PMComanchePeakPEm Resource

From: Monarque, Stephen
Sent: Friday, October 09, 2009 1:50 PM
To: John.Conly@luminant.com; Donald.Woodlan@luminant.com; cp34-rai-luminant@mnes-us.com; Diane Yeager; Eric.Evans@luminant.com; joseph tapia; Kazuya Hayashi; Matthew.Weeks@luminant.com; MNES RAI mailbox; Russ Bywater
Cc: ComanchePeakCOL Resource; Ward, William
Subject: Comanche Peak RCOL Section 9.4.5 - RAI Number 123
Attachments: RAI 3232 (RAI 123).doc

The NRC staff has identified that additional information is needed to continue its review of the combined license application. The NRC staff's request for additional information (RAI) is contained in the attachment. Luminant is requested to inform the NRC staff if a conference call is needed.

The response to this RAI is due within 35 calendar days of October 9, 2009

Note: If changes are needed to the safety analysis report, the NRC staff requests that the RAI response include the proposed changes.

thanks,

Stephen Monarque
U. S. Nuclear Regulatory Commission
NRO/DNRL/NMIP
301-415-1544

Hearing Identifier: ComanchePeak_COL_Public
Email Number: 687

Mail Envelope Properties (9C2386A0C0BC584684916F7A0482B6CA04A84FE265)

Subject: Comanche Peak RCOL Section 9.4.5 - RAI Number 123
Sent Date: 10/9/2009 1:49:41 PM
Received Date: 10/9/2009 1:49:44 PM
From: Monarque, Stephen

Created By: Stephen.Monarque@nrc.gov

Recipients:
"ComanchePeakCOL Resource" <ComanchePeakCOL.Resource@nrc.gov>
Tracking Status: None
"Ward, William" <William.Ward@nrc.gov>
Tracking Status: None
"John.Conly@luminant.com" <John.Conly@luminant.com>
Tracking Status: None
"Donald.Woodlan@luminant.com" <Donald.Woodlan@luminant.com>
Tracking Status: None
"cp34-rai-luminant@mnes-us.com" <cp34-rai-luminant@mnes-us.com>
Tracking Status: None
"Diane Yeager" <diane_yeager@mnes-us.com>
Tracking Status: None
"Eric.Evans@luminant.com" <Eric.Evans@luminant.com>
Tracking Status: None
"joseph tapia" <joseph_tapia@mnes-us.com>
Tracking Status: None
"Kazuya Hayashi" <kazuya_hayashi@mnes-us.com>
Tracking Status: None
"Matthew.Weeks@luminant.com" <Matthew.Weeks@luminant.com>
Tracking Status: None
"MNES RAI mailbox" <cp34-rai@mnes-us.com>
Tracking Status: None
"Russ Bywater" <russell_bywater@mnes-us.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	650	10/9/2009 1:49:44 PM
RAI 3232 (RAI 123).doc	82938	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information (RAI) No. 3232

RAI Number 123

10/9/2009

Comanche Peak Units 3 and 4
Luminant Generation Company, LLC.
Docket No. 52-034 and 52-035
SRP Section: 09.04.05 - Engineered Safety Feature Ventilation System
Application Section: COL FSAR 9.4.5

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

09.04.05-3

Seismic I and Seismic II/I – GDC 2

Each pump house is designed as a Seismic I structure and situated so that all engineered safety feature (ESF) Ventilation System (VS) components will be above the design-basis flooding level (DBFL) [Reference FSAR subsection 3.4.1.2]

For guidance with respect to compliance with 10 CFR part 50, Appendix A, General Design Criteria, (GDC) 2, the NRC staff invokes the following excerpt from Technical Rationale "1" of NUREG-0800, Standard Review Plan (SRP) 9.4.5: "The function of the ESFVS is to provide a suitable and controlled operating environment for engineered safety feature components during normal operation, during adverse environmental occurrences, and during and subsequent to postulated accidents, including loss of offsite power. GDC 2 ensures that engineered safety features will remain functional during and after a design basis earthquake."

The safety related design bases for the ultimate heat sink (UHS) essential service water (ESW) pump house ventilation system are provided by the combined license (COL) applicant in FSAR subsection 9.4.5.3.6. This subsection reads that "*All ventilation system equipment and components are classified as equipment class 3, seismic category I*." and that "*The UHS ESW pump house ventilation system components are protected from tornado generated missiles by their location inside a seismic category I structure*."

The NRC staff found that COL Figure 9.4-201 "UHS ESW Pump House Ventilation System Flow Diagram" of the applicant's FSAR does not indicate seismic classification of the components of the UHS ESW Pump House Ventilation System. Items 2.A and B of Section III "Review Procedures of SRP 9.4.5 indicates that the piping and instrumentation diagrams (P&IDs) should designate the seismic classifications of components and demarcate division between classifications.

Please provide P&IDs that designate the seismic classifications of components and demarcate division between classifications

In addition, the NRC staff found that it appears from review of Figure 9.4-201 that heating ventilation and air conditioning (HVAC) duct work exists on both sides of the back draft dampers of the air outlets and on the upstream side of the back draft dampers of the air intakes of each room's ventilation system. The staff found that Table 3.2-201 "Classification of Site-Specific Mechanical and Fluid Systems, Components, and Equipment" does not list "ducts" or ducting as a system component for UHS ESW Pump House Ventilation System. Please explain why Table 3.2-201 does not list ducts or ducting as a system component.

Also, it is not clear to the NRC staff whether any other non-safety related and/or non-seismic systems or components will be located within the Seismic Category I UHS ESW Pump Houses. Please clarify if there is any other non-safety or non-seismic systems or components located within the Seismic Category I UHS ESW Pump Houses?

Section III Item 3.A "Review Procedures" of SRP section 9.4.5 reads: "The failure of nonessential portions of the system or of other nonseismic SSCs located close to essential portions of the system will not preclude operation of the essential portions of the ESFVS."

What plant programs and/or ITAAC will ensure that the existence of such non-safety related and/or non-seismic systems or components will not represent a threat to the operability of safety-related systems and components within the UHS ESW Pump Houses.

09.04.05-4

Externally Generated Missiles – GDC 4

Section I of SRP section 9.4.5 specifies a "Review Interface" with SRP 3.5.2 "Structures, Systems, And Components to Be Protected From Externally-Generated Missiles".

Section II "SRP Acceptance Criteria" of SRP section 9.4.5 reads: "For GDC 4, acceptance is based on meeting the acceptance criteria in the following SRP sections, as they apply to the ESFVS: SRP Sections 3.5.1.1, 3.5.1.4, 3.5.2, and SRP Section 3.6.1."

Therefore, with respect to GDC 4 and SRP section 3.5.2 the NRC staff notes that conventional air intake and air outlet symbols (per US-APWR DCD Figure 1.7-4 "Legend for Piping and Instrumentation Diagrams of HVAC System") are displayed on COL Figure 9.4-201. The NRC staff also notes that tornado dampers are provided a unique symbol in the legend of DCD Figure 1.7-4. This unique symbol is not employed on COL Figure 9.4-201.

It is not clear to the NRC staff from its review of the applicant's FSAR Chapters 3 and 9 how these air intakes and air outlets are protected from tornado generated missiles. The staff could find no discussion of this design basis commitment in its review of FSAR Chapter 3 "Design of Structures, Systems, Components, And

Equipment". The NRC staff requests that the applicant clarify the FSAR appropriately with information designating tornado dampers.

09.04.05-5

Internal Flooding – GDC 4

Section II of SRP section 9.4.5 provides the "Technical Rationale" behind the acceptance criteria for GDC 4. An excerpt from this passage reads: "Compliance with GDC 4 requires that structures, systems, and components important to safety be designed to accommodate the effects of, and be compatible with, environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be protected against dynamic effects (e.g., those of missiles, pipe whipping, and discharging fluids) that may result from equipment failure and from events and conditions outside the nuclear power unit."

Two of the "Review Interfaces" from SRP section 9.4.5 that these "dynamic effects" refer to are captured in SRP section 3.4.1 "Internal Flood Protection For Onsite Equipment Failures" and SRP section 3.6.1 "Plant Design For Protection Against Postulated Piping Failures In Fluid Systems Outside Containment".

The NRC staff notes that US-APWR DCD subsection 3.4.1.1 contains the following excerpt:

> "Safety-related SSCs are protected from flooding by external and internal sources. The US-APWR design includes the following:
>
> - The separation of redundant trains of safety-related SSCs as addressed in Chapters 1
> - Protective barriers and enclosures, where necessary, as addressed in this section
> - The placement of essential SSCs above internal flood levels
> - In general, SSCs are mounted above the flood level. However, if safety-related SSCs are located below flood level, their safety function is assured, as described in Section 3.11."

The safety-related design basis contained in the second bullet of COL FSAR subsection 9.4.5.3.6 reads: "The ESW pump room exhaust fan and the UHS transfer pump room exhaust fan are separated by a three-hour fire rated barrier. Therefore, each fan powered by different Class 1E power supplies is protected and remains functional in the event of a fire in either room."

The NRC staff requests additional information about the barrier between the ESW pump room and the UHS transfer pump room. COL FSAR Appendix 9A "Fire Hazard Analysis" indicates that the there may be 3-hour fire rated passages between the two rooms. With respect to the issue of internal flooding, the staff could find no information contained in the COL applicant's FSAR subsection 3.4. Please clarify, is there a flood barrier between the UHS ESW pump and the UHS Transfer Pump? Please update the FSAR as appropriate.

09.04.05-6

Internally Generated Missiles – GDC 4

The NRC staff notes that the safety related design basis contained in the sixth bullet of COL FSAR subsection 9.4.5.3.6 reads: "The UHS ESW pump house ventilation system components are protected from tornado generated missiles by their location inside a seismic category I structure."

SRP 9.4.5 Section I links a "Review Interface" to the review requirements of SRP 3.5.1.1 "Internally Generated Missiles (Outside Containment)".

US-APWR DCD subsection 3.3.2.3 "Effect of Failure of Structures or Components Not Designed for Tornado Loads" reads: "It is the responsibility of the COL Applicant to assure that site-specific structures and components not designed for tornado loads will not impact either the function or integrity of adjacent safety-related SSCs, or generate missiles having more severe effects than those discussed in Subsection 3.5.1.4. Where required by the results of investigations, structural reinforcement and/or missile barriers are implemented so as not to jeopardize safety-related SSCs."

The NRC staff found that the COL applicant failed to address in either COL FSAR subsection 9.4.5 "Engineered Safety Function Ventilation System" or COL FSAR subsection 3.5 "Missile Protection", the potential threat of any and all internally generated missiles to safety-related SSCs contained in the ESW pump room and the UHS transfer pump room. More specifically, the COL applicant has not addressed the threats from internally generated missiles created by:

- the fan blades of the unit heaters,
- the fan blades of the exhaust fans, or
- any and all sources of internally generated missiles

within the UHS ESW Pump Houses. The NRC staff requests the applicant address internally generated missiles and update the FSAR, as appropriate.

09.04.05-7

Maintaining Design Basis Temperatures – GDC 4

Section II "Acceptance Criteria" of SRP 9.4.5 for GDC 4 contains the following excerpt: "…The evaluation with respect to GDC 4 also includes evaluation of the adequacy of environmental support provided to structures, systems, and components important to safety located within areas served by the ESFVS."

The "Design Bases" from COL FSAR subsection 9.4.5.1.1.6 "UHS ESW Pump House Ventilation System" reads:

> "The UHS ESW pump house ventilation system provides and maintains the proper environmental conditions within the required temperature range (40 °F – 120 °F) to support the operation of the instrumentation and control

equipment and components in the individual UHS ESW pump houses during a design basis accident and LOOP with outside ambient design temperature condition of 0% temperature exceedance values."

During its review of the guidance of NUREG-800 SRP 9.4.5, the NRC staff found that the COL applicant did not include references in FSAR Section 9.4.8 that would provide the bases for the calculations used in sizing the capacities of the heaters and of the exhaust fans the for the UHS ESW Pump House Ventilation System. (Reference: COL FSAR Table 9.4-202 "UHS EXW Pump House System Equipment Design Data").

The applicant is requested to either establish clear performance criteria for the ESW Pump House Ventilation System and a means (ITAAC and/or startup testing) of verifying that heaters have been sided adequately or provide the following information to justify the value selected.

- What is the basis for the sizing of the ventilation system?

In order to facilitate confirmatory calculations please provide the inputs to the design calculations used in the derivation of the sizing of the ventilation system.

- Each of the room heaters has an attendant fan displayed in COL FSAR Figure 9.4.201 "UHS ESW Pump House Ventilation System Flow Diagram". However, FSAR Table 9.4-202 does not list a design specification air flow rate for these unit heater fans. Please explain why there is no air flow rate for these unit heater fans.

- What is the impact on the UHS ESW Pump House room temperature when the effect of a 140ºF UHS Basin temperature (COL FSAR Table 7.5-201) is combined with the effects of the most severe summertime ambient conditions for the plant site and the heat load from the ESW pump motor? What is the expected room temperature in this scenario? Will the ESF equipment within the room remain operable?

Regulatory Guide 1.206 section C.I.9.4.5.1 "Design Bases" reads:

> "The design bases for the air handling and treatment system for areas that house ESF equipment should include the criteria and/or features to ensure the system's performance (i.e., flow rates, temperature limits, humidity limits, filtration) and reliability (i.e., single failure, redundancy, seismic design, environmental qualification) for all modes of operation, including normal, abnormal, and SBO conditions. The design bases should also include requirements for manual or automatic actuation, system isolation, monitoring for radiation, and other controls essential to the performance of the system functions. In addition, the applicant should provide details concerning the means used to protect system vents and louvers from externally and internally generated missiles."

The NRC staff found the "System Description" of COL FSAR subsection 9.4.5.2.6 lacking significant detail when compared to the prescriptive guidance of Regulatory Guide 1.206 section C.I.9.4.5.1 “Design Bases”.

SRP 9.4.5 section IV. “Evaluation Findings” permits the staff to perform confirmatory calculations on a select basis to provide reasonable assurance of the plant’s overall integrity with respect to safety-related component design. More specifically, section IV reads: “The reviewer verifies that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions of the following type to be included in the staff's safety evaluation report. The reviewer also states the bases for those conclusions.”

In addition, the NRC staff notes that the “Technical Rationale” section of SRP 9.4.5 provides the reasoning behind the acceptance criteria contained in the SRP. In particular, the staff invokes the following clause from Technical Rationale 2: “…The function of the ESFVS is to provide a suitable and controlled operating environment for engineered safety feature components during normal operation, during adverse environmental occurrences, and during and subsequent to postulated accidents, including loss of offsite power. This requirement is imposed to ensure that engineered safety features function through the course of operating and accident events. In addition, the ESFVS design must withstand dynamic effects associated with postulated accidents.

> Meeting these requirements provides assurance that engineered safety features will not fail to operate as designed, thus providing protection against loss of core cooling and/or containment integrity.”

Based on the review requirements and technical rationale of SRP 9.4.5, the staff:

1) requests the COL Applicant provide the level of detail in the FSAR consistent with the guidance of Regulatory Guide 1.206; and

2) requests that the COL Applicant provide, for the purposes of conducting confirmatory calculations, the inputs to design calculations used in the derivation of the heater and exhaust flow capacity values for these components of the UHS ESW Pump House Ventilation System.

09.04.05-8

<u>Maintaining Design Basis Temperatures – GDC 4</u>

From the information provided by the COL applicant in FSAR subsections 9.4.5. 9.4.5.1.1.6, 9.4.5.2.6, 9.4.5.3.6, 9.4.5.4.6, 9.4.5.5.6, 9.4.7, FSAR Table 9.4-202 and FSAR Figure 9.4-201, the operating status of the UHS ESW Pump House Ventilation System during normal plant operations was not clear to the staff. It appears that this Class 1E system would secured, but ready and armed to support emergency response operations.

It seems probable that a non-Class 1E non-safety related heating system would be required during the winter months to maintain the UHS ESW Pump House

above the lowest limiting design basis temperature for all safety-related equipment within the pump house. In contrast, after the NRC staff read the information provided by the COL applicant in the above FSAR sections and the Part 10 "ITAAC and Proposed License Conditions" Appendix A.2 for the "UHS ESW Pump Hose Ventilation System," does not indicate that the required need will be met. The NRC staff found the "System Description" of COL FSAR subsection 9.4.5.2.6 lacking significant detail when compared to the prescriptive guidance of Regulatory Guide 1.206 section C.I.9.4.5.2 "Systems Description"

For normal plant operations, the staff requests additional information about the COL applicant's intent with respect to maintaining the operability of this safety related equipment and to maintain the integrity of the pump houses' instrument lines, wet pipe sprinkler station and the standpipe hose station during the most severe design basis winter conditions.

The NRC staff requests that the COL applicant augment the FSAR to conform to the guidance of Regulatory Guide 1.206 section C.I.9.4.5.2 "Systems Description".

09.04.05-9

Proper Functioning of the Essential Electric Power System – GDC 17

The second paragraph from Section II "Acceptance Criteria" of SRP section 9.4.5 "Technical Rationale" item 4 reads:

> "With regard to the ESFVS, the plant design should ensure that electrical contacts and relays in diesel generator rooms are protected from dust, dirt, and grit. For example, contacts and relays must be enclosed in dust-tight cabinets with fully gasketed openings and ventilation louvers must be equipped with filters. In addition, air used for ventilation should be filtered and should be taken from a height of at least 7 meters (20 feet) above ground level."

The NRC staff notes that NUREG-CR/0660 "Enhancement of Onsite Emergency Diesel Generator Reliability" addresses this issue.
The staff could find no information in the COL FSAR about the spatial positioning of the fresh air intake dampers. More specifically, to limit the flow of airborne particulate (dust) into the two rooms of the UHS ESW Pump House, the bottom of the fresh air intakes are to be positioned 20 feet above grade elevation. Alternately, or in addition to, the electrical and instrumentation cabinets are to be provided with suitable seals or gaskets to prevent dust from entering the cabinets.

The NRC staff requests additional information about how the design of the UHS ESW Pump House satisfies these required design attributes of GDC 17.

09.04.05-10

Proper Functioning of the Essential Electric Power System – GDC 17

Section III "Review Procedures" indicates that the reviewer using the results of the failure modes and effects analyses (FMEA) will determine that the safety-related portion of the system is capable of sustaining a failure of any active component.

In particular, Item 3.D of SRP section 9.4.5 reads: "Essential components and subsystems can function as required in the event of a loss of offsite power. The system design will be acceptable if the ESFVS meets minimum system requirements as stated in the SAR, assuming failure of a single, active component within the system itself or in the auxiliary electric power source which supplies the system. The SAR is reviewed to verify that for each ESFVS component or subsystem affected by the loss of offsite power, the resulting system performance will not affect the capability of any engineered safety feature equipment. Statements in the SAR and results of failure modes and effects analyses are considered in verifying that the system meets these requirements. This will be an acceptable verification of system functional reliability."

The NRC staff notes that the fifth bullet of COL FSAR "Safety Evaluation" subsection 9.4.5.3.6 reads "*Failure of a single active component in one of the UHS ESW pump house ventilation system exhaust fans does not result in a loss of the system's safety function*." However, the staff, in its review of the COL applicant's FSAR, could not find the results of a FMEA specific to the UHS ESW Pump House Ventilation System nor did the COL Applicant include a reference to a FMEA. Regulatory Guide 1.206 section C.I.9.4.5.3 "Safety Evaluation" also speaks to this issue.

The NRC staff attempted to draw this safety conclusion based on other sources of information contained in the COL applicant's FSAR. However, as documented below, this only led to more findings of inconsistencies with respect to the instrumentation of the UHS ESW Pump House Ventilation System.

An excerpt from the third bullet of COL FSAR subsection 9.4.5.3.6 reads *"…All ventilation system equipment and components are classified as equipment class 3, seismic category I."* From this excerpt, the staff concludes that all the instrumentation (e.g. TS, TC, FE) and alarms displayed on Figure 9.4-201 "UHS ESW Pump House Ventilation System Flow Diagram" is equipment class 3 and seismic category I. The staff found the following inconsistencies for this homogeneous grouping of instrumentation:

- COL FSAR subsection 9.4.5.5.6 does not list TS and TCA instruments/alarms for the unit heaters contained in the ESW Pump Room or the UHS Transfer Pump Room

- Not all the instrumentation displayed on Figure 9.4-201 appears in Table 3D-201 "Site-Specific Environmental Qualification Equipment List". FSAR subsection 3.11.1.1 reads "This table (i.e. Table 3D-201) lists information on site specific safety-related or important to safety equipment." In addition,

Table 3D-201 does not list the tornado resistant back draft dampers for the ESW Pump Rooms and UHS Transfer Pump Rooms (e.g. VRS-BDD-603A, VRS-BDD-601A)

· COL FSAR Chapter 7 “Instrumentation and Controls” does not include any reference to the homogeneous grouping of instruments displayed on Figure 9.4-201. Most of these instruments, if not all, are safety-related.

Based on the above findings and the absence of a FMEA for the UHS ESW Pump House Ventilation System, the staff requests that the COL applicant:

1) Provide a summary of the FMEA for this ventilation system

2) Provide additional information about the instrumentation inconsistencies documented above

3) Augment the COL FSAR as appropriate to provide clarification with respect to these issues.

09.04.05-11

Coping with a Station Blackout Event – 10 CFR 50.63

The NRC staff acknowledges that the COL applicant incorporated by reference with no departures or supplements DCD subsection 8.4 “Station Blackout”.

The information contained within DCD Table 8.3.1-6 “Electrical Load Distribution – AAC GTG Loading (SBO Condition)” indicates that one Essential Service Water Pump (i.e. ESW pump) will be required to be in operation for the duration of the 8-hour coping event. Phase “3” (i.e. “After AAC GTG has restored power to the Class 1E power system within 60 minutes of the start of the event) of DCD subsection 8.4.2.1.2 “Station Blackout Coping Analysis” indicates that the supporting systems will include I&C, cooling system & HVAC. The NRC staff observes that three Motor Control Centers (MCCs) listed Table 8.3.1-6 would have to be of sufficient size to absorb the power requirements of the UHS ESW Pump House Ventilation System (i.e. heaters, exhaust fans, instrumentation and controls)

Based on the above:

1) The NRC staff requests additional information about this scenario. In particular, whether the COL applicant has determined that the electrical sizing of the 3 MCCs relative to all miscellaneous Comanche Peak 3 (or 4) SBO loads is bounded by the electrical capacity of the three MCCs listed in Table 8.3.1-6. These miscellaneous loads would come from not only the UHS ESW Pump House Ventilation System but from other HVAC systems and cooling systems.

2) The staff notes that per COL FSAR subsection 9.4.5.1.1.6, the required temperature range of the ESW pump house is 40ºF -- 120ºF. DCD subsection 8.4.2.1.2 indicates that all Class 1E electrical cabinets and I&C

cabinets are rated to keep their integrity up to 50ºC (or 122ºF). Will any of the Class 1E electrical and I&C cabinets be located within the ESW pump house?

The current COL FSAR has no non-class 1E ventilation system dedicated to normal power operations to prevent the ESW Pump House room temperatures from exceeding 100ºF during the extreme summertime high temperatures of central Texas. Please explain how you demonstrate the Class 1E cabinet temperatures will not exceed 122ºF during the first hour of the SBO event when the AAC GTG has yet to be aligned to the Class 1E bus for HVAC cooling.

3) For the upper operating range average room temperature of 120ºF for the ESW Pump House rooms what is the temperature in the Class 1E cabinets? Given that internal cabinet temperatures typically run 5-10ºF above average room temperatures, the staff requests additional information about the applicant's analysis that justified an average room temperature of 120ºF as the design basis limit. Please explain how you demonstrate the cabinets remain below the design temperature.

09.04.05-12

Inspection and Testing Requirements (including Preoperational Testing and ITACC)

(Based on the requirements of GDC 4 and 10CFR 52.80(a) the review guidance of SRP section 9.4.5 and SRP section 14.3.7)

SRP section 9.4.5, Section I "Areas of Review", item 2, requires review of safety-related portions of the ESFVS with respect to: "C. The ability of the safety features equipment in the areas being serviced by the ventilation system to function under the worst anticipated degraded ESFVS system performance; … D. The capability of the system to circulate sufficient air to prevent accumulation of flammable or explosive gas or fuel-vapor mixtures from components such as storage batteries and stored fuel;"

To this end, the NRC staff requests additional information about:

1) the location of the fresh air intakes of the four UHS ESW Pump Houses with respect to the closest external sources of flammable or explosive gas, fuel-vapor mixtures or exhaust fumes;
2) whether the four UHS ESW Pump Houses will internally harbor any potential sources of explosive gas or fuel-vapor mixtures on a continuous basis or on a periodic basis during plant maintenance activities or basin water chemistry maintenance activities (e.g. hydrogen sulfide gas);
3) the plant programs the applicant will use to detect degraded equipment performance of the UHS ESW Pump House Ventilation System.

The NRC staff also notes that SRP 14.3.7 section II "SRP Acceptance Criteria" "1." reads " …*Tier I should be reviewed for consistency with the initial test program described in DCD Tier 2 Chapter 14.2..".*

The staff found that the COL applicant invokes in FSAR subsection 9.4.5.4.6 the general requirements of US-APWR DCD subsection 9.4.5.4 with respect to "Inspection and Testing Requirements". One of the safety related design bases of FSAR subsection 9.4.5.3.6 reads … "*Backdraft dampers are capable of withstanding the effects of tornado wind and atmospheric differential pressure loading*". The staff could find no mention of demonstrating this capability in either:

- Part 10 "Inspections, Tests, Analyses And Acceptance Criteria (ITAAC) And Proposed License Conditions" of the COL Application;
- Preoperational Test 14.2.12.1.114 "UHS ESW Pump House Ventilation System Preoperational Test";
- COL FSAR Chapter 3 "Design Of Structures, Systems, Components, And Equipment"; or
- FSAR subsection 9.4.5.4.6.

The staff requests the COL applicant amend FSAR subsection 9.4.5.4.6 to include required factory testing of these dampers that demonstrates this capability and amend the ITAAC to include verification of the integrity of the installed safety related backdraft dampers.

In addition, the staff finds that Preoperational Test 14.2.12.1.114 "UHS ESW Pump House Ventilation System Preoperational Test" lacks sufficient detail to clearly demonstrate the capability of the UHS ESW Pump House Ventilation to meet its safety related design basis of:

> "The UHS ESW pump house ventilation system provides and maintains the proper environmental conditions within the required temperature range (40 °F – 120 °F) to support the operation of the instrumentation and control equipment and components in the individual UHS ESW pump houses during a design basis accident and LOOP with outside ambient design temperature condition of 0% temperature exceedance values."

More specifically, the staff notes that the "Test Method" lacks verification that the heaters are capable of meeting their name plate heating capacities (i.e. 24 Kw & 3.5 Kw). The preoperational test lacks verification of proper operation of heater controls and alarms. In addition, the preoperational test's acceptance criteria fail to include criteria that require heater fan flow rates and exhaust fan flow rates meet or exceed design specification values. The NRC staff requests the COL applicant amend Preoperational Test 14.2.12.1.114 to remove these deficiencies.