

**19B Resolution of Applicable Unresolved Safety Issues and Generic Safety Issues**

The information in this appendix of the reference ABWR DCD, including all subsections and tables, is incorporated by reference with the following departures and supplement.

STD DEP T1 2.14-1

STP DEP 1.1-2

STD DEP 8.3-1

**19B.2 Safety Issues****19B.2.2 A-1: Water Hammer*****Resolution***

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

***Update***

South Texas Project Units 3 and 4 does not apply “Leak-Before-Break” analysis. Therefore the COL Applicant Item is not applicable.

**19B.2.9 A-25: Non-Safety Loads on Class 1E Power Sources**

STD DEP 8.3-1

~~The load breakers in the Division 1 bus Class 1E load breakers in the switchgear are part of the isolation scheme between the Class 1E power and the non-Class 1E FMCRD loads. In addition to the normal overcurrent tripping of these load breakers, zone selective interlocking (ZSI) is provided between them and the upstream Class 1E bus feed breakers. The Class 1E load breakers, in conjunction with the ZSI feature, provides the needed isolation between the Class 1E bus and the non-Class 1E loads. (See Subsection 8.3.1.1.1 for more details on this feature relative to the FMCRD power circuits.)~~

**19B.2.11 A-35: Adequacy of Offsite Power System**

STD DEP 8.3-1

***Resolution***

*The ABWR onsite power systems are described in Section 8.3, and include three redundant and independent ~~6.9kV~~ 4.16kV Class 1E safety buses. The incoming source breakers trip upon loss of normal power, and emergency power is provided to each Class 1E bus by separate and independent diesel generator (DG) units. A combustion turbine generator automatically assumes the plant investment protection loads, but can be used to manually provide back-up power for any Class 1E bus, should a DG fail or be out of service.*

**19B.2.12 A-36: Control of Heavy Loads Near Spent Fuel**

STP DEP 1.1-2

**Resolution**

- (6) *The heavy load handling system is designed in accordance with relevant requirements of GDC 2, 4, and 61 and the guidance of References 19B.2.12-2, and 19B.2.12-5 through 19B.2.12-7. ~~The ABWR design is for a single unit~~ STP 3 & 4 is a dual-unit station. The Units do not share heavy load handling systems; therefore GDC 5 is satisfied ~~not applicable~~ (Subsections 9.1.5.1 and Section 3.1).*

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

**Update**

STP DEP 1.1-2

The COL Applicant Items identified in Items (1) and (3) above are discussed in COLA Section 9.1.6.6. STP 3 & 4 is a dual-unit station. The Units do not share heavy load handling systems therefore GDC 5, Sharing of Structures, Systems, and Components, is satisfied.

**19B.2.17 A-47; Safety Implications of Control Systems****Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

**Update**

The required testing, inspection and replacement guidance will be developed consistent with the plant operating procedure development plan described in Section 13.5. (COM 19B-2)

**19B.2.18 A-48: Hydrogen Control Measures and Effects of Hydrogen Burns on Safety Equipment**

STD DEP T1 2.14-1

**Acceptance Criteria**

*An inerted containment ~~and the provision for permanently installed hydrogen recombiners are~~ is acceptable as a hydrogen control measures.*

**Resolution**

*The issue of a large amount of hydrogen being generated and burned within containment was resolved as stated in the NRC document SECY 89-122 dated April*

19, 1989 (Reference 19B.2.18-3). This issue covers hydrogen control measures for recoverable degraded core accidents for all BWRs. Extensive research in this area has led to significant revision of the Commission's hydrogen control regulations, given in 10 CFR 50.44, published ~~December 2, 1984~~ September 16, 2003.

### **19B.2.27 C-1: Assurance of Continuous Long-Term Capability of Hermetic Seals on Instrumentation and Electrical Equipment**

#### **Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

#### **Update**

NUREG-0588 was considered in the design of the ABWR (Table 1.8-22). FSAR Section 3.11.6 discusses the Environmental Qualification program for STP Units 3 and 4.

The STP 3&4 Environmental Qualification (EQ) Program, as described in document U7-PROJ-K-PRD-0025 was developed to meet the requirements of Regulatory Guide 1.89, Rev 1, which includes compliance with NUREG-0588.

Some of the specific provisions of the EQ Program document relating to qualification of seals are provided below.

In section 6.2.4, Performance Specifications, the following is stated:

*Equipment specifications shall include the following characteristics, as applicable:*

- The goal for design and qualified life of the equipment is sixty years. The equipment and qualification specifications shall include the requirement to address equipment which may have a design or qualified life shorter than sixty years and address any maintenance requirements to maintain the design or qualified life in the equipment instruction manual and the qualification documentation as applicable.

This section identifies requirements to address items that have a design life of less than 60 years and identify maintenance requirements to maintain the design or qualified life.

In section 6.3.2, Qualified and Design Life Goals, the following is provided:

*Qualified life shall be established for safety-related equipment installed in a harsh environment. Equipment exposed to a harsh environment has a qualified life goal of 60 years plus DBA/post-DBA duration. The demonstration of qualified life is performed by testing and/or analysis and includes the applicable effects of aging. For components susceptible to aging, a qualified life is established that includes the effects of the radiation and temperature experienced at their respective locations within the plant coupled with wear, as applicable. When a 60 year qualified life is*

*not achievable, a shorter qualified life is established and a replacement program is implemented. Shelf life shall be considered in the equipment qualification program for safety-related equipment. The environmental conditions for equipment storage (temperature, relative humidity, radiation, dust, etc.) under which shelf life was established shall be specified. This information shall be documented along with the qualified life determination and included in the equipment qualification data package for use in the STP 3&4 EQ maintenance program for verification of qualified life adequacy....*

*...The report shall include a list of components that are susceptible to degradation due to effects of the said parameters. The report shall identify nonmetallic materials in the component (e.g. o-rings, hermetic seals, etc.) that are subject to degradation due to environmental conditions and their basis to perform the required functions successfully during their target life. Maintenance & Surveillance (M&S) requirements and replacement frequencies of parts that are subject to environmental degradation shall be also provided.*

This section identifies several aspects of qualification that relate to seals, including effects of radiation, temperature and wear. It addresses concerns associated with equipment storage conditions and shelf life and that all these aspects need to be documented in the EQ qualification package. It also specifically calls out that nonmetallic material such as found in o-rings and seals shall be identified in the documentation and addressed in the maintenance and surveillance requirements, including replacement frequencies for these items, as appropriate.

Section 7.1.1.1, Submergence, states the following:

*Electric equipment located in an area where rapid pressure changes are postulated simultaneously with the most adverse relative humidity should be qualified to demonstrate that the equipment seals and vapor barriers will prevent moisture from penetrating into the equipment to the degree necessary to maintain equipment functionality.*

This addresses concerns with respect to seals performing their function to prevent moisture intrusion in a manner that maintains equipment functionality.

In section 9.1.3, Maintenance & Surveillance Requirements to Maintain Qualification, it states:

*...The equipment qualification documentation shall identify any special requirements to maintain the qualification status following maintenance, testing or calibration activities.*

This provides direction that information relating to actions required to maintain qualification following maintenance, testing or calibration activities, which is often the case with seals or o-rings, is to be described in the equipment qualification documentation.

Lastly, section 10.1.9, Environmental Qualification Document (the STP maintained EQ documentation), states:

*Environmental Qualification Document (EQD) will be prepared summarizing the environmental qualification reports for all safety-related electrical and mechanical equipment located in harsh environments. The EQD as a minimum includes the following:*

- c) *Identification of maintenance that potentially could invalidate the environmental qualification of the equipment. The equipment qualification documentation shall identify any special requirements to maintain the qualification status following maintenance, testing, or calibration activities.*

This provides assurance that required environmental qualification information will be maintained in the STP 3&4 EQ program documents. The EQ program also states that this information will be maintained in an EQ database, which will allow monitoring and tracking of items related to seals and o-rings and in the EQ maintenance program.

#### **19B.2.29 C-17: Interim Acceptance Criteria for Solidification Agents for Radioactive Solid Wastes Issue**

##### ***Resolution***

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

##### ***Update***

COLA Section 11.4.3 discusses compliance to 10CFR 61.56 and the Process Control Program for the solidification process.

#### **19B.2.35 51: Proposed Requirements for Improving the Reliability of Open Cycle Service Water Systems**

##### ***Resolution***

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

##### ***Update***

The information required from the COL Applicant is provided in Section 9.2.5 (Ultimate Heat Sink (UHS)), and Section 9.2.15 (Reactor Service Water (RSW)).

Specifically:

- Ice as a flow blockage mechanism is discussed in Section 9.2.5.7.3.

- Direct service water is not used for component cooling. Transfer of heat from the component heat loads via a heat exchanger to the service water system and ultimate heat sink is discussed in section 9.2.5.3.1
- Reactor service water is treated as needed to reduce the effect of mud, silt, or organisms, as described in Section 9.2.5.4.1
- Materials for piping, pumps, and heat exchangers that offer greater resistance to the range of probable water chemistry conditions are described in Section 9.2.5.8.
- Provisions to facilitate the inspection of service water piping are described in Section 9.2.5.3.1. Replacement of Reactor Service Water piping sections during plant life will be in accordance with the ASME Section XI program as described in Section 6.6.
- The STP well water system provides the non-safety related makeup capability for the ultimate heat sink as described in Section 9.2.5.3.4.
- The Ultimate Heat Sink and the Reactor Service Water system meet the design bases during a loss of offsite power. These systems are designed to perform their cooling function assuming a single active failure in any mechanical or electrical system as described in Section 9.2.5.8 and Section 9.2.15.2.1.

#### **19B.2.38 75: Generic Implications of ATWS Events at Salem Nuclear Plant Issue Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

##### **Update**

The program for post-trip review of unscheduled reactor shutdowns, the program for post-maintenance operability testing, and the program for control of vendor related modifications, preventative maintenance and surveillance for reactor trip breakers are included in the programs discussed in Section 13.5.3.3.2.

#### **19B.2.45 105: Interfacing Systems LOCA at BWRs Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

##### **Update**

No longer listed in NUREG-0933. Therefore, not applicable to future reactor plants.

**19B.2.49 120: On-Line Testability of Protection Systems Issue****Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

**Update**

The Maintenance Rule Program for STP Units 3&4 is described in COLA Section 17.06S.

**19B.2.55 145: ACTIONS TO REDUCE COMMON CAUSE FAILURES****Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

**Update**

The Maintenance Rule Program for STP Units 3&4 is described in COLA Section 17.06S.

**19B.2.56 151: Reliability of Anticipated Transient Without Scram Recirculation Pump Trip (ATWSRPT) in BWRs Issue****Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

**Update**

The Maintenance Rule Program for STP Units 3&4 is described in COLA Section 17.06S.

**19B.2.57 153: Loss of Essential Service Water in Light-Water Reactors Issue****Resolution**

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

**Update**

The design of the RSW system is presented in STP 3&4 COLA, Section 9.2.15. The design of the Ultimate Heat Sink is presented in COLA Section 9.25, which includes measures to prevent flow blockage from ice formation. The RSW system and UHS system has been included in the site-specific PRA described in COLA Section 19. The Maintenance Rule Program for STP Units 3&4 is described in COLA Section 17.06S.

**19B.2.60 A-29: Nuclear Power Plant Design for the Reduction of Vulnerability to Industrial Sabotage Issue*****Resolution***

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

***Update***

The ABWR design features enhancing resistance of the ABWR to sabotage have been confirmed to be present in the STP 3&4 design.

**19B.2.68 II.E.6.1: Test Adequacy Study Issue*****Resolution***

The following supplement is provided to address information required by the COL License Applicant in Appendix 19B.

***Update***

The In-service Inspection plan is included in the STP 3&4 COLA in Section 3.9.6. Generic Letter 89-10 requirements are discussed in Section 13.4S.

**19B.3.1 COL Applicant Safety Issues**

The following standard supplement addresses COL License Information Item 19.28

Information in Appendix 19B that refers to COL Applicant is also addressed in FSAR 1.9S.

**19B.3.2 Testing of Isolators**

The following standard supplement addresses COL License Information Item 19.28a.

The inspection and test program for fiber optic-type isolators used between safety-related and non-safety-related systems and will be established consistent with the plant operating procedure development plan in Section 13.5. If other types of isolators are used (those subject to electrical leakage due to maximum credible electrical faults), the required testing, inspection and replacement guidance will be developed consistent with the plant operating procedure development plan in Section 13.5. (COM 19B-1)