 to 2 hours will result in over sizing the systems. This may have a negative impact on the performance and maintenance of HVAC system and its associated components.

As a result of this RAI response COLA Part 2, Tier 1, Table 5.0 and Tier 2, Supplemental Table 2.0-2, will be revised as follows with changes indicated by gray shading.

Table 5.0, ABWR Site Parameters, and associated Note 8:

Ambient Design Temperature:
1% Exceedance Value
- Minimum: -23.3 °C[8]

[8] ~~The STP site specific annual cooling, dehumidification, and enthalpy design conditions for HVAC system design are: maximum dry bulb 32.8 °C and 26.3 °C wet bulb (coincident). These values are used as design input for determining the cooling loads for site-specific HVAC design.~~ Non-safety-related HVAC systems are designed based on outdoor summer temperatures of 32.8°C dry bulb and 26.3°C wet bulb (coincident) and outdoor winter temperature of 2.1°C dry bulb.

Table 2.0-2: and associated Note 9:

Table 2.0-2 Comparison of ABWR Standard Plant Site Design Parameters and STP 3 & 4 Site Characteristics (Continued)

Subject	ABWR Standard Plant Site Design Parameters	STP 3 & 4 Site Characteristics	Bounded (Yes/No)	Discussion
Ambient Design Temperature	1% Exceedance Values			The maximum dry-bulb temperature in combination with coincident wet-bulb temperature provides the state point (enthalpy of the air) that is used as design input for HVAC system design to determine cooling loads. The 1% exceedance STP site-specific state point value is not bounded by the 1% exceedance ABWR state point (see STP DEP T1 5.0-1).
	Maximum: 37.8°C (100°F) dry-bulb	32.8°C (91°F) dry-bulb [9]	Yes	
	Maximum: 25°C (77°F) wet-bulb (coincident)	26.3°C (79.3°F) wet-bulb (coincident) [9]	No	
	Maximum: 26.7°C (80°F) wet-bulb (non-coincident)	27.3°C (81.2°F) wet-bulb (non-coincident)	No	
	Minimum: -23.3°C (-9.9°F)	2.1°C (35.8°F) [9]	Yes	
				~~The minimum site-specific temperature of 2.1°C and maximum site-specific temperature of 32.8°C are design input used to determine heating loads for the non-safety related HVAC system.~~ Non-safety-related HVAC systems are designed based on outdoor summer temperatures of 32.8°C dry bulb and 26.3°C wet bulb (coincident) and outdoor winter temperature of 2.1°C dry bulb.

[9] ~~The STP site specific annual cooling, dehumidification, and enthalpy design conditions for HVAC system design are: maximum dry bulb 32.8 °C and 26.3 °C wet bulb (coincident). These values are used as design input for determining the cooling loads for site-specific HVAC design.~~ Non-safety-related HVAC systems are designed based on outdoor summer temperatures of 32.8°C dry bulb and 26.3°C wet bulb (coincident) and outdoor winter temperature of 2.1°C dry bulb.

RAI 17.06-1

QUESTION:

Section 17.6S ("Maintenance Rule Program") of the STP FSAR, Revision 2, incorporates by reference the NEI 07-02 template guidance with supplemental information. The text provided in the NEI 07-02 template is, however, generically numbered as "17.X." The staff requests that the applicant provide supplemental information in the STP FSAR to address the formatting change of the section numbers (e.g., Section "17.X" will be changed to Section "17.6S") as a result of incorporating by reference the NEI 07-02 template.

RESPONSE:

COLA Part 2, Tier 2, Section 17.6S will be revised as shown below to address the numbering convention utilized, with changes indicated by gray shading. The response to RAI 17.06-2, adopting a later revision of the Maintenance Rule generic template, is also reflected in the mark-up provided below.

17.6S Maintenance Rule Program

Nuclear Energy Institute Report No. NEI 07-02A, Rev.0, dated March 2008, "Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52" provides the Maintenance Rule Program for STP 3 & 4. This NEI template is incorporated by reference with the following site-specific supplements. The NEI template material is shown in italics with supplemental information shown as regular font underlined. The numbering convention utilized by the NEI Template is maintained in this Section, with "6S" substituted for "X" where it appears in the template numbering.

RAI 17.06-2

QUESTION:

According to NEI 07-02A [Revision 0], "Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52," dated March 2008 (which incorporates the Nuclear Regulatory Commission's revised safety evaluation endorsing NEI 07-02), industry operating experience (IOE) should be applied to various elements of the maintenance rule program and procedure. Therefore, the maintenance rule program should utilize IOE, where appropriate, for scoping, performance/condition criteria development, monitoring, goal-setting, corrective action, training, program assessment, and maintenance and procurement activities. The staff requests that the applicant justify the exclusion of IOE in Section 17.6S of the STP FSAR, or revise this section to reflect conformance with NEI 07-02A guidance and its revised safety evaluation.

RESPONSE:

COLA Part 2, Tier 2, Section 17.6S will be revised to adopt Nuclear Energy Institute (NEI) 07-02A guidance and its revised safety evaluation. See the response to RAI 17.06-1 for the COLA markup incorporating this revision.