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A Structured Approach for Review of Digital Plant Protection System Requirements Specifications

Volume 3: Trial Application to Advanced Boiling Water Reactor Protection System Specifications

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Disclaimer

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EXECUTIVE SUMMARY

This document describes a trial of the Structured Approach, which was conducted by applying the Structured Approach to review requirements specifications for a Advanced Boiling Water Reactor (ABWR) protection system. The intent of this test was to evaluate the completeness of the Structured Approach and its potential usability by the Nuclear Regulatory Commission as a requirements review tool.

This report describes the trial's results for each step of the Structured Approach. At each step a number of questions were developed to represent the requests for additional information that a reviewer might have prepared as a result of applying the method. These questions illustrate the ability to identify issues by applying the Structured Approach to the safety analyses and design documents. These questions should not be taken as a reflection on the ABWR design nor the NRC review of the design.

In this trial, the ABWR Standard Safety Analysis Report (SSAR) formed the basis for a review of the protection system specifications for the Kashiwazaki-Kariwa Nuclear Power Generating Station, Units 5 and 6. This trial application succeeded in applying the Structured Approach to the review of an actual set of protection system specifications. It demonstrated the feasibility of the Structured Approach and succeeded in identifying where further refinement of the approach is needed. Most of these refinements have been incorporated into the Structured Approach, as described in Volume 2 of this report. Some of the needed refinements are beyond the defined work scope for this project and, therefore, must be left for future development.

Strengths of the Structured Approach

The Structured Approach led to a fairly thorough review of the design issues for the plant protection systems, and highlighted areas for further investigation that may not have been identified in a more casual review. The analysis maintained traceability of specification requirements to the plant safety analyses and protection system failure analyses. A major benefit of the Structured Approach is that it forces the reviewer to develop a complete understanding of the design and the basis for the design.

Had the trial application been an actual review, the application of the Structured Approach would have resulted in requests for additional information in the following areas:

- Design bases for protection system functions that are not explicitly credited in the accident analyses of the safety analysis report.
- Design bases for ancillary functions of the protection system such as interlocks, permissives, and control functions.
- Response time requirements.
- Communications interface requirements.
- Environmental requirements.
- Electromagnetic interference environments and protection methods.
- Setpoint analysis assumptions.

Many of the questions raised relate to information needed about plant safety characteristics. Generally, where information was available on both the fundamental safety requirements and specification requirements, the specification requirements were found to be consistent with safety analyses assumptions and findings. In cases where such consistency was not found, a number of possible rationales for the inconsistencies are possible and would be investigated in the course of an actual review.

The questions raised by the trial application of the Structured Approach should not be taken as a reflection on the ABWR SSAR, ABWR design, or the NRC review. A typical requirements review would have a narrower scope than this trial; therefore, additional questions were expected be found by this more extensive review. Establishing confidence in a plant design does not require that the NRC staff identify and resolve every possible open item. Rather, the intent is to perform a review that is broad enough to provide confidence in the applicant's design processes and to identify issues of high safety significance.

Weaknesses of the Structured Approach

The Structured Approach collects insufficient data regarding exactly what functions must be performed. It identifies the functions generically (e.g., initiate reactor core isolation cooling) but does not specify the specific functions required of protection system functions (e.g., data transformations, or output of command sequences). This is a important lack of completeness as it provides no basis to review the specific algorithms or command logic that must be implemented by the protection system. To develop these requirements, the necessary functions of the mechanical engineered safety feature systems must be defined along with their performance requirements and integrity strategies. Incorporating these elements into the Structured Approach would be a major effort. From a review standpoint, it may be more reasonable to perform a confirmatory review that the required protection system actions will result in proper alignment of the associated engineered safety features (ESF) systems.

Using the applicant's failure analysis to identify hazards from protection system failures *did* identify hazards that pose significant threats to the baseline design of the protection system, but did *not* identify hazards that were already addressed by the baseline design — for example, hazards addressed by compliance accepted practices, such as those defined by IEEE Std. 603. In this regard, the Structured Approach identified a very incomplete set of integrity requirements for the protection system.

The Structured Approach does not consider design choices that must be documented in order to ensure proper functional interfaces between protection system components and subsystems. These design choices generally do not derive directly from safety analysis assumptions or results; they are determined by the designer. The Structured Approach should confirm that the choices made are consistent with the fundamental safety requirements and are consistently implemented across all system components.

The Structured Approach was difficult to implement because it requires familiarity with an extensive set of input documentation, and the organization of existing safety analysis documentation poorly supports the Structured Approach. The information needed to perform the review is scattered throughout the SSAR and many specification documents. Implementing the review for one specific function would require familiarity with tens of documents and the examination of many tens more to locate the required set. Consequently, the Structured Approach as defined is probably too burdensome to be a practical review tool for the NRC.

The trial application suggests that implementing the Structured Approach is very resource-intensive. Approximately 20 staff-weeks were required to review the ABWR requirements. This estimate does not include time spent in developing data collection tools that significantly simplified the effort, time spent developing the requirements topic catalog, or time spent preparing this report. Furthermore, the effort would have been greater but for the fact that many of the required documents were unavailable for review. In an actual application, the reviewer would have the opportunity to request additional information from the applicant, but this was not possible in the trial use. The lack of a complete set of safety documentation and specifications also caused a large number of blanks in the review documentation tables provided in the appendices of this report. LLNL staff work on other requirements documents — not available for use on an NRC project — indicates that many of the blanks could have been filled in if a complete set of documents had been available for the trial. Therefore, the availability of more complete documentation would not have significantly affected the conclusions drawn from the trial application.

To a large extent, the level of resources required is attributable to the Approach's attempt to establish "forward traceability," which requires an exhaustive search of documentation for fundamental requirements in order to develop a basis for specification review. A "reverse traceability" review would be simpler and equally effective at finding incorrect requirements, but less effective at detecting incomplete requirements.

Knowledge gained from the trial application suggested the means to develop a practical requirements review tool — a set of review templates using concepts from the Structured Approach that could be used by NRC staff in actual reviews. The templates would identify the critical requirement topics that the reviewer expects specifications to cover. The Structured Approach process for extracting protection system functional requirements based upon accident analysis assumptions and results would be used in a simplified form appropriate for performing trace audits of functional requirements. Integrity requirement checklists could be developed based upon the guidance of IEEE Std. 603, IEEE Std. 7-4.3.2, and their supporting standards. Generic checklists could be developed for typical protection system architectures and design elements. Such checklists would address most systems because using the IEEE standards is essentially mandated by 10 CFR 50.55a(h), and considerable commonality exists between the system architectures from the various vendors. The templates would assist reviewers in confirming that system and component specifications are consistent with the requirements of 10 CFR 50.55a(h) (IEEE Std. 603 as supplemented by IEEE Std. 7-4.3.2). These templates would be used to conduct reviews in accordance with Standard Review Plan (SRP) Section 7.1-C.

TRIAL APPLICATION TO ADVANCED BOILING WATER REACTOR PROTECTION SYSTEM SPECIFICATIONS

1. INTRODUCTION

This document describes a test of the Structured Approach described in Berg and Johnson (1988). The test was conducted by applying the Structured Approach to the review of requirements specifications for a Advanced Boiling Water Reactor (ABWR) protection system. The intent of this test was to evaluate the completeness of the Structured Approach and its potential usability by the Nuclear Regulatory Commission as a requirements review tool.

The primary inputs to this test were the ABWR Standard Safety Analysis report and a partial set of protection systems specifications for the Kashiwazaki-Kariwa Nuclear Power Generating Station, Units 5 and 6. Note that the Kashiwazaki-Kariwa specifications used as an input for this report are proprietary to Tokyo Electric Power Company and General Electric Nuclear Energy. Therefore, the contents of this volume, particularly Sections 5 and 9 and the associated Appendices, should not be distributed beyond the NRC and the Sandia, LLNL, and UC Berkeley project teams.

This report describes the test results for each step of the Structured Approach. For each step the report provides an overview of the process extracted from Berg and Johnson (1998), describes the implementation of the trial application, and describes what was learned from the trial. At each stage a number of questions were developed to represent the requests for additional information that a reviewer might have prepared as a result of applying the method. These questions, provided in Appendix A, represent the Structured Approach output that would be used as part of a application review process. They illustrate the ability to identify issues by applying the Structured Approach to the safety analyses and design documents. However, the questions should not be taken as a reflection on the ABWR design nor the NRC review of the design.

The trial was constrained to the use of documentation on hand for the ABWR design, with the following consequences:

- The test covered the design decomposition down to the level of major protection system architectural components. Consequently, the trial did not address direct application of the Structured Approach to software. It is unlikely that carrying the analysis further would have produced major findings because continued decomposition of requirements would basically involve repetition of the processes implemented in the trial.
- The test did not review design basis requirements separately from component specification requirements. The process of using the Structured Approach to review design basis requirements is essentially the same as that for reviewing specifications. Consequently, little additional knowledge would have been gained had a separate design basis document been available for examination.
- Many of the basic requirements could not be determined and many specification requirements could not be confirmed. It is likely that many of these requirements are covered in additional documentation that was not available for this test. Enough information was available, however, to learn strengths and weaknesses of the Structured Approach.

2. IDENTIFYING PIE CHARACTERISTICS AND PROTECTION SYSTEM FUNCTIONAL REQUIREMENTS

2.1 Review Process

The purpose of this analysis is to identify the PIEs and PIE characteristics that establish the functional and performance requirements for the protection system. The result serves as a knowledge base for evaluating the digital protection systems designed to mitigate the PIEs. The inputs, processes, and outputs of these steps are shown in Figure 1.

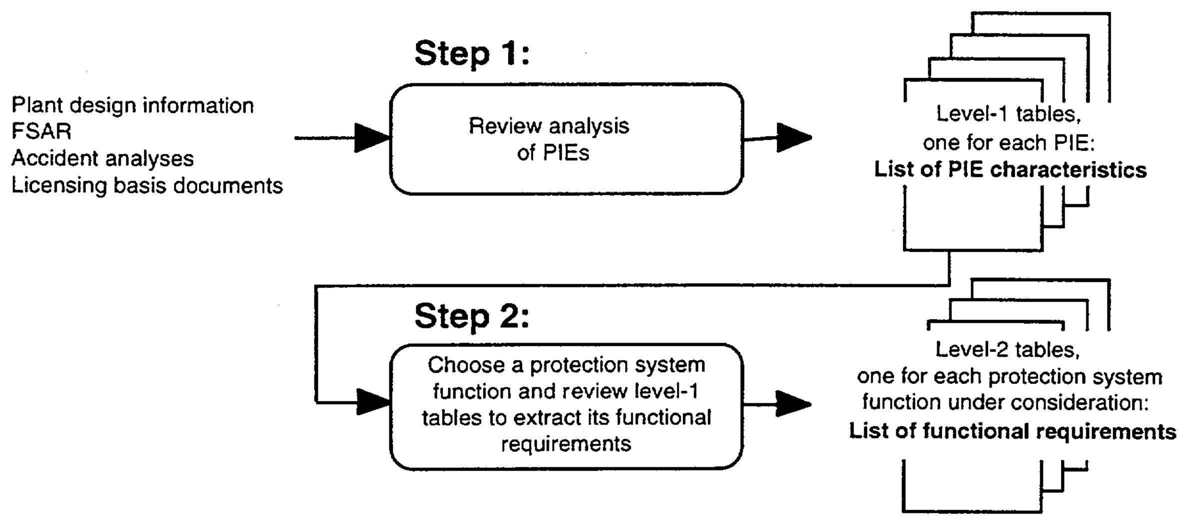

Figure 1. Steps 1 and 2 of the Structured Approach

Inputs: The inputs to this section consist of the following information:

- plant design information
- Final Safety Analysis Reports (FSAR), and
- supporting licensing basis documents.

Process: The process in this section is to review the analyses of PIEs to identify protection system functions and performance assumed in the accident analysis, as well as the plant parameter characteristics that must be accounted for in the protection system's design. Next, the reviewer chooses a protection system function to examine. Normally any given protection system function is credited with responding to several PIEs. The functional requirements for any given function must therefore encompass the requirements associated with every PIE for which the function is responsible. The characteristics of all PIEs examined are then reviewed to determine the limiting cases that must be met in the design of the protection system function. The limiting cases are the most extreme values of the functions, performance, or parameter characteristics over all of the PIEs considered.

Outputs: The outputs from this section consist of the following information:

- one or more level-1 tables identifying the characteristics of PIEs under consideration in the review (those characteristics that may impose requirements on the protection system, and

- one or more level-2 tables describing the required functions and performance of the protection system function(s) selected for consideration.

2.2 Implementation

The analysis was conducted using Amendment 31 of the ABWR Standard Safety Analysis Report (SSAR) as the principle input. Since this project was intended to generate requirements for all protection system functions, it was necessary to have a complete list of protection system functions to make sure that defining requirements for any function were not overlooked. Therefore, considerable interaction occurred between these steps and the identification of protection system functional assignments discussed in Section 3. The results of that analysis were fed back into this step to ensure that each protection system function was considered.

The primary SSAR review inputs for identifying requirements applicable to each function are listed below. These inputs are listed roughly in the order of the amount of material used from each section.

- Chapter 15, "Accident and Analysis"
- Chapter 16.3.3, "Technical Specifications — Instrumentation"
- Chapter 16.B.3.3, "Technical Specifications Bases —Instrumentation"
- Chapter 7.1, "Instrumentation and Control Systems — Introduction"
- Chapter 7.2, "Instrumentation and Control Systems — Reactor Protection System"
- Chapter 7.3, "Instrumentation and Control Systems — Engineered Safety Features Systems"
- Chapter 6.2, "Engineered Safety Features — Containment Systems"
- Chapter 6.3, "Engineered Safety Features — Emergency Core Cooling Systems"
- Chapter 6.5, "Engineered Safety Features — Fission Products Removal and Control Systems"
- Chapter 5.4, "Reactor Coolant System and Connected Systems — Component and Subsystem Design."

Each event analyzed in SSAR Chapter 15 was examined to identify the parameter characteristics relevant to the protection system design. The level-1 tables from this analysis are provided in Appendix B. These tables were reviewed to extract the limiting conditions that establish the bounding design requirement for each protection system function. The level-2 tables from this analysis are provided in Appendix C.

2.3 Evaluation of Usability and Completeness

The Structured Approach was adequate to document the review of PIEs into the level-1 tables. The analysis succeeded in identifying a number of areas where the information in Chapter 15 of the SSAR does not provide an adequate basis for evaluation of the protection system design requirements. In most cases this missing information is almost certainly contained in supporting documentation and would be readily available from the applicant. One area that would be a candidate for follow-up would be the safety system logic and control time response assumptions made in the accident analysis. Zero time delay appears to have been assumed for the electronic components of the engineered safety feature actuation and control system (ESFAS). The effect of this assumption on the results of the transient analyses (particularly for functions that have fast-acting final actuation devices) and the actual basis for time delay requirements imposed on the ESFAS electronics would be a candidate topic for further discussion with an applicant.

The team encountered a number of problems in implementing the Structured Approach as discussed below.

- The accident analysis does not always unambiguously identify the protective functions assumed. In step 2 the team needed to map the bounding requirements for each protection system function, so it was important to unambiguously identify each function in the analysis. This required that the reviewer have a good understanding of the protection system functions and functional assignments to understand specifically what functions are credited as protection for each PIE. To overcome this problem the team found it necessary to identify protection system functional assignments before analyzing PIE data. The team recommends that the Structured Approach be modified accordingly.

- It was difficult to locate information for a number of PIE characteristics. An example of this problem is the time delay allowance for automatic depressurization on low reactor vessel water level. The safety analysis for this function is discussed in Chapter 6, not Chapter 15 of the SSAR. It proved necessary for reviewer to have a good understanding of the organization of the SSAR and particularly the organization of the Chapter 15 material to effectively analyze the PIEs. This will not be an issue for experienced reviewers, but the Structured Approach should recommend that less-experienced reviewers spend a few days becoming familiar with the chapters identified above.

- It was not possible to locate information for certain PIE characteristics. An example of this problem is the time delay allowance for main steam line isolation on high steam line flow. Table 15.0-1 gives the allowed time delay as 0 seconds, which is unachievable. The actual allowable time delay is unknown, but must be greater than 0. In an actual review the reviewer might choose to review a different PIE for which all information is available, or to request the information from the licensee or applicant.

- It was difficult to extract precise information for certain PIE characteristics. An example of this problem is extraction of signal frequency response information. Three issues needed to be overcome. First, the figures in the SSAR are very small; therefore it would difficult to identify fluctuations in the analytical results that would demand very-high-frequency response by the instrumentation and control (I&C) system. Second, the frequency information in the analytical results has a upper cutoff due to the size of time-step selected when running the analytical codes. Essentially, the thermo-hydraulic analyst has made a decision about frequencies above which the dynamics of the signal are not important, but the Structured Approach will not give the reviewer insights about the correctness of this decision. Finally, the transient results in the SAR are given in a time domain representation, whereas the analysis needs frequency domain information. Correctly performing this transformation would require a rather tedious mathematical analysis (or at least a tedious description of the parameter time histories to provide an input for computer analysis) by the reviewer. For this effort the team developed a simplified rule of thumb: the maximum frequency content would be taken as 10 times the time interval over which the steepest ramp in the analysis outputs occurs. This rule was arrived at by assuming that the steepest ramp is the rise of a sawtooth wave, and then picking the cutoff frequency such that 95 % of the signal power is contained in frequencies below the cutoff. This is a conservative estimate because by assuming a sawtooth wave the analyzed bandwidth is maximized. This, or some similar rule of thumb should be included in the description of the Structured Approach.

- The information in the safety analysis is sometimes not specific to the requirements for the I&C system. An example of this problem is the response time for reactor trip on main steam line isolation valve closure. The allowed time delay for rod insertion can be deduced as 3.71 seconds from examining Table 15.0-1 together with Table 15.0-6. The allocation of this time delay between the rod drop time, scram discharge system time, and instrumentation delay time cannot be determined, however.

- The Structured Approach was found to collect data adequately on the performance characteristics of protection system functions, but collects insufficient data regarding exactly what functions must be performed. For the reactor trip system this is relatively unimportant because the reactor protection system (RPS) actions are relatively simple (de-energize scram solenoids). For ESFAS functions, however, this lack of complete data is problematic. An example of the lack of specificity in required functionality is reactor core isolation cooling (RCIC) initiation of high drywell pressure. The Structured Approach identifies no specific actions required of the protection system beyond the name of the function. By reviewing the interlock block diagrams (SSAR Figure 7.3-3) for this function, one can determine that the design of this function implements the specific actions listed below. (Note that this outline only addresses RCIC pump start-up. Additional requirements exist for shutting the system down at the appropriate time and resetting the protection system logic so that RCIC initiation is rearmed after shutdown.)

```
IF      Drywell pressure is high
        AND
        Reactor vessel water level is less than the level 8 setpoint
THEN
        CLOSE RCIC flow test valves F008 and F009
        AND
        START the RCIC turbine barometric condenser vacuum pump
        AND
        OPEN the RCIC steam supply bypass valve F045
        AND
        BYPASS motor control center thermal overloads for valves F008, F009, F045, F037, and
        F004.
        AND
        IF      Condensate storage tank suction valve F001 is not fully open
        THEN
                OPEN the suppression pool suction valve F006
        AND
        IF the RCIC steam supply valve F037 has been closed for more than 10 sec
                AND
                The RCIC steam supply bypass valve F045 has been not fully closed for more
                than 10 sec
        THEN
                OPEN the RCIC injection valve F004
                AND
                OPEN the RCIC steam supply valve F037.
```

This incompleteness can be traced to missing elements in the NRC means–end hierarchy (Beltracchi 1996) that set the boundaries for the development of the Structured Approach. To address this problem the Structured Approach needs to consider a Plant Safety — Engineered Safety Features (ESF) — Domain of Mitigation and Defense, an ESF System Integrity Domain of Hazards, and an ESF System Integrity Domain of Mitigation and Defense. In these domains, the required functions of the ESF systems, integrity threats to these systems, and integrity strategies for these systems would be defined. As the next step, the specific protection system functions that are needed to support the performance requirements and integrity strategies for these ESF system functions would need to be identified. Practically, this would be accomplished by reviewing (1) mechanical system design documents (mostly piping and instrument diagrams) to identify the control actions needed to implement ESF functions, and (2) reviewing mechanical system failure analyses to identify control actions needed to implement ESF system integrity strategies. Adding these elements to the Structured Approach would be a major effort. From a review standpoint, it may be more reasonable to perform a confirmatory review that the required protection system actions will result in proper alignment of the associated ESF systems.

- The Structured Approach was adequate to document the bounding PIE characteristics applicable to each protection system function in the level-2 tables. Many of the protection system functions, however, are not explicitly discussed in the safety analysis. Therefore, the team could not extract functional requirements for these protection system functions. Consequently, the parameter characteristics for these functions are blank in Appendix C. Section 3 below discusses this finding in more detail.

3. IDENTIFICATION OF PROTECTION SYSTEM FUNCTIONAL ASSIGNMENTS

3.1 Review Process

The purpose of this analysis is to identify the digital protection elements (i.e., naming and describing their protection functions) that handle each PIE cataloged in the previous section. The inputs, processes, and outputs of this steps are shown in Figure 2, and described in detail below.

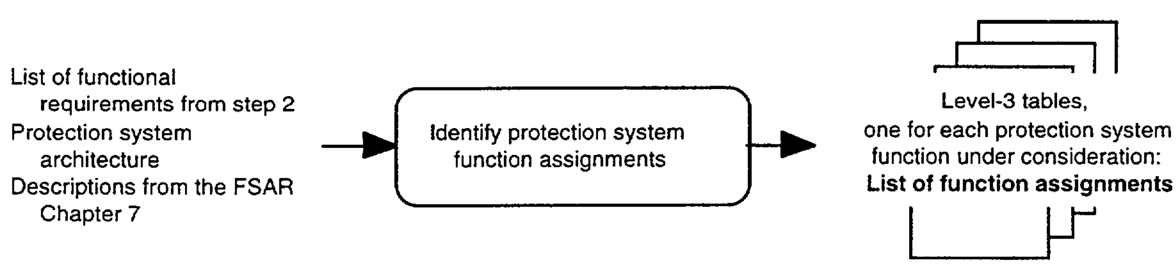

Figure 2. Step 3 of the Structured Approach

Inputs: The inputs to this identification process include:
- the level-2 table of functional requirements from the previous section, and
- the protection system architecture or hierarchy (i.e., identification of protection system's subsystems and elements, and how they are interconnected) and,
- descriptions from the FSAR Chapter 7.

Process: The process in this section is to examine the protection function allocations to ensure that the protection system function under consideration is handled by at least one of the defined protection systems. Definitions of the protection subsystems could be based on the traditional protection systems discussed in Section 7 of NUREG-0800, (1997); on definitions that exist for protection systems of evolutionary and passive advanced light water reactors (ALWRs)

(EPRI-1, 1980 and EPRI-2, 1980); or on novel concepts. Traditional protection subsystems include:
- the RPS, and
- the ESFAS.

Outputs: The outputs of this process include the following:
- identification of the subsystem(s) assigned responsibility for the protection system function under consideration. This information is appended to the level-2 table of functional requirements to produce a level-3 table.

3.2 Implementation

The analysis was conducted using Amendment 31 of the ABWR Standard Safety Analysis Report as the principle input. The primary SSAR review inputs, listed roughly in the order of the amount of material used from each section, were:

- Chapter 16.B.3.3, "Technical Specifications Bases —Instrumentation,"
- Chapter 16.3.3, "Technical Specifications — Instrumentation,"
- Chapter 7.1, "Instrumentation and Control Systems — Introduction,"
- Chapter 7.2, "Instrumentation and Control Systems — Reactor Protection System," and
- Chapter 7.3, "Instrumentation and Control Systems — Engineered Safety Features Systems."

These sources of information were used to develop a table of systems, functions, and related PIEs to help identify the functions credited in the accident analyses. As a discussion of each function was encountered in the accident analysis, this fact was noted and the completed table was used to check that PIE information had been gathered for each unique combination of PIE and associated protection function. The result is shown in Table 1. Because this information was encoded in the level-1 and level-2 tables in the appendices using system, sub-system identification numbers, there was no need to produce separate level-3 tables for this example. The level-1 and level-2 tables are provided in Appendices A and B.

3.3 Evaluation of Usability and Completeness

As demonstrated by Table 1, implementation of the Structured Approach revealed that the Chapter 15 accident analysis provides no insight into the requirements for a large number of protective functions. There appear to be two reasons why these are not explicitly discussed. First, the function is not needed as a primary protection against any event and is provided primarily for functional diversity. Second, the function is assumed to actuate in concert with other functions that are discussed. Containment isolation, for example, is assumed to initiate at the same time as several other functions such as low pressure flood. In these cases the associated function dictates most of the parameter characteristics for the functions that are not explicitly discussed. Certain characteristics, most notably the allowed time delay, must be inferred by the analyst. Generally, the requirements can be presumed to be relatively non-demanding. For the containment isolation example it can be reasonably presumed that the time delay of any practical I&C system would be much longer than the allowed delay time. The design bases for these functions, including both actuation and protection system interlock functions, would be a candidate for further discussions with an applicant.

Table 1. Allocation of Protective Functions to PIEs and to Systems

		SSLC														
		RPS	ESFAS													
	Systems	RPS	ECCS						Isolation			Other ESF				
	Subsystems	N/A	LPFL	RCIC	HPCF	ADS	MSIV	Contain	RCIC	CUW	SCSI	Diesel	SGTS	RCW/RSW	CAMS	SPC
1a	Startup Range Neutron Monitor - Neutron Flux - High	N														
1b	Startup Range Neutron Monitor - Neutron Flux - Short period	A														
2a	APRM - High Setdown	A														
2b	APRM - Simulated Thermal Power High	A														
	Recirculation Flow (part of APRM STP)	N														
2e	Rapid Core Flow Decease	A														
2f	Osciation Power Range Monitor	N														
2g	APRM ATWS ADS Permissive (low APRM & Leve<1.5)					N										
3	Reactor Vessel Steam Dome Pressure - High	N	N							N	N					
4	Reactor Vessel Steam Dome Pressure - Low		A													
5	Reactor Vessel Water Level - High, Level 8			N (shut)	N (shut)											
6	Reactor Vessel Water Level - Level 3	A						N			N		N			
7	Reactor Vessel Water Level - Level 2			A				N		N						
8	Reactor Vessel Water Level - Level 1.5				A		N					N				
9	Reactor Vessel Water Level - Level 1		A			A		N				N		N	N	
10	Main Steam Isolation Valve - Closure	A														
11	Drywell Pressure - High	N	N	N	N	N		N				A	N	N	N	
12	CRD Water Header Charging Pressure - Low	N														
13	Turbine Stop Valve - Closure	A														
14	Turbne Control Valve Fast Closure, Trip Oil Pressure - Low	A														
15	Main Steam Tunnel Radiation - High	N					N									
16	Supression Pool Temperature - High	A														A
17	Condensate Storage Tank Level - Low			N	N											
18	Supression Pool Water Level - High			N	N											
19	Main Steam Line Pressure - Low						A									
20	Main Steam Line Flow - High						A									
21	Condenser Vaccum - Low						A									
22	Main Steam Tunnel Temperature - High						N			N						
23	Main Turbine Area Temperature - High						N									
24	Reactor Building / Fuel Handling Area, Exhaust Air Radiation - High							N					N			
25	RCIC Steam Line Flow - High								N							
26	RCIC Steam Supply Line Pressure - Low								N							
27	RCIC Equipment Area Temperature - High								N							
28	RHR Area Temperature - High										N					
29	CUW Dufferential Flow - High									N						
30	CUW Area Temperature - High								N	N						
	RHR Pump Discharge Pressure - High				N											
	HPCF Pump Discharge Pressure - High				N											
	RCIC Turbine Exhaust Pressure - High								N							

A	Function Considered in Accident Analysis	ESFAS	Engineered Safety Features Actuation System	RCW	Reactor Building Cooling Water
ADS	Automatic Depressurization System	HPCF	High Pressure Core Flooder	RPS	Reactor Protection System
CAMS	Containment Atmosphere Cleanup System	LPFL	Low Pressure Flooder	RSW	Reactor Service Water
Contain	Containment Isolation	MSIV	Main Steam Isolation Valve	SCSI	Shutdown Cooling System Isolation
CUW	Reactor Water Cleanup System	N	Function not Considered in Accident Analysis	SGTS	Standby Gas Treatment System
ECCS	Emergency Core Cooling System	RCIC	Reactor Core Isolation Cooling	SPC	Suppression Pool Cooling
				SSLC	Safety System Logic Control

Reviewers may choose to emphasize the functions credited in the safety analysis, in which case the lack of information on the back-up functions is unimportant. Otherwise, reviewers will need to consult more detailed licensee documents for information on the required characteristics for these functions. The implicitly assumed functions should have most of the same required characteristics as the driving functions that are discussed in the accident analyses. The Structured Approach needs to inform users about how to handle these two situations. For the implicitly credited functions, the Structured Approach should caution reviewers to account for the few characteristics that will be unique to these functions.

4. IDENTIFICATION OF COMPONENT FUNCTIONAL REQUIREMENTS

4.1 Review Process

The purpose of this analysis is to identify protection system mitigation and defense requirements that should addressed in the specifications of digital components. For the purposes of this discussion a component can be any protection system design element (e.g., system, subsystem, module, or part) which has a separable function and for which requirements can be sensibly developed. A component might be composed of hardware, software, or procedures, or an integrated combination of these three. The inputs, processes, and outputs of this steps are shown in Figure 3, and described in detail below.

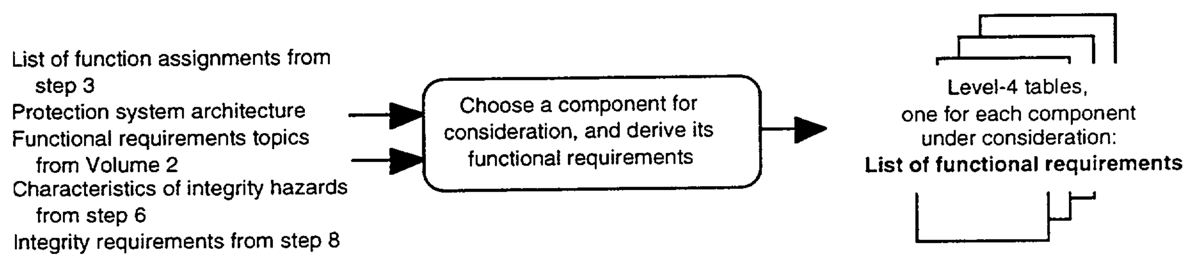

Figure 3. Step 4 of the Structured Approach

Inputs: The inputs to this analysis are:

- the level-3 table of protection system functional requirements from Section 5.2.,
- the protection system and subsystem architectures, and an understanding of the component's role within the system, and
- functional requirements topics from Volume 2.

After integrity requirements are identified, the following are inputs to later iterations of the functional requirements:

- the characteristics of integrity hazards from step 6, and
- integrity requirements from step 8.

Process: The process in this section is to review the protection system functional requirements to identify the areas that must be addressed in the system requirements specification for the chosen component. Topics that must be contained in the component specification are identified using the catalog given in Volume 2.

Because the functional and integrity requirements of the protection system interact (i.e., the functional requirements must not cause an integrity hazard that cannot be addressed), the characteristics of integrity hazards from step 6 and the integrity requirements from step 8 need to be considered after these requirements are developed. Note that steps 1–5 and 6–9 cover two series of relatively independent reviews, so the processes for reviewing the functional and integrity requirements can be undertaken concurrently.

Outputs: The outputs from this process are:

- expected functional requirements for the component under consideration, in the form of a level-4 table.

4.2 Implementation

Identifying requirements for protection system components required first that the components to be considered in the study be identified. SSAR Figure 7.2-2 shows the overall protection system architecture. SSAR Figure 7.6-4a shows the architecture of the neutron monitoring system. Examination of these figures shows that the protection system includes the generic types of components listed in Table 2.

Except for the digital and analog transducers, all of the component types identified in Table 2 are either associated with all protective functions or only with nuclear instrumentation functions, so this level of information is sufficient to identify the requirements for these components. The requirements for digital

Table 2. Generic Component Types in the ABWR Architecture

Type of Component	Component Description
Hardware/software	Remote multiplexer unit
Hardware/software	Multiplexer
Hardware/software	Digital trip module
Hardware/software	Trip logic unit (TLU)
Hardware/software	Bypass unit
Hardware/software	Output logic unit (OLU)
Hardware/software	Trip actuator
Hardware/software	Manual scram logic unit (MLU)
Hardware	Start-up range neutron preamplifier
Hardware	SRNM processor (digital measurement & control)
Hardware	APRM preamplifier
Hardware	APRM processor (digital measurement & control)
Hardware	Manual scram switch
Hardware	Reactor mode switch
Hardware	Manual scram reset switch
Hardware	Division manual trip switch
Hardware	Division trip reset switch
Hardware	Bypass switches
Hardware	Channel manual trip switch
Hardware	Digital transducers
Hardware	Analog transducers

and analog transducers, however, are specific to the individual measurements. Therefore, to identify requirements for these components it was necessary to first identify the specific types of transducers in the protection system. Review of Technical Specification Tables 3.3.1.1-1, and 3.3.1.4-1 (SSAR Chapter 16) together with SSAR table 7.2-1 and SSAR Figure 7.4-6a led to the identification of the analog and digital transducers shown in Table 3. The digital transducers are all switches. None are of a type that output a digitally encoded values of a continuous signal..

Table 3. Specific Transducers Used by the ABWR Protection System

Generic Component Description	Specific Type of Transducer
Analog transducer	Start-up range neutron detector
Analog transducer	APRM detector
Analog transducer	Core flow sensor
Analog transducer	Steam dome pressure sensor
Analog transducer	Reactor water level sensor
Digital transducer	MSIV position switch
Analog transducer	Drywell pressure sensor
Analog transducer	CRD water header pressure sensor
Digital transducer	Turbine stop valve position sensor
Analog transducer	Turbine control valve oil pressure sensor
Analog transducer	Main steam tunnel radiation sensor
Analog transducer	Condensate storage tank level sensor
Analog transducer	Suppression pool level sensor
Analog transducer	Main steam line pressure sensor
Analog transducer	Main steam line flow sensor
Analog transducer	Condenser vacuum sensor
Analog transducer	Main steam tunnel temperature sensor
Analog transducer	Main turbine area temperature sensor
Analog transducer	Reactor building / fuel handling area exhaust radiation sensor
Analog transducer	RCIC steam line flow sensor
Analog transducer	RCIC steam supply line pressure sensor
Analog transducer	RCIC equipment area temperature sensor
Analog transducer	RHR area temperature sensor
Analog transducer	CUW differential flow sensor
Analog transducer	CUW area temperature sensor
Analog transducer	RHR pump discharge pressure sensor
Analog transducer	HPCF pump discharge pressure sensor
Analog transducer	RCIC turbine exhaust pressure sensor
Analog transducer	Suppression pool temperature sensor
Analog transducer	HPCF pump discharge flow sensor
Analog transducer	HPCF pump suction pressure sensor
Analog transducer	Drywell sump drain radiation monitor

Components and functions are not always consistently named in all SSAR sections and drawings. Therefore, it was sometimes necessary to use the interlock block diagrams (SSAR Figures 7.2-10 and 7.3-1 through 7.3-10) to determine if different names actually referred to different components or were simply different descriptions of the same component.

Technical Specification Tables 3.3.1.1-1 and 3.3.1.4-1 (SSAR Chapter 16) were used to relate the components to protective functions that established bounding performance requirements. These relationships are shown below in Table 4. This relationship allowed the limiting functional requirement given in Appendix C to be linked to the individual components.

Table 4. Protection System Functions Supported by Each Protection System Component

Component	Protective Function
APRM detector	Reactor trip—average power range monitor—high
APRM preamplifier	Reactor trip—average power range monitor—high
APRM processor	Reactor trip—average power range monitor—high
Bypass switches	All PPS bypass & reset functions
Bypass unit	All PPS bypass & reset functions
Channel manual trip switch	All PPS bypass & reset functions
Condensate storage tank level sensor	RCIC initiation -ore flood—condensate storage tank level—low
Condensate storage tank level sensor	RCIC initiation—condensate storage tank level—low
Condenser vacuum sensor	Main steam line isolation—condenser vacuum—low
Core flow sensor	Reactor trip—average power range monitor—rapid core flow decrease
CRD water header pressure sensor	Reactor trip—control rod drive water header charging pressure—low
CUW area temperature sensor	RCIC isolation—CUW area temperature—high
CUW differential flow sensor	Reactor water cleanup isolation—CUW differential flow—high
Digital trip module	All PPS functions
Division manual trip switch	All PPS bypass & reset functions
Division trip reset switch	All PPS bypass & reset functions
Drywell pressure sensor	Automatic depressurization system initiation—drywell pressure—high
Drywell sump drain radiation monitor	Containment isolation—drywell sump drain HCW radiation—high
HPCF pump discharge flow sensor	High pressure core flood initiation—HPCF pump discharge flow -low
HPCF pump discharge pressure sensor	High pressure core flood initiation—HPCF pump discharge pressure—high
HPCF pump suction pressure sensor	High pressure core flood initiation—HPCF pump suction pressure—low
Main steam line flow sensor	Main steam line isolation—main steamline flow—high
Main steam line pressure sensor	Main steam line isolation—main steamline pressure—low
Main steam tunnel radiation sensor	Main steam line isolation—main steam tunnel radiation—high
Main steam tunnel temperature sensor	Main steam line isolation—main steam tunnel temperature—high
Main turbine area temperature sensor	Main steam line isolation—main turbine area temperature—high
Manual scram logic unit (MLU)	Reactor trip—manual reactor protection system scram
Manual scram reset switch	All PPS bypass & reset functions
Manual scram switch	Reactor trip—manual reactor protection system scram
MSIV position switch	Reactor trip—main steam isolation valve—closure
Multiplexer	All PPS functions except NI
Output logic unit	All ESFAS functions
RCIC equipment area temperature sensor	RCIC isolation—RCIC equipment area temperature—high
RCIC steam line flow sensor	RCIC isolation—RCIC steamline flow—high

Component	Protective Function
RCIC steam supply line pressure sensor	RCIC isolation—RCIC steam supply line pressure—low
RCIC turbine exhaust pressure sensor	RCIC isolation—RCIC turbine exhaust pressure—high
Reactor building / fuel handling area exhaust radiation sensor	Containment isolation—reactor building/ fuel handling area, exhaust air radiation—high
Reactor mode switch	Reactor trip—manual reactor protection system scram
Reactor water level sensor	Reactor trip—reactor vessel water level—level 3
Remote multiplexer unit	All PPS functions except NI
RHR area temperature sensor	Shutdown cooling system isolation—RHR area temperature—high
RHR pump discharge pressure sensor	High pressure core flood initiation—RHR pump discharge pressure—high
Start-up range neutron detector	Reactor trip—startup range neutron flux—short period
Start-up range neutron preamplifier	Reactor trip—startup range neutron flux—short period
Steam dome pressure sensor	Low pressure core flood initiation—reactor vessel steam dome pressure—low
Suppression pool level sensor	RCIC initiation—suppression pool water level—high
Suppression pool temperature sensor	Reactor trip—suppression pool temperature—high
Trip actuator	All RTS functions
Trip logic unit	All PPS functions
Turbine control valve oil pressure sensor	Reactor trip—turbine control valve fast closure
Turbine stop valve position sensor	Reactor trip—turbine stop valve closure

The limiting parameter characteristics[1] were identified for each component. Where a component is associated with only one function, the functional requirements are the requirements from the level-2 tables (Appendix C) for that function. Where more than one function is associated with a given component, the level-2 tables for each associated function were inspected, and the most limiting value from each functional requirement field was identified as the requirement for the component.

Once the components to be considered and the associated limiting parameter characteristics were defined, these high-level requirements were decomposed into detailed requirements that should be found in the component specifications. The types of requirements expected will be the same for components that are functionally identical. Therefore, instead of examining each component separately, generic classes of components were considered. The requirements topics expected to be specified are the same for all components within a class. The different generic classes of components were identified, as shown in Table 5.

For each generic class of component, each type of parameter characteristic from the level-1 tables was considered, and the catalog of functional requirements was examined to relate requirements topics to each parameter characteristic, based upon reviewer experience. This resulted in a list of requirements topics applicable to each generic component class, as shown in Table 6.

Some topics could not be directly related to parameter characteristics, as described in Section 2.1. One set of these comprise requirements related to the required component functions. Section 2.2 discussed this missing element of the Structured Approach. The other set of these comprise requirements that do not derive from accident analysis assumptions, but that relate to design decisions that must be consistently addressed throughout the system design. These topics were added to the level-3 tables even though the topics could not be directly related back to the review of safety analyses.

[1] Defined as the limiting characteristics from all of the functions associated with that component.

Table 5. Generic Classes of Protection System Components

Generic Class	Component Description
Analog transducer	Analog transducers
Digital transducers	Bypass switches Channel manual trip switch Digital transducers Division manual trip switch Division trip reset switch Manual scram reset switch Manual scram switch Reactor mode switch
Digital trip module	Bypass unit Digital trip module
Multiplexer	Multiplexer Remote multiplexer unit
Nuclear instrumentation preamplifier	APRM preamplifier Start-up range neutron preamplifier
Nuclear instrumentation processor	APRM processor (digital measurement & control) SRNM processor (digital measurement & control)
Output logic unit	Output logic unit
Trip actuator	Trip actuator
Trip logic unit	Manual scram logic unit (MLU) Trip logic unit

Table 6. Relationship of Functional Requirement Topics to Parameter Characteristics

Generic Class	Parameter Characteristic	Related Topic(s)
Analog transducers	Analytical limit	Measurement errors
	Bounding rate of change	Signal rate of change
	Design choice*	Electrical connections Electrical interface requirements Mounting Parameter location
	Function*	Sense element
	Minimum and maximum frequency spectrum	Frequency range
	Minimum and maximum variable range	Signal span
	Response time	Response time

Generic Class	Parameter Characteristic	Related Topic(s)
Digital transducers	Analytical limit	None. The analytical limit sets no requirements on position switch design.
	Bounding rate of change	Signal rate of change
	Design choice*	Electrical connections Electrical interface requirements Mounting Parameter location
	Function*	Sense element
	Minimum and maximum frequency spectrum	None. The signal frequency spectrum sets no requirements on position switch design.
	Minimum and maximum variable range	Signal span
	Response time	Response time
Digital trip modules	Analytical limit	Analytical limit Resolution
	Bounding rate of change	Signal rate of change
	Design choice*	Electrical connections Electrical interface requirements Mounting
	Function*	Command functions
	Maximum and minimum frequency spectrum	Sampling interval Frequency range
	Minimum and maximum variable range	Signal span
	Response time	Response time
Multiplexers	Analytical limit	Resolution
	Bounding rate of change	Signal rate of change
	Design choice*	Electrical connections Electrical interface requirements Mounting
	Function*	Communications function
	Maximum frequency spectrum	Sampling interval Frequency range
	Minimum and maximum variable range	Signal span
	Response time	Response time

Generic Class	Parameter Characteristic	Related Topic(s)
Nuclear instrumentation preamplifiers	Analytical limit	None. The analytical limit sets no requirements on the preamplifier design
	Bounding rate of change	Signal rate of change
	Design choice*	Electrical connections Electrical interface requirements Mounting
	Function*	Sense function
	Minimum and maximum frequency spectrum	Frequency range
	Minimum and maximum variable range	Signal span
	Response time	Response time
Nuclear instrumentation processors	Analytical limit	Resolution
	Bounding rate of change	Signal rate of change
	Design choice*	Electrical connections Electrical interface requirements Mounting
	Function*	Command function
	Maximum frequency spectrum	Sampling interval Frequency range
	Minimum and maximum variable range	Signal span
	Response time	Response time
Output logic units	Analytical limit	None. The analytical limit sets no requirements on the output logic unit design.
	Bounding rate of change	None. The bounding rate of change sets no requirements on the output logic unit design.
	Design choice*	Electrical connections Electrical interface requirements Mounting
	Function*	Execute function
	Maximum frequency spectrum	Sampling interval
	Minimum and maximum variable range	Signal span
	Response time	Response time

Generic Class	Parameter Characteristic	Related Topic(s)
Trip actuators	Analytical limit	None. The analytical limit sets no requirements on the trip actuator design.
	Bounding rate of change	None. The bounding rate of change sets no requirements on the trip actuator design.
	Design choice*	Electrical interface requirements Mounting
	Function*	Execute function
	Maximum frequency spectrum	None. The signal frequency spectrum sets no requirements on the trip actuator design.
	Minimum and maximum variable range	Signal span
	Response time	Response time
Trip logic units	Analytical limit	Resolution
	Bounding rate of change	None. The bounding rate of change sets no requirements on the trip logic unit design.
	Design choice*	Electrical connections Electrical interface requirements Mounting
	Function*	Command functions
	Maximum frequency spectrum	Sampling interval
	Minimum and maximum variable range	Signal span
	Response time	Response time

* These characteristics were not identified in the original list of parameter characteristics because they were not included in the original Structured Approach.

Linking the individual components to the bounding parameter characteristics of Appendix C on the basis of the system function relationships in Table 5 gave a list of all components along with the associated bounding parameter characteristics that form the basis for their functional requirements. Linking the individual components and the associated parameter characteristics to the expected requirements topics according to the relationships in Table 6 identified the topics that should be addressed in each component's specification. Each topic and parameter characteristic was examined for each component to derive the specific expected requirement for each relevant topic. The derivation of the expected requirements for each topic was performed as follows:

- Analytical limit — Equals analytical limit from the parameter characteristic tables.
- Command function — Not specified. Not included in original Structured Approach.
- Communications function — Not specified. Not included in original Structured Approach.
- Electrical connections — Not specified. Requires access to more detailed information than is available in the safety analysis.

- Electrical interface requirements — Not specified. Requires access to more detailed information than is available in the safety analysis.
- Execute function — Not specified. Not included in original Structured Approach.
- Frequency range — Equals the difference between minimum and maximum frequency spectrum parameter characteristics.
- Measurement errors — Not specified. Requires access to setpoint analysis assumptions.
- Mounting — Not specified. Requires access to more detailed information than is available in the safety analysis.
- Parameter location — Not specified. Requires access to more detailed information than is available in the safety analysis.
- Resolution — Not specified. Requires access to setpoint analysis assumptions.
- Response time — Equals response time parameter characteristic.
- Sampling interval — Taken as one-tenth the period of the maximum frequency.
- Sense element — Not specified. Requires access to more detailed information than is available in the safety analysis.
- Sense function — Not specified. Not included in original Structured Approach.
- Signal rate of change — Equals bounding rate of change parameter characteristic.
- Signal span — Equals difference between maximum and minimum variable range parameter characteristics.

This analysis was applied to each component to produce the level-4 tables that are presented in Appendix D. The tables in Appendix D also include the results of the specification functional requirements review discussed in Section 5 below.

4.3 Evaluation of Usability and Completeness

The Structured Approach identified expected requirements that could be used as the basis for review of component requirements specifications. At the system architectural level, establishing the correlation between system components and functional requirements derived from the accident analyses was relatively straightforward. Continuing the analysis at a more detailed level, the software component level, would depend upon the availability of detailed design information for the major system components. That level of detail was not available for this test, but it is typically available in topical reports or other documents that support the safety analyses.

The Structured Approach did not address the need to consider design choices that must be documented to ensure proper functional interfaces between protection system components and other systems, but it should. These design choices are not derived directly from safety analyses assumptions or results. Therefore, designers may have a great deal of freedom in such choices. Often the choices derive from industrial practice, formal standards, or commercial availability. The requirements on a given component considered in the Structured Approach should be determined by examining the design of interfacing components or systems.

The analysis identified a number of topics for which information needed for requirements review could not be extracted from the SSAR. Many of these, e.g., mounting and electrical interface requirements, would not be good candidates for further pursuit because common design practices will typically result in acceptable solutions. The impact of setpoint analysis methodology assumptions on protection system design requirements and the basis for signal sampling intervals, however, would be good candidates for further discussion with an applicant.

5. SPECIFICATION FUNCTIONAL REQUIREMENTS REVIEW

5.1 Review Process

This analysis compares the expected functional requirements for the component under consideration to the requirements specifications. The review confirms consistency of specifications with, and traceability to, system requirements credited in the accident analyses. The inputs, processes, and outputs of this steps are shown in Figure 4, and described in detail below.

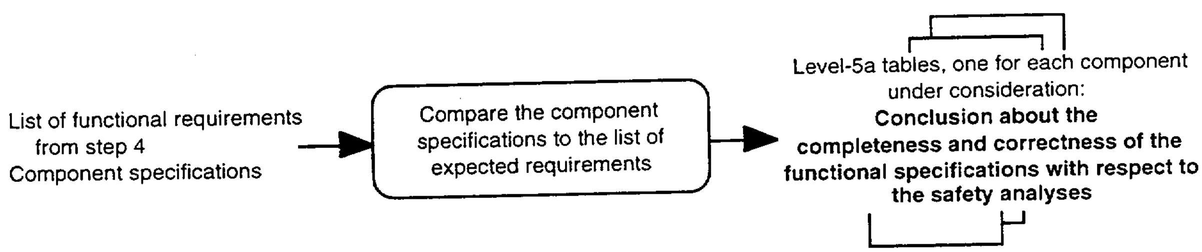

Figure 4. Step 5a of the Structured Approach

Inputs: The inputs to this analysis are:
- the level-4 table identifying the functional requirements for the component under consideration, and
- component specifications

Process: The list of expected performance requirements specifications (level-4 tables) are evaluated against the specification for the components under consideration (see Figure 1).

Specific requirements for each component are evaluated by correlating the protection system functional requirements with the characteristics of the related subsystems and components to identify the requirements applicable to the component being considered. The component's specification is then compared against the topics and related specific requirements to verify that all functional requirements derived from PIEs and assigned to the component under consideration are appropriately reflected in the system requirements specifications. If conflicts or omissions are found, questions are posed to the licensee or applicant. Another iteration through the process may be required to resolve review findings.

Outp. The outputs from this process are:
- a conclusion about the completeness and correctness of the system requirements specifications, with respect to the safety analyses, in the form of a level-5a table.

5.2 Implementation

The following specification documents for the Kashiwazaki-Kariwa Nuclear Power Generating Station Units 5 and 6 were available for use in this test.

- 22A8477, Neutron Monitoring System Design Specification
- 23A6301, Neutron Monitoring System Hardware & Software System Specification
- 23A1317, Safety System Logic and Control System Design Specification
- 23A6327, Essential Multiplexing System — Safety System Logic and Control Interface Requirements
- 3E-28-A249, Essential Multiplexing System — System Design Specification
- 23A6710, Reactor Protection System, Hardware / Software System Specification
- 23A1302, Reactor Protection System Design Specification
- SSAR Figure 7.2-10, Reactor Protection System Interlock Block Diagram
- SSAR Figure 7.3-1, High Pressure Core Flooder System Interlock Block Diagram
- SSAR Figure 7.3-2, Nuclear Boiler System Interlock Block Diagram
- SSAR Figure 7.3-3, Reactor Core Isolation Cooling System Interlock Block Diagram
- SSAR Figure 7.3-4, Residual Heat Removal System Interlock Block Diagram
- SSAR Figure 7.3-5, Leak Detection and Isolation System Interlock Block Diagram
- SSAR Figure 7.3-6, Standby Gas Treatment System Interlock Block Diagram
- SSAR Figure 7.3-7, Reactor Building Cooling Water and Reactor Service Water System Interlock Block Diagram
- SSAR Figure 7.3.9, HVAC Emergency Cooling Water System Interlock Block Diagram
- SSAR Figure 7.3-10, High Pressure Nitrogen Gas Supply System Interlock Block Diagram

Typically a reviewer would not use the SSAR figures as a input to the review process. The actual controlled drawings from which the SSAR figures are derived should be used because they would be the more up-to-date source. The SSAR figures are, however, a good stand-in for the official drawings for the purposes of this trial.

These documents were reviewed against the expected functional requirements identified in Appendix D. Where requirements information was available it was entered into the appropriate columns of the Appendix D tables. Where the requirements were not within the expected ranges, a question was generated and recorded in Appendix A. In short, these questions represent potential errors in requirements and could be the basis for further review and discussion with an applicant.

5.3 Evaluation of Usability and Completeness

The application of the Structured Approach demonstrated that the protection system functional specifications are generally correct and consistent with safety analyses where expected requirements and specification requirements could both be found. Two inconsistencies were identified regarding ESFAS response time requirements and the operating range of neutron monitoring instruments. These would be reasonable issues to pursue further with an applicant, but they appear to be issues that could be quickly resolved. The completeness of the specifications could not be judged because a complete set of safety analysis documents and specifications was not available for this trial.

Finding the specific requirements in the documentation that correlated to the expected requirements proved to be very difficult. The requirements are contained in a number of different documents, they are presented in a number of different formats in the different documents. Considerable and repeated examination of the specification documents was required to extract the necessary information. This problem is likely to be encountered in conducting a trace audit using the Structured Approach, but the issue will be more easily managed because the more restricted scope of the trace audit will reduce the number of different pieces of information that must be found. Furthermore, an auditor may have the assistance of the applicant's staff to help find the necessary requirements information.

The requirements documents available for review contained actual requirements that related to only about half of the expected requirements. To a large extent this result occurred because a complete set of requirements documents was not available to support this trial. More-complete sets of requirements documentation for other, similar, projects have been reviewed by the team, but could not be used for this trial because of proprietary information agreements. Therefore, the team expects that most of the expected requirements could be found in a complete set of requirements documents. Additional Kashiwazaki-Kariwa documents that would have supported a more complete review include the following:

- A11-1010, Design Specification — Plant General Systems Application Requirements
- A11-3020, Design Specification — Applicable Codes & Standards
- A11-3120, Design Specification — Electrical Equipment Independence & Separation *Future, Seismic Design Guide
- A11-4110, Design Requirements — Instrument Setpoints
- A11-4100, BWR Requirements — Equipment Environmental Interface Data
- A30-3030, BWR Requirements — Environmental Qualification for Safety Grade Structural, Mechanical, and Electrical Equipment and Components
- A11-4010, Design Specification, Composite Nuclear Plant System
- A32-3021, Design Specification — Digital Measurement and Control
- D11-4010, Design Specification — Process Radiation Monitoring System
- E31-4010, Design Specification — Leak Detection and Isolation System
- H22-4010, Design Specification — Instrument Racks
- R42-4010, Design Specification — DC Power Supply
- R46-4010, Design Specification — Vital AC Power Supply

The availability of documents such as these would have made the test review more complete, but also would have exacerbated the problem of searching through a large volume of documents to find the specific requirements that were relevant to safety.

Generally, the specification requirements that could be located were consistent with the expected requirements identified by the Structured Approach analysis. The specified overall channel response times were, however, determined to be greater than the times assumed for ESF actuation in the safety analysis, and the average power range monitor system range was less than the possible range of the parameter under calculated accident conditions. These would be candidate issues for follow-up in an actual review.

6. IDENTIFICATION OF INTEGRITY REQUIREMENTS

6.1 Review Process

The purpose of this analysis is to identify, analyze, and characterize hazards that threaten the integrity of the digital protection system being examined. This serves as a knowledge base for reviewing mitigation and defense strategies (e.g., functional diversity, redundancy, or environmental qualification) to protect the digital protection system itself against integrity hazards. The inputs, processes, and outputs of this step are shown in Figure 5, and are described in detail below.

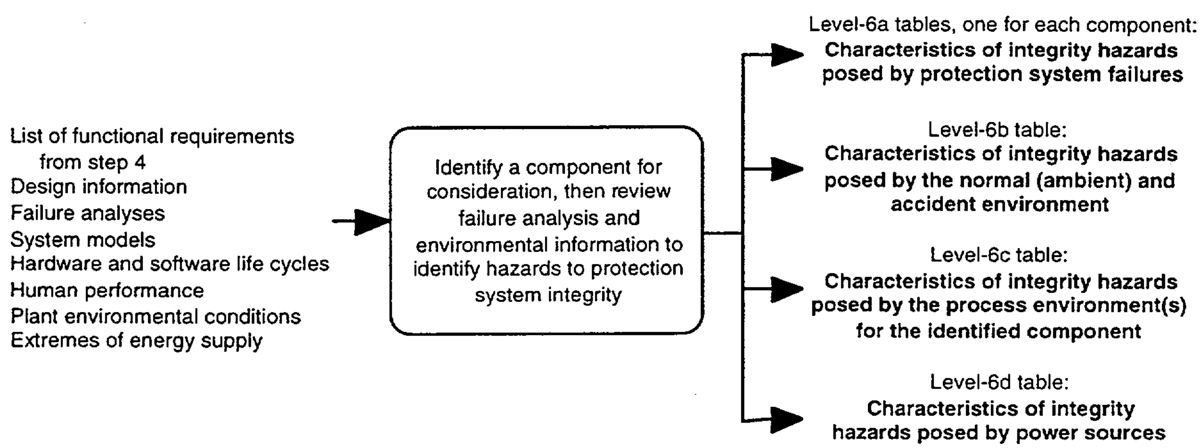

Figure 5. Step 6 of the Structured Approach

Inputs: The inputs to this analysis consist of the following information:

- list of functional requirements from step 4,
- identification of the component under consideration,
- design information,
- failure analyses,
- system models,
- hardware and software life cycles (e.g., requirements and design),
- human performance (e.g., interaction with the human-machine interface),
- plant environmental conditions (e.g., natural occurrences such as earthquakes, accident by-products such as radiation, and installed conditions), and
- extremes of energy supply (e.g., power supply and power quality).

Process: The process in this section is to examine the analyses of the protection system designs, environments, and development processes to identify the characteristics of hazards that could threaten the integrity of the protection systems. The characteristics of environmental and energy source ACEs (of natural or mechanical origin) depend upon systems other than the protection system. The characteristics of these hazards are derived from analyses of these "external" systems whose normal operation or failure could create environments that pose an integrity hazard to the protection system.

The characteristics of hardware, software, human performance, and development process hazards depend upon the design of the protection system. The characteristics of these hazards are derived from analyses of the failures that can occur "internal" to the protection system and its development.

Outputs: The output from this section consists of the following information:

- a set of level-6 tables identifying the hazards to the integrity of the protection system and the characteristics of these hazards.

6.2 Implementation

Several different analyses were required to implement this step.

- Analyses of integrity hazards posed by protection system failures.
- Analyses of integrity hazards posed by the normal ambient environment
- Analyses of integrity hazards posed by accident ambient environments
- Analyses of integrity hazards posed by natural phenomena hazards
- Analyses of integrity hazards posed by the process environment
- Analyses of integrity hazards posed by power supplies.

Each of these analyses is described below.

6.2.1 Integrity Hazards Posed by Protection System Failures

The analysis of integrity hazards posed by protection system failures was based upon the failure mode and effect analysis (FMEA) documented in UCRL-ID-111498, "FMEA Study of the GE ABWR Protection System" and SSAR Appendix 19N, which discusses common-cause failure of protection system multiplexers. The FMEA divided the protection system into different functional blocks then those defined as architectural components in Table 2. Therefore, to make use of the FMEA a correlation between FMEA functional blocks and structured components was established by examining the system boundaries defined for the FMEA blocks and the structured analysis components and pairing these as closely as possible. This analysis resulted in the mapping between components and FMEA functional blocks shown in Table 7.

Table 7. Correlation of Components to FMEA Functional Blocks

Component	FMEA Functional Block
APRM detector	Neutron monitoring system
APRM preamplifier	Neutron monitoring system
APRM processor	Neutron monitoring system
Bypass switches	ECCS loop bypass switch
Bypass unit	ECCS loop bypass switch
Channel manual trip switch	Neutron monitoring system
Condensate storage tank level sensor	Quad redundant sensors
Condenser vacuum sensor	Quad redundant sensors
Core flow sensor	Quad redundant sensors
CRD water header pressure sensor	Quad redundant sensors
CUW area temperature sensor	Redundant systems
CUW differential flow sensor	Redundant systems
Digital trip module	Digital trip modules
Division manual trip switch	Quad redundant switches
Division trip reset switch	Quad redundant switches
Drywell pressure sensor	Quad redundant sensors
HPCF pump discharge pressure sensor	Quad redundant sensors
Main steam line flow sensor	Quad redundant sensors
Main steam line pressure sensor	Quad redundant sensors
Main steam tunnel radiation sensor	Quad redundant sensors
Main steam tunnel temperature sensor	Quad redundant sensors
Main turbine area temperature sensor	Quad redundant sensors
Manual scram logic unit (MLU)	Quad redundant OLU
Manual scram reset switch	Quad redundant switches
Manual scram switch	Quad redundant switches
MSIV position switch	Quad redundant sensors
Multiplexer	Division I EMS Division II EMS Division III EMS Division IV EMS
Output logic unit	Quad redundant OLU
RCIC equipment area temperature sensor	Quad redundant sensors
RCIC steam line flow sensor	Quad redundant sensors
RCIC steam supply line pressure sensor	Quad redundant sensors
RCIC turbine exhaust pressure sensor	Quad redundant sensors
Reactor building / fuel handling area exhaust radiation sensor	Quad redundant sensors
Reactor mode switch	Reactor mode switch
Reactor water level sensor	Quad redundant sensors
Remote multiplexer unit	Division I EMS Division II EMS Division III EMS Division IV EMS
RHR area temperature sensor	Quad redundant sensors

Component	FMEA Functional Block
RHR pump discharge pressure sensor	Quad redundant sensors
Start-up range neutron detector	Neutron monitoring system
Start-up range neutron preamplifier	Neutron monitoring system
Steam dome pressure sensor	Quad redundant sensors
Suppression pool level sensor	Quad redundant sensors
Trip actuator	Quad redundant OLU
Trip logic unit	Division I ESF TLU 1 or 2 Division I ESF TLU 3 or 4 Division II ESF TLU 1 or 2 Division III ESF TLU 1 or 2 Quad redundant TLU
Turbine control valve oil pressure sensor	Quad redundant sensors
Turbine stop valve position sensor	Quad redundant sensors

These correlations allowed determination of the integrity hazards posed by failure of each component by examination of the FMEA. The hazards associated with each FMEA functional block were identified by examining the FMEA report and SSAR Appendix 19.N. These hazards were then associated with each individual component using the relationships described in Table 7. This analysis produced the table of internal integrity hazards included in Appendix E.

6.2.2 Integrity Hazards Posed by the Normal Ambient Environment

The integrity hazards posed by the normal ambient environments are determined by the equipment location. Component locations were determined by examination SSAR Figure 1.2 which shows the locations of major plant equipment. These drawings show the locations of instrument racks, but not of specific transmitters. Therefore, it was assumed that all transmitters for a given system are located on the instrument racks associated with that system. Errors in this assumption would have minimal impact on the normal ambient environments specified because most instrument racks are located in very similar environments.

Protection system equipment was found to be located in the following areas.

- Control building (CB) main control room
- LPRM detector thimbles
- Primary containment
- Secondary containment (SC) general floor area
- SC HPCF pump room
- SC Instrument Rack Rooms
- SC Main Steam Tunnel Room
- SC RCIC Pump Room
- Start-up range detector thimbles
- Turbine building (TB) main steam stop valve area

The normal environmental conditions for each of these areas were identified by examining the SSAR. Normal temperature, pressure, and humidity environments were determined from SSAR Tables 3I-2 through 3I-7. Normal radiation doses were determined from SSAR Figure 12.3, which is a radiation zone map. These maps give maximum normal dose rates in each location. These dose rates were multiplied by 60 years to give a upper bound of the total normal dose at each location.

The GE SSAR does not consider abnormal environments separately from normal environments. Therefore, it is assumed that the range of normal environments envelopes both sets of conditions.

The environments identified for each area were associated with the components in each area. This analysis produced the table of normal environmental hazards provided in Appendix F. Appendix F also includes hazards posed by accident environments.

6.2.3 Integrity Hazards Posed by Accident Environments

The integrity hazards posed by accident environments are also determined by the room in which the equipment is located. The temperature, pressure, and humidity accident environments associated with the locations identified above were determined from SSAR Tables 3I-12 and 3I-13. Accident radiation doses were determined from SSAR Figure 12.3. Sheets 12 through 32 of this figure give zone maps for post LOCA radiation dose rates. These zone maps show the maximum post-accident radiation dose rate. To estimate the total integrated dose requirement, a one-year post-accident operating time was assumed and the average dose rate was assumed to be one-half of the maximum.

Possible exposure to water spray from fire suppression equipment was determined for each area by examining SSAR Table 9.5-5.

The accident environment hazards identified were associated with each component based upon component location. This analysis produced the table of accident environmental hazards provided in Appendix F.

6.2.4 Integrity Hazards Posed by the Natural Phenomena Hazards

The ABWR considers seismic activity and flooding as natural phenomena hazards that could affect protection system equipment. Other natural phenomena hazards, such as tornadoes, are not considered to pose integrity hazards to the protection system because the equipment is located within hardened structures.

The seismic hazards to which equipment is exposed depends upon the structure in which the equipment is located, the equipment's elevation within the structure, and whether the equipment is mounted on the floor or a wall. The hazards are typically defined by a set of enveloping seismic spectra for various regions of the plant. Amendment 31 of the ABWR FSAR does not contain such seismic spectra; however, these spectra were provided in Chapter 3G of Amendment 4. Figures 3G.4-1 through 3G.4-20 and 3G.5-1 through 3G.5-22 were used to determine the seismic loading at locations containing protection system equipment. The following locations were identified.

Table 8. Seismic Hazard Locations

Building	Elevation (m)
Secondary containment wall	23.5
Secondary containment wall	8.2
Secondary containment floor	23.5
Secondary containment floor	8.2
Secondary containment floor	18.1
Secondary containment wall	18.1
Secondary containment floor	4.8
Secondary containment wall	4.8
Secondary containment floor	1.5
Secondary containment wall	1.5
Control building wall	7.9
Control building floor	7.9
Outside	12.3
Reactor building floor	31.7
Reactor building wall	31.7

FSAR Figure 1.2 was used to determine the locations of protection system components with respect to the locations at which the seismic loading was provided. Two assumptions were made to allow establishing these relationships. First, it was assumed that equipment is floor-mounted, as all protection system equipment is expected to be located either in panels or on instrument racks that are bolted to the floor. Second, if floor response spectra were not available for the exact elevation at which a component is located, it was assumed that the spectra at the next-highest level in the same building would envelop the spectra at the location of interest. This is a "rule of thumb" that generally results in selecting conservative seismic requirements. Also, the potential for flooding was considered to be present if fire suppression equipment was present in the area. Post-LOCA flooding of protection system equipment does not appear to be a consideration in the ABWR design. This analysis produced the table of natural phenomena hazards provided in Appendix G.

6.2.5 Integrity Hazards Posed by the Process Environment

Sensors are the only protection system components exposed to process environment hazards. The process fluid to which the sensors are exposed can be readily determined from the description of the measured variable. Protection system sensors were determined to interface with the following process fluids.

- Condensate
- Condenser vapor
- Control rod drive water
- Clean-up water
- Main steam
- RCIC drive steam

- Reactor coolant
- Suppression pool
- TCV hydraulic fluid

Process fluid characteristics were determined from reviewing process characteristics as described in SSAR Tables 5.2-5, 5.4-1, 5.4-1a, 10.3-1, 10.4-7. 12.4-1, and Figure 4.6-9. These environmental conditions were associated with each component based upon the process fluid to which the component is connected. This analysis produced the table of process environment hazards provided in Appendix H.

6.2.6 Integrity Hazards Posed by Power Supplies

Power supply requirements were determined by review of SSAR Chapter 7 and from knowledge of the typical characteristics of protection system components. Each component was associated with one of the following types of power supplies.

- 1E inverters
- Instrument loop power supply
- 1E batteries
- Not powered
- Start-up range high voltage
- Local power range monitoring high voltage

The possibility that some components might be air-powered was considered, but no such components were identified in the ABWR protection system design. It is likely that some final actuation devices (e.g., solenoid valves) are air-powered, but are out of the scope of this analysis.

Power supply characteristics were identified by reviewing SSAR Chapter 8.2. Only voltage and frequency requirements were found. No discussion of power quality or electromagnetic interference hazards were located, nor information on neutron monitoring system high-voltage supply characteristics. This analysis produced the table of power supply hazards provided in Appendix I.

6.3 Evaluation of Usability and Completeness

The Structured Approach led the team to develop a relatively complete set of external integrity hazard characteristics at the system architectural level. Most of the required information was available in the SSAR, and the process for extracting the information was more tedious than difficult.

A few pieces of necessary information, such as the required installed life of electronic components, specific seismic loading curves, and required post-accident operating times were not available. These may be intended for inclusion in a combined operating license application. It would be reasonable to pursue these issues further with an applicant.

The Structured Approach led the team to identify integrity hazards posed by equipment failures as defined by the FMEA and common-cause failure analysis. These analyses identified hazards that pose significant threats to the baseline design of the protection system. They do not identify hazards that may be well-addressed by design in compliance with accepted practices, such as those defined by IEEE Stds. 603, 7-4.3.2, and the suite of supporting standards. In this regard, the identification of hazards posed by equipment failures was very incomplete. The more complete analysis envisioned for the Structured Approach would require that an exhaustive listing of possible hazards be developed. The reviewer would need to determine the combination of integrity strategies used to address each hazard and conclude if the strategies applied are appropriate — a very difficult and time-consuming process.

A more direct approach is to assume the required integrity strategies are those defined by IEEE Stds. 603, 7-4.3.2, and their daughter standards. The bulk of these standards focus on integrity strategies for protection systems and protection system equipment. These strategies were developed with consideration to integrity hazards in protection systems, have incorporated lessons learned from previous applications, and have stood the test of time as covering the predominate failures that are encountered. Furthermore, the fundamental recommendations of IEEE Std. 603 have become requirements by incorporation of its predecessor standard (IEEE Std. 279) into 10 CFR 50.55a(h). It is unlikely that an applicant will propose integrity strategies that significantly deviate from those outlined in the standard. Therefore, the review team recommends that the integrity analysis portion of the Structured Approach be modified to simply confirm that the integrity requirements of IEEE Std. 603 and 7-4.3.2 have been incorporated into the protection system requirements. Failure analyses should also be reviewed to confirm that remaining vulnerabilities identified in the design are also addressed. The latter step was accomplished in this application of the Structured Approach.

Identifying hazards at a level below the system architectural elements would require that more detailed failure analyses be available. For software failures, the software safety analyses may fill this role and should be considered as an input to the Structured Approach. For hardware, detailed component failure mode and effects analyses or reliability analyses may sometimes be available for consideration.

7. ALLOCATION OF INTEGRITY HAZARDS

7.1 Review Process

The purpose of this analysis is to determine how integrity hazards have been allocated to the design features, using the characteristics of integrity hazards cataloged in the previous section. The inputs, processes, and outputs of this steps are shown in Figure 6, and described in detail below.

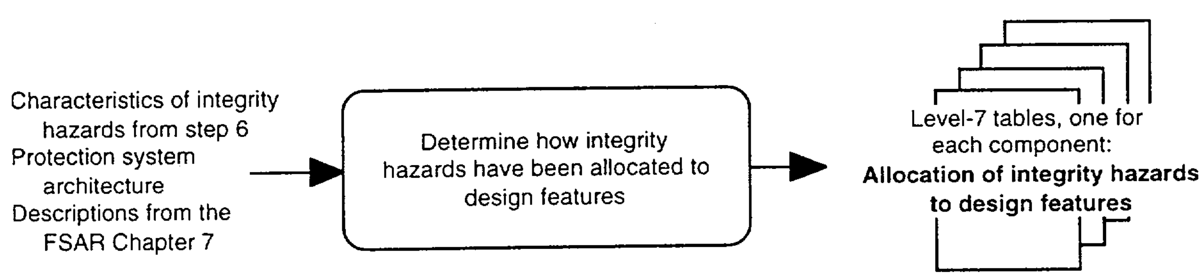

Figure 6. Step 7 of the Structured Approach

Inputs: The inputs to this identification process include:

- the level-6 tables of integrity hazard characteristics from the previous section,

- the protection system architecture or hierarchy (i.e., identification of protection system's subsystems and elements, and how they are interconnected), and
- descriptions of protection system integrity features from the FSAR Chapter 7.

Process: The process in this section is to examine the integrity hazard allocations to ensure that each hazard under consideration is handled by at least one integrity strategy implemented in the protection system design. In many cases a combination of strategies will be employed to address a given integrity hazard. For example, the hazard of random failures of system components is addressed by a combination of quality design, periodic testing, and redundancy.

Outputs: The outputs of this process include the following:

- identification of the protection system integrity strategy that is assigned responsibility for the integrity hazards under consideration. This information is appended to the level-6 tables of integrity hazard characteristics to produce level-7 tables.

7.2 Implementation

The implementation of this analysis involved slightly different approaches for protection system failure hazards, environmental hazards, and power supply hazards. The approach for environmental hazards was applied to normal, accident, natural phenomena, and process environments.

7.2.1 Allocation of Integrity Strategies to Hazards Posed by Protection System Failures

Integrity hazard topics were identified by examining the integrity strategies credited for each failure mode. These strategies are identified in the FMEA and Appendix 19N of the SSAR. Also, Chapter 7 of the SSAR was examined to identify additional strategies that were credited in the safety analysis. For each type of failure mode the catalog of integrity requirements (see Volume 2 of this report) was examined to identify the related strategy in terms of integrity topics. This review disclosed the relationship between failures and integrity strategy requirements topics shown in Table 9.

Associating these integrity strategies with each component–failure-mode pair in the internal integrity hazard table of Appendix E produced the list of integrity requirements topics for each component that is given in Appendix J. This table also shows the expected requirements identified, as described in Section 8.2 and the corresponding requirements found in the GE specifications, as discussed in Section 9.2.

7.2.2 Allocation of Integrity Strategies to Hazards Posed by Environmental Conditions

Sections 3.10 and 3.11 of the SSAR were examined to identify the strategies selected by GE to prevent or mitigate hazards caused by environmental extremes. Essentially, only one strategy is credited — qualification for the use environment. Associating this strategy with each component and environmental condition produced the tables of integrity requirements topics provided in Appendices K (normal and accident environments), L (accident environments), and M (natural phenomena hazard environments). These tables also show the expected requirements identified, as described in Section 8.2 and the corresponding requirements found in the GE specifications, as discussed in Section 9.2.

Table 9. Integrity Strategies Associated with Hazards from Failure of Protection System Components

Component	Failure Mode	Failure Type	Failure Effect	Assigned Integrity Strategy (Requirements Topic)	Notes
ARI manual switch	Fails to transfer	Random	Cannot initiate ARI manually	Failure detection	
Diesel generators	Loss of one diesel generator or the ability to initiate one generator during LOCA	Random	No impact		The logic on how diesel generators will automatically initiated during LOCA is incomplete.
Digital trip modules	Not applicable	Not applicable	Not applicable		Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activation of the protection system, even in the presence of a single bypassed division.
Digital trip modules	Setpoint drift	Common-mode	Failure to trip or initiate ESF	Inherently safe design	
ECCS loop bypass switch	Fails to transfer from bypass	Random	Reduces the logic to one-of-one	Failure detection	Increases the probability of spurious initiation of ECCS
ECCS loop bypass switch	Fails to transfer from bypass	Random	Reduces the logic to one-of-one	Inherently safe design	Increases the probability of spurious initiation of ECCS
EMS	EMS failure not detected by other modules	Random	Loss of one signal for each quad redundant set of input	Failure detection	EMS cannot initiate any protection system. RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from the control room
EMS	Loss of dc power	Random	Failure to trip or initiate ESF	Redundancy	
EMS	Loss of cooling	Common-mode	Failure to trip or initiate ESF	Physical independence	
EMS	RMU miscalibration	Common-mode	Failure to trip or initiate ESF	Design for maintainability	
EMS	Maintenance or test error	Common-mode	Failure to trip or initiate ESF	Inherently safe design	
EMS	Manufacturing error	Common-mode	Failure to trip or initiate ESF	Process quality	
EMS	Software fault	Common-mode	Failure to trip or initiate ESF	Process quality	
EMS	RMU miscalibration	Common-mode	Failure to trip or initiate ESF	Procedures	

Component	Failure Mode	Failure Type	Failure Effect	Assigned Integrity Strategy (Requirements Topic)	Notes
EMS	Maintenance or test error	Common-mode	Failure to trip or initiate ESF	Failure detection	
EMS	Maintenance or test error	Common-mode	Failure to trip or initiate ESF	Failure detection	
EMS	Maintenance or test error	Common-mode	Failure to trip or initiate ESF	Procedures	
EMS	Manufacturing error	Common-mode	Failure to trip or initiate ESF	Burn-in	
EMS	Software fault	Common-mode	Failure to trip or initiate ESF	Diversity	
EMS	Software fault	Common-mode	Failure to trip or initiate ESF	Procedures	
Leak detection system	Not applicable	Random	No impact		No single failure can disable the LDS
Manual start/stop for pumps	Multiplexer in the same division as the pump fails.	Random	No manual control of the pump	Failure detection	Loss of multiplexer may prohibit all control of pumps needing interlock signals from the failed multiplexer.
Manual start/stop for pumps	Multiplexer in the same division as the pump fails.	Random	No manual control of the pump	Redundancy	Loss of multiplexer may prohibit all control of pumps needing interlock signals from the failed multiplexer.
Neutron monitoring system	NMS divisional average is incorrect	Random	Failure to trip at high power setpoint	Process quality	Trip will occur late depending on magnitude of error
Neutron monitoring system	NMS divisional average is incorrect	Random	Failure to trip at high power setpoint	Failure detection	Trip will occur late depending on magnitude of error
Neutron monitoring system	NMS divisional average is incorrect	Random or common-mode	Failure to trip at high power setpoint	Diversity	Trip will occur late depending on magnitude of error
Quad redundant OLU	Not applicable	Not applicable	Not applicable		Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activation of the protection system, even in the presence of a single bypassed division.

Component	Failure Mode	Failure Type	Failure Effect	Assigned Integrity Strategy (Requirements Topic)	Notes
Quad redundant sensors	Not applicable	Not applicable	Not applicable		Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activation of the protection system, even in the presence of a single bypassed division.
Quad redundant sensors	Sensor miscalibration	Common-mode	Failure to trip or initiate ESF	Diversity	
Quad redundant switches	Not applicable	Not applicable	Not applicable		Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activation of the protection system, even in the presence of a single bypassed division.
Quad redundant TLU	Not applicable	Not applicable	Not applicable		Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activation of the protection system, even in the presence of a single bypassed division.
RCIC isolation	RCIC valves fail to close	Random	Leak will continue until the valves are manually operated.	Failure detection	Annunciation will indicate false RCIC isolated signal
Reactor mode switch	Loss of signal to one division	Random	Individual trip signals inhibited	Redundancy	
Reactor mode switch	Fails to transfer	Random	Failure to trip on placing mode switch into shutdown	Diversity	Only failure of transfer from run to shutdown has a safety impact. Failure to transfer between any other pair of states in unimportant to safety.
Redundant systems	Single failure makes system inoperable	Random	Protection function is lost if one of the redundant systems is under maintenance.	Redundancy	RCIC, HPCF B and C are considered one triply redundant system
Redundant systems	Single failure makes system inoperable	Random	Protection function is lost if one of the redundant systems is under maintenance.	Procedures	RCIC, HPCF B and C are considered one triply redundant system
Trip logic unit	TLU failure cannot be detected by other modules	Random	ESF systems controlled solely by TLU cannot be automatically initiated.	Failure detection	TLU cannot initiate any protection system

7.2.3 Allocation of Integrity Strategies to Hazards Posed by Power Supplies

The SSAR gives no information on the integrity strategies employed to address power and electromagnetic effect hazards. Strategies were, however, assigned by reviewing integrity hazard strategies listed in the catalog of integrity requirements (see Volume 2 of this report). The assigned strategies are given in Table 10. Associating these strategies with each component and power or EMI hazard produced the tables of integrity requirements topics in Appendix N.

Table 10. Integrity Strategies Associated with Hazards from Power Supplies and Electromagnetic Interference

Environment	Assigned Integrity Strategy (Requirements Topic)
Power Source	Electrical interface requirements
Vmax	Electrical energy source extremes
Vmin	Electrical energy source extremes
Fmax	Electrical energy source extremes
Fmin	Electrical energy source extremes
Pmax	Not applicable (no air-powered components)
Pmin	Not applicable (no air-powered components)
Air purity	Not applicable (no air-powered components)
EMI	Noise immunity
Total harmonic distortion	Energy source noise
Transients	Energy source noise

7.3 Evaluation of Usability and Completeness

The Structured Approach led the team to identify integrity strategies by reviewing the SSAR or supporting analyses. Many integrity strategies that are incorporated in protection system designs were not identified, however, because of the narrow range of failure modes considered, as discussed in Section 6.3. Considering a broader range of strategies for a complete set of failure conditions would have been so time consuming as to be impractical. A more reasonable approach would be to provide a set of standard review templates for the specific components typically included in protection systems and the integrity strategies required by 10 CFR 50.55a(h), and by extension IEEE Std. 603, IEEE Std. 7-4.3.2, and their supporting standards. This would greatly reduce the number of analyses required and would provide much simpler review guidance that would adequately cover the majority of cases addressed in NRC reviews.

8. IDENTIFICATION OF COMPONENT INTEGRITY REQUIREMENTS

8.1 Review Process

The purpose of this analysis is to identify expected integrity requirements that should be considered in system requirements specifications, in order to provide reasonable assurance that the digital protection system will maintain its functional performance despite hazards to its integrity. Specifications must describe requirements for all topics important to ensuring component integrity in the presence of expected integrity hazards. As an aid in identifying integrity topics that are important for a particular component, Volume 2 contains a catalog of sample integrity requirements specification topics that are typically important to sense, command, and execute features of protection systems. Each topic includes the same information for topics described in Section 3.1. The inputs, processes, and outputs of this step are shown in Figure 7, and are described in detail below.

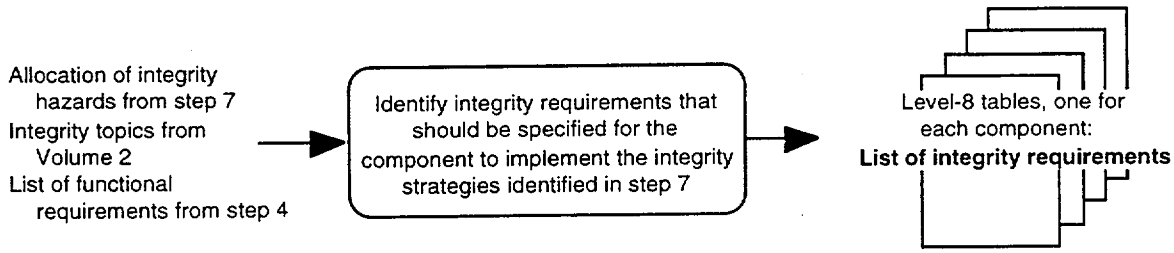

Figure 7. Step 8 of the Structured Approach

Inputs: The inputs to this analysis are:

- the level-7 tables identifying the characteristics and allocation of integrity hazards to integrity strategies, as determined by the analysis in the previous section,
- integrity topics identified in Volume 2 of this report, and
- the list of functional requirements from step 4.

Process: The process in this section is to identify integrity requirements that should be specified for the component to implement the integrity strategies identified in step 7. This process identifies integrity requirements that address the hazards against which the component must protect. Topics that must be contained in the subsystem and component specification are then identified using the catalog of topics given in Volume 2.

Candidate integrity requirements for the component are then identified for each topic by examining the hazard characteristics, and considering the characteristics of interacting systems and components. This list of topics and related specific requirements can then be used to verify that all integrity requirements derived from the integrity hazards and assigned to the component under consideration are reflected in the system requirements specifications. Several integrity topics might be identified against the requirements to address a given integrity strategy.

Because the functional and integrity requirements of the protection system interact (i.e., the functional requirements must not cause an integrity hazard that cannot be addressed), the functional requirements from step 4 should be taken into account when performing this review.

Outputs: The outputs from this process are:

- a level-8 table identifying integrity requirements for the component under consideration.

8.2 Implementation — Identification of Integrity Hazard Requirements

Expected requirements for each component–integrity strategy pair given in Appendix J were identified by examining the commitments identified in the FMEA and Appendix 19N of the SSAR. Also, Chapter 7 of the SSAR was examined to identify additional commitments made in the safety analysis. This review produced the listing of expected requirements which is also include on the tables in Appendix J. The tables of Appendix J also contain the actual requirements found in the specifications, as described in Section 9.

Expected requirements for the environmental and power topics are qualification for the hazard levels (e.g., temperature, pressures, voltages) identified by the analyses described in Sections 6.2.2 through 6.2.5. These values were associated with the requirements topics to describe the expected requirements.

This analysis produced the expected requirements that are included in the tables of in Appendices K through N. The tables also contain the actual requirements found in the specifications, as described in Section 9.

8.3 Evaluation of Usability and Completeness

Applying the Structured Approach led to identification of integrity requirements from review of the SSAR or supporting analyses. As with integrity strategies, many integrity requirements that are incorporated in protection system designs were not identified, however, because of the narrow range of failure modes considered, as discussed in Section 6.3. Revising the Structured Approach as discussed in Sections 6.3 and 7.3 will correct this shortcoming.

9. SPECIFICATION INTEGRITY REQUIREMENTS REVIEW

9.1 Review Process

This section describes a method for implementing the review recommended by Appendices 7.1-B (item 2) and 7.1-C (item 20) of the SRP, which recommend that NRC's review of protection systems confirm that the applicant/licensee has justified the degree of redundancy, diversity, testability, and quality provided in the safety system design. Chapter 18 of the SRP recommends that the NRC review confirm that critical or risk-significant human actions have been examined to consider ways of reducing or eliminating sources of human error. SRP Appendices 7.1-B (item 5) and 7.1-C (item 9) recommend that NRC verify that the applicant/licensee confirmed that safety system equipment is designed to meet the functional performance requirements over the range of environmental and electromagnetic interference conditions. The inputs, processes, and outputs of this step are shown in Figure 8, and are described in detail below.

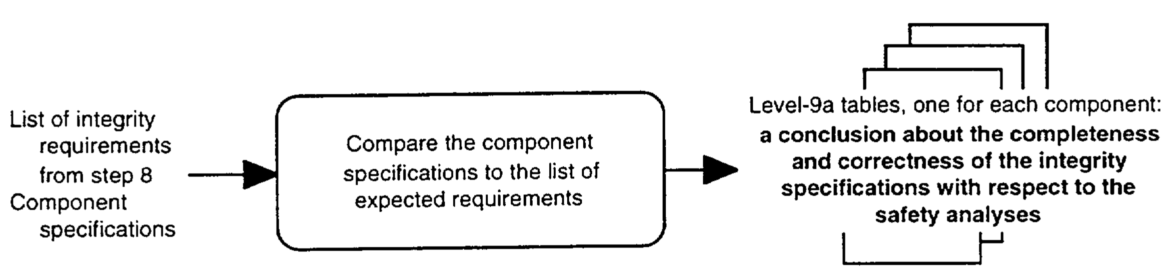

Figure 8. Step 9a of the Structured Approach

Inputs: The inputs to this analysis are:

- the level-8 table identifying the integrity requirements for the component under consideration, and
- component specifications.

Process: The completed set of expected integrity requirements specifications (level-8 table) are evaluated against the specification for the components under specification (see Figure 2).

Specific requirements for each component are evaluated by correlating the protection system integrity requirements with the characteristics of the related subsystems and components to identify the requirements applicable to the component being considered. The component's specification is then compared against the topics and related specific requirements to verify that all integrity requirements derived from PIEs and assigned to the component under consideration are appropriately reflected in the system requirements specifications. If conflicts or omissions are found, questions are posed to the licensee or applicant. Another iteration through the process may be required to resolve review findings.

Outputs: The outputs from this process are:

- a conclusion about the completeness and correctness of the system requirements specifications with respect to the safety analyses, in the form of a level-9a table.

9.2 Implementation

The integrity requirements were reviewed using the same set of source documents described in Section 5.2. During this review, the team completed the tables given in Appendices R through W.

9.3 Evaluation of Usability and Completeness

Applying the Structured Approach demonstrated that the protection system functional specifications are generally correct and consistent with safety analyses where expected requirements and specification requirements could both be found.

Finding the specific specification requirements that correlated to the expected integrity requirements proved to be very difficult as it did for functional requirements. The same problems discussed in Section 5.3 were encountered.

The requirements documents available for review contained actual requirements that related to only about half of the expected requirements, because a complete set of requirements documents was not available to support this test. Other requirements documentation existed and has been reviewed by the team, but could not be used for this test because of proprietary information agreements. Most of the expected requirements could be found in a complete set of requirements documents. Additional documents that would have supported a more complete review are listed in Section 5.3.

10. CONCLUSIONS

The Structured Approach identified a very large number of functional and integrity requirements that formed the basis for a review of the protection system specifications for the Kashiwazaki-Kariwa Nuclear Power Generating Station, Units 5 and 6. The analysis maintained traceability of these requirements to the plant safety analyses and protection system failure analyses. A large number of questions were identified that could be used to test the completeness and correctness of the requirements documents. These are provided in Appendix A. No conclusions about the completeness and correctness of the requirements can be drawn from developing these questions, as they are as likely to result from the incompleteness of the documentation set available for review as from incompleteness in the specifications. An applicant, however, should have ready and reasonable answers for questions such as those posed by this review. Judgements should be based upon review of the answers provided rather than upon the ability to generate the questions themselves.

The Structured Approach lead to a fairly thorough review of the design issues for the plant protection systems, and developed many areas for further investigation that may not have been identified in a more casual review. In this regard this test of the Structured Approach was a success. The test, however, identified three important elements missing from the Structured Approach.

First, the Structured Approach collects insufficient data regarding exactly what functions must be performed. It identifies the functions generically (e.g., initiate RCIC) but does not specify exactly what sequence of valve alignments and pump starts must occur. This is a important lack of completeness as it provides no basis to review the specific command logic that must be implemented by the protection system. To develop these requirements, the necessary functions of the ESF systems, and the associated performance requirements and integrity strategies for these functions, need to be defined. This could be accomplished by (1) reviewing mechanical system design documents (mostly piping and instrument diagrams) to identify the control actions needed to implement ESF functions and (2) reviewing mechanical system failure analyses to identify control actions needed to implement ESF system integrity strategies. Adding these elements to the Structured Approach would be a major effort. From a review standpoint, it may be more reasonable to perform a confirmatory review that the required protection system actions will result in proper alignment of the associated ESF systems.

Second, using the applicant's failure analysis to identify hazards from protection system failures identified hazards that pose significant threats to the baseline design of the protection system. This analysis did not identify hazards that may be well-addressed by design in compliance accepted practices, such as those defined by IEEE Stds. 603, 7-4.3.2, and the suite of supporting standards. In this regard, the Structured Approach identified a very incomplete set of hazards posed by equipment failures. A complete analysis envisioned for the Structured Approach would require developing an exhaustive list of possible hazards. The reviewer would need to determine the combination of integrity strategies used to address each hazard and conclude if the strategies applies are appropriate — a very difficult and time-consuming process. A more direct approach is to assume that the required integrity strategies are those defined by IEEE Stds. 603, 7-4.3.2, and their daughter standards. This could be done by developing review checklists for compliance with the standards. The checklists could be developed generically for typical protection system architectures and design elements. Such checklists would address the preponderance of all systems because the use of the IEEE standards is essentially mandated by 10 CFR 50.55a(h), and considerable commonality exists between the system architectures from the various vendors.

Third, the Structured Approach does not consider design choices that must be documented in order to ensure proper functional interfaces between protection system components and subsystems. A simple example of this concerns the type of connectors and card racks used to mount safety-related circuit boards in a panel. These design choices generally do not derive directly from safety analysis assumptions or results; they are determined by the designer. The review should confirm that the choices made are consistent with the fundamental safety requirements and are consistently implemented across all system components. In the case of connectors and card racks, for example, the selections should be consistent with seismic and electrical noise immunity requirements, and the specifications for the panels should be consistent with the specifications for the cards.

The Structured Approach was difficult to implement because it requires familiarity with such an extensive set of input documentation. Even the limited set of documentation available for this test bordered on overwhelming. The organization of existing safety analysis documentation poorly supports implementation of the Structured Approach. The information needed to perform the review is scattered throughout the SSAR and many specification documents. Furthermore, much of the detailed information needed for the review was not located in the SSAR. The evaluation sections in the body of this report describe many instances where information was not found in the SSAR nor the specifications available for review. Experience has shown that that the additional information needed may typically be found in found in SSAR references, specification references, and drawings that were not available for this test. However, complete implementation of the Structured Approach down to the software level would require availability and review of hundreds of different safety analysis documents, design analysis documents, and specifications. Even implementing the review for a specific function would require familiarity with tens of documents and the examination of many tens more to locate the required set.

A positive benefit of the Structured Approach is that it forces the reviewer to develop a complete understanding of the design and the basis for the design. Conversely, it is unlikely that NRC can commit the level of review resources necessary to implement the approach in a very thorough way. Implementation will be very resource-intensive because the Structured Approach's "forward traceability" requires an exhaustive search of documentation for fundamental requirements in order to develop a basis for specification review. This type is considerably more difficult to implement that a "reverse traceability" review, where the reviewer picks a requirement and then locates its source to confirm correctness and completeness. This type of review is more straightforward because it allows the reviewer to focus only on those requirements that are relevant to the item under consideration. A "reverse traceability" review would be equally effective at finding incorrect requirements, but less effective at detecting incomplete requirements.

The Structured Approach as defined is probably too burdensome to be a practical review tool for the NRC. A more practical tool would be to develop a set of review templates using concepts from the Structured Approach. The templates would identify the critical requirement topics that the reviewer expects specifications to cover. The templates would also either identify the specific requirements that should be found (e.g., a redundant system should be specified) or explain how to determine what requirements should be found (e.g., the normal temperature environment should be specified, and the values should be consistent with the environmental design requirements of SAR Section 3.11 and the HVAC performance commitments of SAR Section 9.4). The Structured Approach process for extracting protection system functional requirements based upon accident analysis assumptions and results would be used in a simplified form appropriate for performing trace audits, as opposed to developing specifications.

The templates would assist reviewers in confirming that system and component specifications are consistent with the requirements of 10 CFR 50.55a(h) (IEEE Std. 603 as supplemented by IEEE Std. 7-4.3.2). These templates would be tools used to conduct reviews in accordance with SRP Section 7.1-C.

A relatively few (probably less than two dozen) templates would be sufficient to guide requirements reviews for most of the types of I&C systems and components found in nuclear power plants.

A key difference from the Structured Approach is that the templates would define the expected requirements topics. The definition of topics would be based upon common practice, the requirements of IEEE Std. 603, and the guidance of supporting Regulatory Guides, standards, and SRP discussion. This approach will somewhat reduce the flexibility of the Structured Approach to deal with novel designs, but will allow reviewers to deal more directly with the preponderance of designs in most cases.

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IEEE Std 7-4.3.2. "IEEE Standard for Digital Computers in Safety Systems of Nuclear Power Generating Stations," Institute of Electrical and Electronic Engineers, 1993.

NUREG-0800, 'Standard Review Plan for Review of Safety Analysis Reports for Nuclear Power Plants," Chapter 7, Revision 4, June 1997.

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Appendix A: Example Open Items from Structured Approach Review

This appendix presents examples of the questions that were raised as a result of reviewing the ABWR SSAR and protection system specifications using the Structured Approach. These questions are presented in the form of a request for information (RAI) that might be prepared during a review. To minimize the volume of questions they are worded very generically. An actual RAI might break some of the questions below into several more-specific questions.

Many of the questions relate to information needed about plant safety characteristics. Generally, where information was available on both the fundamental safety requirements and specification requirements, the specification requirements were found to be consistent with safety analyses assumptions and findings. In cases where such consistency was not found, a number of possible rationales for the inconsistencies are possible, and would have been investigated in the course of an actual review.

The questions raised by the trial application of the Structured Approach should not be taken as a reflection on the ABWR SSAR, ABWR design, or the NRC review. A typical requirements review would have a narrower focus than this trial; therefore, additional questions were expected be found by this more extensive review. Establishing confidence in a plant design does not require that the NRC staff identify and resolve every possible open item. Rather, the intent is to perform a review that is broad enough to provide confidence in the applicant's design processes and to identify issues of high safety significance.

1. Provide the following information about the transients that establish the fundamental requirements for the protection system functions listed in Table A-1.
2. Describe the design bases for the ECCS system interlocks, e.g., HPCF pump suction pressure low.
3. Describe the design bases for protection system permissives, e.g., startup range flux ATWS permissive.
4. Describe the design bases for ESFAS control functions, e.g., RCIC and HPCF water supply transfer on low CST level.

Table A-1. Requested Transient Analysis Information

Function	Bounding Accidents	Response Time	Variable Range	Rate of Change	Analytical Limit	Bandwith of Measured Parameter
Reactor trip on turbine stop valve closure			x	x	x	x
Reactor trip on startup range high flux	x	x	x	x	x	x
Reactor trip on startup range short period	x	x	x	x	x	x
Reactor trip on APRM high flux					x	x
Reactor trip on flow-based high power	x	x	x	x	x	x
Reactor trip on drywell pressure high	x	x	x	x	x	x
LPCF initiation on low RV water level — Level 1	x		x	x	x	x
LPCF Initiation on RV Steam Dome Pressure High	x		x	x	x	x
Suppression pool cooling actuation on high temperature				x	x	x
HPCF initiation on RV water level — Level 1.5	x	x	x	x	x	x
ADS actuation on drywell pressure high			x	x	x	x
ADS actuation on RV water level — Level 1			x	x	x	x
Reactor trip on APRM rapid core flow decrease					x	x
Reactor trip on suppression pool temperature high		x		x	x	x
MSIV isolation on low main steamline pressure					x	
MSIV isolation on high main steamline flow			x	x	x	x
MSIV isolation on low condenser vacuum			x	x	x	x

5. Describe the design bases for the following protection system functions that are not directly considered in the FSAR Chapter 15 transient analyses:
   - Reactor trip on startup range high flux
   - Reactor trip on oscillation power range monitor
   - ADS ATWS permissive
   - Clean-up water and shutdown cooling system isolation on high steam dome pressure
   - Reactor trip on high steam dome pressure
   - Low-pressure flood initiation on high steam dome pressure
   - Containment and shutdown cooling system isolation and STGS initiation on RPV Level 3
   - Containment and clean-up water isolation on RPV Level 2
   - MSIV isolation and diesel generator initiation on RPV Level 1.5
   - Containment isolation, diesel, RCW, and CAMS initiation on RPV Level 1
   - Reactor trip, LPFL, RCIC, HPCF, ADS, RCW, and CAMS initiation and containment isolation on high drywell pressure
   - Reactor trip on control rod drive charging pressure low
   - Reactor trip and MSIV isolation on high main steam tunnel radiation
   - MSIV isolation on main steam tunnel and turbine area temperature high
   - Clean-up water isolation on main steam tunnel temperature high
   - Containment isolation and STGS initiation on reactor building exhaust radiation high
6. Provide response time requirements for each protection system function.
7. Explain the effect of the transient analyses' assumption of zero electronic time delay for ESF functions upon the transient analysis results. Discuss in particular functions that use relatively fast-acting actuation devices such that the electronic time delays would make up a reasonably large fraction of the overall function time delay.
8. Discuss the requirements on communications interfaces between protection system components, including error-correction and error-detection protocols.
9. Discuss the setpoint analysis methodology and the assumptions made in this analysis that have a bearing on the design of protection system components.
10. Provide the following requirements documents for review:
    - A11-1010, Design Specification — Plant General Systems Application Requirements
    - A11-3020, Design Specification — Applicable Codes & Standards
    - A11-3120, Design Specification — Electrical Equipment Independence & Separation Future, Seismic Design Guide

- A11-4110, Design Requirements — Instrument Setpoints
- A11-4100, BWR Requirements — Equipment Environmental Interface Data
- A30-3030, BWR Requirements — Environmental Qualification for Safety Grade Structural, Mechanical, and Electrical Equipment and Components
- A11-4010, Design Specification — Composite Nuclear Plant System
- A32-3021, Design Specification — Digital Measurement and Control
- D11-4010, Design Specification — Process Radiation Monitoring System
- E31-4010, Design Specification — Leak Detection and Isolation System
- H22-4010, Design Specification — Instrument Racks
- R42-4010, Design Specification — DC Power Supply
- R46-4010, Design Specification — Vital AC Power Supply

11. The safety analysis assumes a 0-second response time for ESF initiation, but the requirements for safety system logic and control functions indicate that the channel response time will exceed 1,110 msec (50 msec for TLU + 50 msec for OLU + 10 msec + unspecified times for DTM, transmission delays + up to 1,000 msec delays for some sensors). Explain this inconsistency. (See also question 7.)

12. It appears that in some events, neutron flux transients may exceed 100% of the rated thermal power (RTP), but the upper range specified for the average power range monitor is 118% of the RTP. Explain this inconsistency.

13. Describe the electromagnetic environment in which protection system components are located. Address radiated and conducted environments, as well as normal, transient, and lightning conditions.

14. Describe the strategies employed (e.g., grounding, shielding, and qualification) to ensure that protection system components can and will function under normal and abnormal electromagnetic environment conditions.

15. Describe the supply characteristics of the instrument power supplies.

16. Describe the supply characteristics of the neutron detector power supplies.

17. Describe the supply characteristics of the power supplies servicing the digital trip modules, trip logic units, and output logic units.

18. Describe the accident and normal radiation environmental requirements (including projected total integrated dose) for protection system components.

19. What is the planned normal life for protection system components, especially those components located in harsh environments?

20. Provide the required post-accident operating time requirements for each protection system component located in a harsh environment.

21. Provide current seismic response spectra for the plant locations in which protection system equipment will be mounted.

22. Describe provisions for protecting protection system equipment from fire-protection sprays and from flooding effects.
23. Describe the process environment requirements applicable to protection system sensors.
24. Describe the process for ensuring that protection system sensors are suitable for the process environments.
25. Identify protection system components that are exposed to normal vibration, the vibration environment, and the process for ensuring components are suitable for these environments.
25. Describe expected failure rates for protection system components.

Appendix B: 1-PIE Characteristics

Entry	***Data***		***Notes***
PIE Name:	Pressure Regulator Fails Open Ref: 15.1.3		
Initial Condition:	Standard Ref: 15.0.1		
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7		
Time Delay:	14.2 sec Ref: T15.1-7		
Variable Range:	MAX Variable Range: Ref: Figure 15.1-5	1.9 m	Value extracted from the figure 15.1-5
	MIN Variable Range: Ref: Figure 15.1-5	-2 m	Minimum value was estimated keeping the gradient of the two portions in the graph and extrapolating. Considered WR sensed level
MAX Rate Change:	0.5 m/sec Ref: Figure 15.1-5		Value extracted from figure 15.1-3
Analytical Limit:	-0.75 Ref: T 15.0-1 - item 32		Reference : m above bottom of separator
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.1-5	10 Hz	
	MIN Freq Spectrum: Ref: Figure 15.1-5	0 Hz	Assumed Value 0

Entry	*Data*		*Notes*
PIE Name:	Feedwater Controller Failure - Maximum Demand Ref: 15.1.2		
Initial Condition:	Standard Ref: 15.0.1		
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7		
Time Delay:	30 sec Ref: T15.1-5		
Variable Range:	MAX Variable Range: Ref: Figure 15.1-3	1.7 m	Value extracted from the figure 15.1-3
	MIN Variable Range: Ref: Figure 15.1-3	m	Considered WR sensed level . Value not available in the figure as the ESF initiation time is out of the range of the figure.
MAX Rate Change:	0.43 m/sec Ref: Figure 15.1-3		Value extracted from figure 15.1-3
Analytical Limit:	-0.75 Ref: T 15.0-1 - item 32		Reference setpoint - m above bottom of separator skirt
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.1-3	1.43 Hz	Value extracted from figure 15.1-3
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*		*Notes*
PIE Name:	MSVI Closures Ref: 15.2.4		
Initial Condition:	Standard Ref: 15.0.1		
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7		
Time Delay:	7.4 sec Ref: Table 15.2-9		
Variable Range:	MAX Variable Range: Ref: Figure 15.2-9	0.8 m	Value extracted from figure 15.2-9
MIN Variable Range:	-0.75 Ref: Figure 15.2-9	m	The value refers to m above the bottom of separator skirt
MAX Rate Change:	0.71 m/sec Ref: Figure 15.2-9		Value extracted from figure 15.2-9
Analytical Limit:	-0.75 Ref: Table 15.0-1		Reference point is bottom of separator skirt
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.2-9	1.1 Hz	Considered WR sensed level
	MIN Freq Spectrum: Ref: Figure 15.2-9	0 Hz	

Entry	Data		Notes
PIE Name:	Loss of Condenser Vacuum Ref: 15.2.5		
Initial Condition:	Standard Ref: 15.0.1		
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7		
Time Delay:	13.7 sec Ref: Table 15.2-14		
Variable Range:	MAX Variable Range: Ref: Figure 15-2-10	1.2 m	Value extracted form figure 15.2-10 Reference : level above separator skirt
	MIN Variable Range: Ref: Figure 15-2-10	-1 m	Value extracted form figure 15.2-10 Reference : level above separator skirt
MAX Rate Change:	0.86 m/sec Ref: Figure 15-2-10		Value extracted form figure 15.2-10 Considered WR sensed level
Analytical Limit:	-0.75 Ref: Table 15.0-1		
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.2-10	2.86 Hz	Value extracted form figure 15.2-10
	MIN Freq Spectrum: Ref:	0 Hz	Assumed value

Entry	Data		Notes
PIE Name:	Loss of Non-Emergency AC Power to Station Auxiliaries Ref: 15.2.6		
Initial Condition:	Standard Ref: 15.0.1		
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7		
Time Delay:	21 sec Ref: Table 15.2-6 and item 15.2.6.3.1		
Variable Range:	MAX Variable Range: Ref: Figure 15.2-11	1.1 m	Value extracted from figure 15.2-11
	MIN Variable Range: Ref: Figure 15.2-11	-0.75 m	Value extracted from the figure 15.2-11 assuming that the corresponds to the set point for level 2 Considered WR sensed level
MAX Rate Change:	1.5 m/sec Ref: Figure 15.2-11		Value extracted from figure 15.2-11
Analytical Limit:	-0.75 Ref: table 15.0-1 item 32		Reference point: above bottom of separator
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.2-11	5 Hz	Value extracted from figure 15.2-11
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*		*Notes*
PIE Name:	Loss of Feedwater Flow Ref: 15.2.7		
Initial Condition:	Standard Ref: 15.0.1		
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7		
Time Delay:	19.5 sec Ref: Table 15.2-17		
Variable Range:	MAX Variable Range: Ref: Figure 15.2-12	0.9 m	Value extracted from figure 15.2-12
	MIN Variable Range: Ref: Figure 15.2-12	-2 m	Value extracted from figure 15.2-12
MAX Rate Change:	0.53 m/sec Ref: Figure 15.2-12		0.9
Analytical Limit:	-0.75 Ref: Table 15.0-1		Reference : m above bottom of separator
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.2-12	6.66 Hz	Value extracted from figure 15.2-12
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	Data	Notes
PIE Name:	Steam System Piping Break Outside Containment Ref: 15.6.4	
Initial Condition:	Standard Ref: 15.0.1	
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7	
Time Delay:	30 sec Ref: Table 15.6-4	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	18 Reactor Vessel Water Level - Level 2 Ref: Chap16 - B3.3.1.1- Function 7	
Time Delay:	18 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	***Data***		***Notes***
PIE Name:	Feedwater Controller Failure - Maximum Demand Ref: 15.1.2		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Turbine Stop Valve Closure Ref: Chapter 16, Table 3.3.1.1-1, Function 13. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref:	% closed	It is suppose to be 100%
	MIN Variable Range: Ref: T3.3.1.1.-1	% closed	It is suppose to be 0% Scram is initiated when the stop valve switch indicates less than 85% open
MAX Rate Change:	% Ref: Unknown		
Analytical Limit:	40 Ref: T 3.3.1.1-1		The setpoint is closure > 40 % RTP
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*	*Notes*
PIE Name:	Turbine Trip Ref: 15-.2.3	
Initial Condition:	Standard Ref: 15.0.1	
Protective	16 Turbine Stop Valve Closure Ref: Chapter 16, Table 3.3.1.1-1, Function 13. See Bases for list of RPS and ESFAS	
Time Delay:	3.71 sec Ref: T15.0-1 and t15.0-6	
Variable Range:	MAX Variable Range: % open Ref: T 15.2-6 - scram initiates when the valve stem position indicates 85% open	It is suppose to be 100% open (0% closed).
	MIN Variable Range: % open Ref: T 15.2-6 - scram initiates when the valve stem position indicates 85% open	It is suppose to be 0% open (100% closed).
MAX Rate Change:	% Ref: unknown	Unknown
Analytical Limit:	Ref: Unknown	Unknown
Frequency Spectrum:	MAX Freq Spectrum: Hz Ref: MIN Freq Spectrum: 0 Hz Ref:	

Entry	*Data*		*Notes*
PIE Name:	Loss of Condenser Vacuum Ref: 15.2.5		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Turbine Stop Valve Closure Ref: Chapter 16, Table 3.3.1.1-1, Function 13. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: T 15.2-6 - scram initiates when the valve stem position indicates 85% open	% open	It is suppose to be 100% open (0% closed).
	MIN Variable Range: Ref: T 15.2-6 - scram initiates when the valve stem position indicates 85% open	% open	It is suppose to be 0% open (100% closed).
MAX Rate Change:	% Ref: unknown		unknown
Analytical Limit:	Ref: unknown		unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*		*Notes*
PIE Name:	Rod Withdrawal Error - Low Power Ref: 15.4.1		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Startup Range Neutron Flux - Short Period Ref: Chapter 16, Table 3.3.1.1-1, Function 1b. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Unknown	sec	unknown
	MIN Variable Range: Ref: Chapter 16 table 3.3.1.1-1 - function 1b Table 15.4-2	sec	Scram is initiated when the short period setpoint is reached - less than 10 secs
MAX Rate Change:	sec Ref: Unknown		unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	***Data***	***Notes***
PIE Name:	Recirculation Flow Control Failure - Decreasing Flow Ref: 15.3.2	
Initial Condition:	Standard Ref: 15.0.1	
Protective	16 Average Power Range Monitor - High Setdown Ref: Chapter 16, Table 3.3.1.1-1, Function 2a. See Bases for list of RPS and ESFAS	
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6	
Variable Range:	MAX Variable Range: 138 % RTP Ref: Figure 15.4-3	Value extracted from figure 15.4-3
	MIN Variable Range: 0 % RTP Ref: Figure 15.4-3; Chapter 16 table 3.3.1.1.1 function 2a	The measured value is the neutron flux
MAX Rate Change:	88 % Ref: Figure 15.4-3	
Analytical Limit:	Ref: Unknown	Unknown
Frequency Spectrum:	MAX Freq Spectrum: Hz Ref: MIN Freq Spectrum: 0 Hz Ref:	

Entry	***Data***		***Notes***
PIE Name:	Closure of One Main Steam Isolation Valve Ref: 15.2.4..1.2.2		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Average Power Range Monitor - High Setdown Ref: Chapter 16, Table 3.3.1.1-1, Function 2a. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.01 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Unknown	% RTP	It is supposed to be 0%
	MIN Variable Range: Ref: 15.2.4.3.1 Scram is initiated when position switches on the valves indicate less than 85% open	% RTP	It is suppose to be 0% open
MAX Rate Change:	% open Ref: Unknown		Unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	17 Reactor Vessel Water Level - Level 1 Ref: Chapter 7-7.3.1.1.1.4-(3) a - Chapter 16 -Table 3.3.1.1-1	
Time Delay:	118 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	17 Reactor Vessel Steam Dome Pressure - Low Ref: Chapter 7-7.3.1.1.1.4-(3) a	
Time Delay:	344 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*		*Notes*
PIE Name:	Inadvertent Safety/ Relief Valve Opening Ref: 15.1.4		
Initial Condition:	Standard Ref: 15.0.1		
Protective	25 Suppression Pool Temperature - High Ref: Chapter 7 - 7.31.1.4 (3)(a) Chapter 16 - Table 3.3.1.1-1 [16b] Chap16 - B3.3.1.1- Function 16		
Time Delay:	750 sec Ref: Table 15.1-8		
Variable Range:	MAX Variable Range: Ref: Unknown	°C	Unknown
	MIN Variable Range: Ref: 15.1.4.3 and 7.3.1.1.4 (1)	43.3 °C°	Unknown
MAX Rate Change:	Ref: Unknown		Unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref: Unknown	0 Hz	

Entry	*Data*	*Notes*
PIE Name:	Steam System Piping Break Outside Containment Ref: 15.6.4	
Initial Condition:	Standard Ref: 15.0.1	
Protective	19 Reactor Vessel Water Level - Level 1.5 Ref: Chap 7 - 7.3.1.1.1.1 (3) a Chap16 - B3.3.1.1- Function 8	
Time Delay:	199 sec Ref: table 15.6-4	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	19 Reactor Vessel Water Level - Level 1.5 Ref: Chap 7 - 7.3.1.1.1.1 (3) a Chap16 - B3.3.1.1- Function 8	
Time Delay:	65 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	19 Drywell Pressure - High Ref: Chap 7 - 7.3.1.1.1.1 (3) a Chap16 - B3.3.1.1- Function 11	
Time Delay:	sec Ref:	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	Data	Notes
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	20 Drywell Pressure - High Ref: Chap 7 - 7.3.1.1.1.2 (3) a Chap16 - B3.3.1.1- Function 11	
Time Delay:	30 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	20 Reactor Vessel Water Level - Level 1 Ref: Chap 7 - 7.3.1.1.1.2 (3) b Chap16 - B3.3.1.1- Function 9	
Time Delay:	30 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	***Data***		***Notes***
PIE Name:	Reactor Internal Pump Trip Ref: 15.3.1		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Average Power Range Monitor - Rapid Core Flow Decrease Ref: Chapter 16, Table 3.3.1.1-1, Function 2e. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Figure 15..3-2	100 %	The maximum value will start to decrease 2 secs after scram is initiated
	MIN Variable Range: Ref: Figure 15.3-2	0 %	Minimum value is reached after 6 secs of scram initiation
MAX Rate Change:	12.5 % flux Ref: Figure 15.3-2		Value extracted from figure 15.3-2
Analytical Limit:	Ref: unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*	*Notes*
PIE Name:	Loss of Feedwater Flow Ref: 15.2.7	
Initial Condition:	Standard Ref: 15.0.1	
Protective	16 Reactor Vessel Water Level - Level 3 Ref: Chapter 16, Table 3.3.1.1-1, Function 6a. See Bases for list of RPS and ESFAS	
Time Delay:	3.71 sec Ref: T15.0-1 and T 15.0-6	
Variable Range:	MAX Variable Range: 1 m Ref: T 15.0-1 - item 32 - Level 3 - 0.57 above bottom of separator skirt bottom	Not specified
	MIN Variable Range: -2. m Ref: T 15.0-1 - item 32 - Level 3 - 0.57 above bottom of separator skirt bottom	
MAX Rate Change:	0.15 m/sec Ref: Figure 15.2.12	Calculated from the graph (figure 15.2-12)
Analytical Limit:	0.57 Ref: T15.0-1	
Frequency Spectrum:	MAX Freq Spectrum: 1.25 Hz Ref: Figure 15.2-12 MIN Freq Spectrum: 0 Hz Ref: Figure 15.2-12	

Entry	*Data*		*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Reactor Vessel Water Level - Level 3 Ref: Chapter 16, Table 3.3.1.1-1, Function 6a. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref:	m	
	MIN Variable Range: Ref:	m	Scram initiates when level reaches - 0.57m above bottom of separator skirt bottom.
MAX Rate Change:	Ref:		
Analytical Limit:	Ref:		
Frequency Spectrum:	MAX Freq Spectrum: Ref:		
	MIN Freq Spectrum: Ref:	0	

Entry	*Data*		*Notes*
PIE Name:	Generator Load Rejection Ref: 15.2.2		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Turbine Control Valve Fast Ref: Chapter 16, Table 3.3.1.1-1, Function 14. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T 15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: T3.3.1.1-1	Kgf/cm 2	Depends upon the hydraulic trip system oil pressure of Turbine Control Valve
	MIN Variable Range: Ref: T3.3.1.1-1	Kgf/cm 2	Depends upon the hydraulic trip system oil pressure of Turbine Control Valve
MAX Rate Change:	Kgf/cm Ref: Unknown		Unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*		*Notes*
PIE Name:	Loss of Non-Emergency AC Power to Station Auxiliaries Ref: 15.2.6		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Turbine Control Valve Fast Ref: Chapter 16, Table 3.3.1.1-1, Function 14. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and t15.0-6		
Variable Range:	MAX Variable Range: Ref: T3.3.1.1-1	Kgf/cm 2	Depends upon the hydraulic trip system oil pressure of Turbine Control Valve
	MIN Variable Range: Ref: T3.3.1.1-1	Kgf/cm 2	Depends upon the hydraulic trip system oil pressure of Turbine Control Valve
MAX Rate Change:	Kgf/cm Ref: Unknown		Unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	Data		Notes
PIE Name:	Inadvertent Safety/ Relief Valve Opening Ref: 15.1.4		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Suppression Pool Temperature - High Ref: Chapter 16, Table 3.3.1.1-1, Function 16a. See Bases for list of RPS and ESFAS functions		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Unknown	°C	Unknown
	MIN Variable Range: Ref: 15.1.4.3	48.9 °C	
MAX Rate Change:	Ref: Unknown		Unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref: Unknown	Hz	Unknown
	MIN Freq Spectrum: Ref: Unknown	0 Hz	Unknown

Entry	*Data*		*Notes*
PIE Name:	MSVI Closures Ref: 15.2.4		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Main Steam Isolation Valve - Closure Ref: Chapter 16, Table 3.3.1.1-1, Function 10. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref:	% open	It is suppose to be 100% open (0% closed)
	MIN Variable Range: Ref: T 15.2-9	% open	It is suppose to be 0% open (100% closed) Scram is initiated when the position switches of two or more MSIV indicate less than 85% open.
MAX Rate Change:	% open Ref: Unknown		unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	*Data*		*Notes*
PIE Name:	Steam System Piping Break Outside Containment Ref: 15.6.4		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Main Steam Isolation Valve - Closure Ref: Chapter 16, Table 3.3.1.1-1, Function 10. See Bases for list of RPS and ESFAS		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref:	% open	It should be 100
	MIN Variable Range: Ref: T15.6-4	% open	
MAX Rate Change:	% Ref: Unknown		Unknown
Analytical Limit:	Ref: Unknown		Unknown
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref:	0 Hz	

Entry	Data	Notes
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	17 Reactor Vessel Steam Dome Pressure - High Ref: Chapter 16-B3.3.1.1 - function	
Time Delay:	Ref:	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	***Data***	***Notes***
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	21 Reactor Vessel Water Level - Level 1.5 Ref: Chap16 - B3.3.1.1- Function 8	
Time Delay:	65 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref: MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss-of-Coolant Accident (Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary)-Inside Containment Ref: 15.6.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	21 Drywell Pressure - High Ref: Chap16 - B3.3.1.1- Function 11	
Time Delay:	10 sec Ref: Table 6.3-2	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Pressure Regulator Fails Open Ref: 15.1.3	
Initial Condition:	Standard Ref: 15.0.1	
Protective	29 Main Steamline Pressure - Low Ref: Chap16 - B3.3.1.1- Function 19	
Time Delay:	33.2 sec . Ref: Table 15.1-7	
Variable Range:	MAX Variable Range: 0.7 Mpa Ref: Table 15.0-1 gives the value 6.85 MPaA for the Turbine Inlet Pressure	Value extracted from figure 15.1-5
	MIN Variable Range: -2 Mpa Ref: 7.3.1.1.2 - 3(e) and figure 15.1-5. Assumed value for Stem Line Pressure Rise (MPa)	Value extracted from figure 15.1-5
MAX Rate Change:	4.5 MPa/se Ref: Figure 15.1-5	value extracted from figure 15.1-5
Analytical Limit:	Ref: Unknown	unknown
Frequency Spectrum:	MAX Freq Spectrum: 5 Hz Ref: Figure 15.1-5	Value extracted from figure 15.1-5
	MIN Freq Spectrum: 0 Hz Ref: Figure 15.1-5	

Entry	*Data*	*Notes*
PIE Name:	Steam System Piping Break Outside Containment Ref: 15.6.4	
Initial Condition:	Standard Ref: 15.0.1	
Protective	29 Main Steamline Flow - High Ref: Chap16 - B3.3.1.1- Function 20	
Time Delay:	0.5 sec Ref: Table 15.6-4	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref:	
	MIN Freq Spectrum: Ref:	

Entry	***Data***	***Notes***
PIE Name:	Loss of Condenser Vacuum Ref: 15.2.5	
Initial Condition:	Standard Ref: 15.0.1	
Protective	29 Condenser Vacuum - Low Ref: Chap16 - B3.3.1.1- Function 21	
Time Delay:	5 sec Ref: Table 15.2-14	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*	*Notes*
PIE Name:	Loss of Non-Emergency AC Power to Station Auxiliaries Ref: 15.2.6	
Initial Condition:	Standard Ref: 15.0.1	
Protective	29 Condenser Vacuum - Low Ref: Chap16 - B3.3.1.1- Function 21	
Time Delay:	28 sec Ref: Table 15.2-16	
Variable Range:	MAX Variable Range: Ref:	
	MIN Variable Range: Ref:	
MAX Rate Change:	Ref:	
Analytical Limit:	Ref:	
Frequency Spectrum:	MAX Freq Spectrum: Ref: MIN Freq Spectrum: Ref:	

Entry	*Data*		*Notes*
PIE Name:	Inadvertent RHR Shutdown Cooling Operation Ref: 15.1.6		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Average Power Range Monitor - High Ref: Chapter 16, Table 3.3.1.1-1, Function 2a.		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Unknown	% RTP	
	MIN Variable Range: Ref: Table 3.3.1.1-1	% RTP	Values not found
MAX Rate Change:	Ref: Unknown		
Analytical Limit:	Ref:		Table T15.0-1 item 30 refers to high Trip Flux Trip at 127.5 % NBR
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref: Unknown	0 Hz	

Entry	*Data*		*Notes*
PIE Name:	Inadvertent Closure of One Turbine Control Valve Ref: 15.2.1.1.2.1		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Average Power Range Monitor - High Ref: Chapter 16, Table 3.3.1.1-1, Function 2a.		
Time Delay:	3.71 sec Ref: T15.0-1, T15.0-6		
Variable Range:	MAX Variable Range: Ref: F15.2.1	130 % RTP	
	MIN Variable Range: Ref: F15.2-1	0 % RTP	
MAX Rate Change:	75 % Ref: F15.2.1		
Analytical Limit:	127.5 Ref: T15.0-1		
Frequency Spectrum:	MAX Freq Spectrum: Ref:	Hz	
	MIN Freq Spectrum: Ref: F15.2-1	0 Hz	APRMs should be capable of monitoring steady state.

Entry	*Data*		*Notes*
PIE Name:	Pressure Regulator Downscale Ref: 15.2.1.2.1.1		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Average Power Range Monitor - High Ref: Chapter 16, Table 3.3.1.1-1, Function 2a.		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Figure 15.2-2	140 %RTP	
	MIN Variable Range: Ref: Figure 15.2-2	0 %RTP	Value obtained from figure 15.2-2
MAX Rate Change:	80 %RTP/s Ref: Figure 15.2-2		
Analytical Limit:	127.5 Ref: T15.0-1		
Frequency Spectrum:	MAX Freq Spectrum: Ref:		
	MIN Freq Spectrum: Ref:	0	There is no report of this information on the curves

Entry	*Data*		*Notes*
PIE Name:	Fast Runout of All Reactor Internal Pumps Ref: 15.4.51.2.2		
Initial Condition:	Standard Ref: 15.0.1		
Protective	16 Average Power Range Monitor - High Ref: Chapter 16, Table 3.3.1.1-1, Function 2a.		
Time Delay:	3.71 sec Ref: T15.0-1 and T15.0-6		
Variable Range:	MAX Variable Range: Ref: Figure 15.4-3	140 % RTP	Value extracted from figure 15.4-3
	MIN Variable Range: Ref: Figure 15.4-3	0 % RTP	Value extracted from figure 15.4-3
MAX Rate Change:	45 %RTP/s Ref: Figure 15.4-3		Value extracted from figure 15.4-3
Analytical Limit:	127.5 Ref: Table 15.0-1 item 30		The analytical limit is expressed in % NBR
Frequency Spectrum:	MAX Freq Spectrum: Ref: Figure 15.4-3	2.5 Hz	Value extracted from figure 15.4-3
	MIN Freq Spectrum: Ref:	0 Hz	Assumed Value

Appendix C: Protection System Functional Requirements

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 Reactor Vessel Water Level - Level 2 Chap16 - B3.3.1.1- Function 7	

Parameter Characteristics

Response Time Ref	7.4 sec Table 15.2-9	RCIC is initiated approximately 7.4 secs after four RIP are tripped. This time includes the actual delay time for RCIC
MIN Variable Ref:	-2 m Figure 15.2-12, Figure 15.2-5	Value extracted from figure 15.2-12
MAX Variable	1.9 m Ref: Figure 15.1-5	Value extracted from the figure 15.1-5
Bounding Rate Ref :	2 Figure 15.2-11	Value extracted from figure 15.2-11
Bounding Analytical Limit:	-1 Ref table 15.0-1 item 32	Reference point: above bottom of separator skirt
MIN Freq Ref:	0 Hz Figure 15.1-5	Assumed Value 0
MAX Freq Re:	7 Hz Figure 15.2-12	Value extracted from figure 15.2-12

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Turbine Stop Valve Closure Chapter 16, Table 3.3.1.1-1, Function 13. See Bases for list of RPS and ESFAS functions	

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	% closed T3.3.1.1.-1	t is suppose to be 0% open (100% closed).
MAX Variable	% closed Ref: T 15.2-6 - scram initiates when the valve stem position indicates 85%	It is suppose to be 100%
Bounding Rate Ref :	Unknown	
Bounding Analytical Limit:	40 Ref T 3.3.1.1-1	The setpoint is closure > 40 % RTP
MIN Freq Ref:	0 Hz	
MAX Freq Re:	Hz	

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Startup Range Neutron Flux - High Chapter 16, Table 3.3.1.1-1, Function 1a. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Startup Range Neutron Flux - Short Chapter 16, Table 3.3.1.1-1, Function 1b. See Bases for list of RPS and ESFAS functions	

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	sec Chapter 16 table 3.3.1.1-1 - function 1b Table 15.4-2	Scram is initiated when the short period setpoint is reached - less than 10 secs
MAX Variable	sec Ref: Unknown	unknown
Bounding Rate Ref :	Unknown	unknown
Bounding Analytical Limit:	Ref Unknown	Unknown
MIN Freq Ref:	0 Hz	
MAX Freq Re:	Hz	

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Permissive	16 Startup Range Neutron Flux ATWS Ref Chapter 16, Table 3.3.1.1-1, Function 1c. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Startup Range Neutron Flux Inoperable Chapter 16, Table 3.3.1.1-1, Function 1d. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System
Subsystem Name:	N/A
Protective Setdown	16 Average Power Range Monitor - High Ref Chapter 16, Table 3.3.1.1-1, Function 2a. See Bases for list of RPS and ESFAS functions

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	0 % RTP Figure 15.4-3; Chapter 16 table 3.3.1.1.1 function 2a	The measured value is the neutron flux
MAX Variable	138 % RTP Ref: Figure 15.4-3	Value extracted from figure 15.4-3
Bounding Rate Ref :	88 Figure 15.4-3	
Bounding Analytical Limit:	Ref Unknown	Unknown
MIN Freq Ref:	0 Hz	
MAX Freq Re:	Hz	

System Name: Reactor Trip System

Subsystem Name: N/A

Protective 16 Average Power Range Monitor - Simulated Thermal Power High, Flow Based
Ref Chapter 16, Table 3.3.1.1-1, Function 2b. See Bases for list of RPS and ESFAS functions

Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 Drywell Pressure - High Chap16 - B3.3.1.1- Function 11	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Low Pressure Core Flood	
Protective Ref	17 Drywell Pressure - High Chapter 7-7.3.1.1.1.4-(3) a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	Low Pressure Core Flood
Protective Ref	17 Reactor Vessel Water Level - Level 1 Chapter 7-7.3.1.1.1.4-(3) a - Chapter 16 -Table 3.3.1.1-1 [9a]

Parameter Characteristics

Response Time Ref	118 sec Table 6.3-2	LPCF starts 118 secs after L°CA. This time includes the actual time delay for LPCF
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	Low Pressure Core Flood
Protective Low	17 Reactor Vessel Steam Dome Pressure -
	Ref Chapter 7-7.3.1.1.1.4-(3) a

Parameter Characteristics

Response Time Ref	344 sec Table 6.3-2	LPCF starts 344 secs after L°CA, This time includes the actual delay time for LPCF
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Suppression Pool Cooling Actuation	
Protective Ref	25 Suppression Pool Temperature - High Chapter 7 - 7.31.1.4 (3)(a) Chapter 16 - Table 3.3.1.1-1 [16b] Chap16 - B3.3.1.1- Function 16	

Parameter Characteristics

Response Time Ref	750 sec Table 15.1-8	Suppression pool cooling function is initiated 750 secs after SRV initiates opening This time includes the system initiation delay time.
MIN Variable Ref:	43. °C 15.1.4.3 and 7.3.1.1.4 (1)	Unknown
MAX Variable	°C Ref: Unknown	Unknown
Bounding Rate Ref :	Unknown	Unknown
Bounding Analytical Limit:	Ref Unknown	Unknown
MIN Freq Ref:	0 Hz Unknown	
MAX Freq Re:	Hz	

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Standby Gas Treatment	
Protective Ref	22 Drywell Pressure - High Chap 7 - 7.3.1.1.5 (3) a Chap16 - B3.3.1.1- Function 11	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Standby Gas Treatment	
Protective Ref	22 Reactor Vessel Water Level - Level 3 Chap 7 - 7.3.1.1.5 (3) a Chap16 - B3.3.1.1- Function 6	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Standby Gas Treatment	
Protective Ref	22 High Radiation in the Fuel Handling Area Chap 7 - 7.3.1.1.5 (3) a Chap16 - B3.3.1.1- Function 24	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Building Cooling Water & Service Water Actuation	
Protective Ref	23 Reactor Vessel Water Level - Level 1 Chap 7 - 7.3.1.1.7 (3) b Chap16 - B3.3.1.1- Function 9	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Building Cooling Water & Service Water Actuation	
Protective Ref	23 Drywell Pressure - High Chap 7 - 7.3.1.1.7 (3) b Chap16 - B3.3.1.1- Function 11	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	High Pressure Core Flood
Protective Ref	19 Reactor Vessel Water Level - Level 1.5 Chap 7 - 7.3.1.1.1.1 (3) a Chap16 - B3.3.1.1- Function 8

Parameter Characteristics

Response Time Ref	65 sec table 15.6-4	HPCF starts 199 secs after break of one steamline outside the containment
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 Drywell Pressure - High Chap 7 - 7.3.1.1.1.1 (3) a Chap16 - B3.3.1.1- Function 11	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	Automatic Depressurization System
Protective Ref	20 Drywell Pressure - High Chap 7 - 7.3.1.1.1.2 (3) a Chap16 - B3.3.1.1- Function 11

Parameter Characteristics

Response Time Ref	30 sec Table 6.3-2	118 secs after L°CA, ADSdelay time is initiated. After 30 secs, ADS is initiated
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	Automatic Depressurization System
Protective Ref	20 Reactor Vessel Water Level - Level 1 Chap 7 - 7.3.1.1.1.2 (3) b Chap16 - B3.3.1.1- Function 9

Parameter Characteristics

Response Time Ref	30 sec Table 6.3-2	ADS starts at 148 secs after L°CA. Which includes the 30 secs time delay.
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Inoperative	16 Average Power Range Monitor - this function Ref Chapter 16, Table 3.3.1.1-1, Function 2d. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for

Parameter Characteristics

Response Time Ref	
MIN Variable Ref:	
MAX Variable	Ref:
Bounding Rate Ref :	
Bounding Analytical Limit:	Ref
MIN Freq Ref:	
MAX Freq Re:	

System Name: Reactor Trip System

Subsystem Name: N/A

Protective 16 Average Power Range Monitor - Rapid Core Flow Decrease

Ref Chapter 16, Table 3.3.1.1-1, Function 2e. See Bases for list of RPS and ESFAS functions

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	0 % flow Figure 15.3-2	Minimum value is reached after 6 secs of scram initiation
MAX Variable	100 % flow Ref: Figure 15..3-2	The maximum value will start to decrease 2 secs after scram is initiated
Bounding Rate Ref :	12 Figure 15.3-2	Value extracted from figure 15.3-2
Bounding Analytical Limit:	Ref unknown	Unknown
MIN Freq Ref:	0 Hz	
MAX Freq Re:	Hz	

System Name: Reactor Trip System

Subsystem Name: N/A

Protective High: 16 Reactor Vessel Steam Dome Pressure - this function
Ref Chapter 16, Table 3.3.1.1-1, Function 3a. See Bases for list of RPS and ESFAS functions

Accident analysis contains no requirements for

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Reactor Vessel Water Level - Level 3 Chapter 16, Table 3.3.1.1-1, Function 6a. See Bases for list of RPS and ESFAS functions	

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T 15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	-2 m T 15.0-1 - item 32 - Level 3 - 0.57 above bottom of separator skirt bottom	Scram initiates when level reaches - 0.57m above bottom of separator skirt bottom.
MAX Variable	1 m Ref: T 15.0-1 - item 32 - Level 3 - 0.57 above bottom of separator skirt bottom	Not specified
Bounding Rate Ref :	2 Figure 15.2.12	Calculated from the graph (figure 15.2-12)
Bounding Analytical Limit:	1 Ref T15.0-1	
MIN Freq Ref:	0 Hz Figure 15.2-12	
MAX Freq Re:	7 Hz Figure 15.2-12	

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Drywell Pressure - High Chapter 16, Table 3.3.1.1-1, Function 11a. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Turbine Control Valve Fast Closure Chapter 16, Table 3.3.1.1-1, Function 14. See Bases for list of RPS and ESFAS functions	

Parameter Characteristics

Response Time Ref	3.7 sec T 15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod. Bypass opens 0.2 seconds after Turbine Stop Valve is closed.. One or all bypass valve failures events don't change the scram initiation (fast closure of turbine control Valve)
MIN Variable Ref:	Kgf/cm2 T3.3.1.1-1	Depends upon the hydraulic trip system oil pressure of Turbine Control Valve
MAX Variable	Kgf/cm2 Ref: T3.3.1.1-1	Depends upon the hydraulic trip system oil pressure of Turbine Control Valve
Bounding Rate Ref :	Unknown	Unknown
Bounding Analytical Limit:	Ref Unknown	Unknown
MIN Freq Ref:	0 Hz	
MAX Freq Re:	Hz	

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Main Steam Tunnel Radiation - High Chapter 16, Table 3.3.1.1-1, Function 15a. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Suppression Pool Temperature - High Chapter 16, Table 3.3.1.1-1, Function 16a. See Bases for list of RPS and ESFAS functions	

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	48. °C 15.1.4.3	
MAX Variable	°C Ref: Unknown	Unknown
Bounding Rate Ref :	Unknown	Unknown
Bounding Analytical Limit:	Ref Unknown	Unknown
MIN Freq Ref:	0 Hz Unknown	Unknown
MAX Freq Re:	Hz Unknown	Unknown

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Main Steam Isolation Valve - Closure Chapter 16, Table 3.3.1.1-1, Function 10. See Bases for list of RPS and ESFAS functions	

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay assumed for 100% rod insertion. Actual delay time will be less than that, depending on the actual position of control rod.
MIN Variable Ref:	% open T 15.2-9	t is suppose to be 0% open (100% closed)
MAX Variable	% open Ref:	It should be 100
Bounding Rate Ref :	Unknown	Unknown
Bounding Analytical Limit:	Ref Unknown	Unknown
MIN Freq Ref:	0 Hz	
MAX Freq Re:	Hz	

System Name: Reactor Trip System

Subsystem Name: N/A

Protective Charging Pressure - Low: 16 Control Rod Drive Water Header
Ref Chapter 16, Table 3.3.1.1-1, Function 12. See Bases for list of RPS and ESFAS functions

Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Manual Reactor Protection System Chapter 16, Table 3.3.1.2-1, Function 3. See Bases for list of RPS and ESFAS functions	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF Pump Discharge Pressure - High Chap 16 -Table 3.3.1.4-1 - Function 2a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF Pump Discharge Flow -Low Chap 16 -Table 3.3.1.4-1 - Function 2b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF Pump Suction Pressure -Low Chap 16 -Table 3.3.1.4-1 - Function 2c	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF System Initiation Chap 16 -Table 3.3.1.4-1 - Function 2d	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF Device Actuation Chap 16 -Table 3.3.1.4-1 - Function 2e	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF B Manual Initiation Chap 16 -Table 3.3.1.4-1 - Function 2f	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 HPCF C Manual Initiation Chap 16 -Table 3.3.1.4-1 - Function 2g	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Diesel Generator Actuation	
Protective Ref	21 DG System Initiation Chap.16 - Table 3.3.1.4- Function 5c	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Diesel Generator Actuation	
Protective Ref	21 DG Device Actuation Chap.16 - Table 3.3.1.4- Function 5d	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Diesel Generator Actuation	
Protective Ref	21 DG Manual Initiation Chap.16 - Table 3.3.1.4- Function 5e	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Standby Gas Treatment	
Protective Ref	22 SGTS Initiation Chap.16 - Table 3.3.1.4- Function 6a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Standby Gas Treatment	
Protective Ref	22 SGTS Device Actuation Chap.16 - Table 3.3.1.4- Function 6b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Building Cooling Water & Service Water Actuation	
Protective Ref	23 RCW/RSW System Initiation Chap.16 - Table 3.3.1.4- Function 7a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Building Cooling Water & Service Water Actuation	
Protective Ref	23 RCW/RSW Device Actuation Chap.16 - Table 3.3.1.4- Function 7b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Building Cooling Water & Service Water Actuation	
Protective Ref	23 RCW/RSW Manual Initiation Chap.16 - Table 3.3.1.4- Function 7c	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Atmospheric Monitoring Initiation	
Protective Ref	24 CAM System Initiation Chap.16 - Table 3.3.1.4- Function 8a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Atmospheric Monitoring Initiation	
Protective Ref	24 CAM System Device Actuation Chap.16 - Table 3.3.1.4- Function 8b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Suppression Pool Cooling Actuation	
Protective Ref	25 SPC System Initiation Chap.16 - Table 3.3.1.4- Function 9a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Suppression Pool Cooling Actuation	
Protective Ref	25 SPC Device Actuation Chap.16 - Table 3.3.1.4- Function 9b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Suppression Pool Cooling Actuation	
Protective Ref	25 SPC Manual Actuation Chap.16 - Table 3.3.1.4- Function 9c	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 CIV System Initiation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 CIV Device Actuation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 Drywell Sump Drain LCW Radiation - Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time Ref

MIN Variable Ref:

MAX Variable Ref:

Bounding Rate Ref :

Bounding Analytical Limit: Ref

MIN Freq Ref:

MAX Freq Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Containment Isolation

Protective High: 26 Drywell Sump Drain HCW Radiation - Accident analysis contains no requirements for this function
Ref Chap.16 - Table 3.3.1.4- Function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Water Cleanup Isolation	
Protective Ref	27 CUW System Isolation Initiation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Water Cleanup Isolation	
Protective Ref	27 CUW Isolation Device Actuation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Water Cleanup Isolation	
Protective Ref	27 CUW Isolation on SLC Initiation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Shutdown Cooling System Isolation	
Protective Ref	28 SD Cooling System Isolation Initiation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Shutdown Cooling System Isolation	
Protective Ref	28 SD Cooling Isolation Device Actuation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: RCIC Initiation

Protective Pressure - High: 18 RCIC Turbine Exhaust Diaphragm

Accident analysis contains no requirements for this function

Ref Chap.16 - Table 3.3.1.4- Function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 RCIC Device Actuation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 RCIC Manual Initiation Chap.16 - Table 3.3.1.4- Function 3e	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Automatic Depressurization System	
Protective Ref	20 ADS System Actuation Chap.16 - Table 3.3.1.4- Function 4a	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Automatic Depressurization System	
Protective Ref	20 ADS Device Actuation Chap.16 - Table 3.3.1.4- Function 4b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Automatic Depressurization System	
Protective Ref	20 ADS Manual Initiation Chap.16 - Table 3.3.1.4- Function 4c	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Low Pressure Core Flood

Protective High: 17 Reactor Vessel Steam Dome Pressure - this function
Ref Chapter 16-B3.3.1.1 - function 3

Accident analysis contains no requirements for

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 RCIC System Isolation Initiation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 RCIC Isolation Device Actuation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 RCIC Manual Isolation Initiation Chap.16 - Table 3.3.1.4- Function	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 Condensate Storage Tank Level - Low Chap16 - B3.3.1.1- Function 17	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 Suppression Pool Water Level - High Chap16 - B3.3.1.1- Function 18	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC Initiation	
Protective Ref	18 Reactor Vessel Water Level - Level 8 Chap16 - B3.3.1.1- Function 5 (shutdown)	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable

Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 Reactor Vessel Water Level - Level 8 Chap16 - B3.3.1.1- Function 5 (shutdown)	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 Condensate Storage Tank Level - Low Chap16 - B3.3.1.1- Function 17	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	High Pressure Core Flood	
Protective Ref	19 Suppression Pool Water Level - High Chap16 - B3.3.1.1- Function 18	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: High Pressure Core Flood

Protective Ref: 19 RHR Pump Discharge Pressure - High

Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time Ref

MIN Variable Ref:

MAX Variable Ref:

Bounding Rate Ref :

Bounding Analytical Limit: Ref

MIN Freq Ref:

MAX Freq Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Automatic Depressurization System

Protective 20 APRM ATWS ADS Permissive (Low APRM& Level <1.5)
Ref Chap16 - B3.3.1.1- Function 2g

Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	Diesel Generator Actuation
Protective Ref	21 Reactor Vessel Water Level - Level 1.5 Chap16 - B3.3.1.1- Function 8

Parameter Characteristics

Response Time Ref	65 sec Table 6.3-2	All DG starts 65 secs after L°CA. This time includes the actual delay time for DG
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Diesel Generator Actuation	
Protective Ref	21 Reactor Vessel Water Level - Level 1 Chap16 - B3.3.1.1- Function 9	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Diesel Generator Actuation	
Protective Ref	21 Drywell Pressure - High Chap16 - B3.3.1.1- Function 11	

Parameter Characteristics

Response Time Ref	10 sec Table 6.3-2	RCIC starts 10 secs after L°CA. This time includes the actual delay time for RCIC
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Atmospheric Monitoring Initiation	
Protective Ref	24 Reactor Vessel Water Level - Level 1 Chap16 - B3.3.1.1- Function 9	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Atmospheric Monitoring Initiation	
Protective Ref	24 Drywell Pressure - High Chap16 - B3.3.1.1- Function 11	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 Reactor Vessel Water Level - Level 3 Chap16 - B3.3.1.1- Function 6	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 Reactor Vessel Water Level - Level 2 Chap16 - B3.3.1.1- Function 7	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 Reactor Vessel Water Level - Level 1 Chap16 - B3.3.1.1- Function 9	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time Ref

MIN Variable Ref:

MAX Variable Ref:

Bounding Rate Ref :

Bounding Analytical Limit: Ref

MIN Freq Ref:

MAX Freq Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Containment Isolation	
Protective Ref	26 Drywell Pressure - High Chap16 - B3.3.1.1- Function 11	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Containment Isolation

Protective 26 Reactor Building/ Fuel Handling Area, Exhaust Air Radiation - High
Ref Chap16 - B3.3.1.1- Function 24

Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Reactor Water Cleanup Isolation

Protective High: 27 Reactor Vessel Steam Dome Pressure - this function
Ref Chap16 - B3.3.1.1- Function 3

Accident analysis contains no requirements for

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Reactor Water Cleanup Isolation

Protective Ref	27 Reactor Vessel Water Level - Level 2 Chap16 - B3.3.1.1- Function 7	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Water Cleanup Isolation	
Protective Ref	27 Main Steam Tunnel Temperature - High Chap16 - B3.3.1.1- Function 22	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Water Cleanup Isolation	
Protective Ref	27 CUW Differential Flow - High Chap16 - B3.3.1.1- Function 29	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Reactor Water Cleanup Isolation	
Protective Ref	27 CUW Area Temperature - High Chap16 - B3.3.1.1- Function 30	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: Shutdown Cooling System Isolation

Protective High: 28 Reactor Vessel Steam Dome Pressure - this function
Ref Chap16 - B3.3.1.1- Function 3

Accident analysis contains no requirements for

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Shutdown Cooling System Isolation	
Protective Ref	28 Reactor Vessel Water Level - Level 3 Chap16 - B3.3.1.1- Function 6	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX Variable
Ref:

Bounding Rate
Ref :

Bounding Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Shutdown Cooling System Isolation	
Protective Ref	28 RHR Area Temperature - High Chap16 - B3.3.1.1- Function 28	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Main Steamline Isolation Valve	
Protective Ref	29 Reactor Vessel Water Level - Level 1.5 Chap16 - B3.3.1.1- Function 8	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Main Steamline Isolation Valve	
Protective Ref	29 Main Steam Tunnel Radiation - High Chap16 - B3.3.1.1- Function 15	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Main Steamline Isolation Valve	
Protective Ref	29 Main Steamline Pressure - Low Chap16 - B3.3.1.1- Function 19	

Parameter Characteristics

Response Time Ref	33. sec Table 15.1-7	Main steamline isolation initiates 33.32 secs after turbine stop valve is closed. This time includes the time delay of the main steamline isolation valve
MIN Variable Ref:	4.8 Mpa 7.3.1.1.2 - 3(e) and figure 15.1-5. Assumed value for Stem Line Pressure Rise (MPa)	Value extracted from figure 15.1-5
MAX Variable	7.5 Mpa Ref: Table 15.0-1 gives the value 6.85 MPaA for the Turbine Inlet Pressure	Value extracted from figure 15.1-5
Bounding Rate Ref :	4 Figure 15.1-5	value extracted from figure 15.1-5
Bounding Analytical Limit:	Ref Unknown	unknown
MIN Freq Ref:	0 Hz Figure 15.1-5	
MAX Freq Re:	5 Hz Figure 15.1-5	Value extracted from figure 15.1-5

System Name:	Engineered Safety Feature Actuation
Subsystem Name:	Main Steamline Isolation Valve
Protective Ref	29 Main Steamline Flow - High Chap16 - B3.3.1.1- Function 20

Parameter Characteristics

Response Time Ref	0 sec Table 15.6-4	MSIV starts do close 0.5 secs after break of one mainsteam line outside the containment
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Main Steamline Isolation Valve	
Protective Ref	29 Condenser Vacuum - Low Chap16 - B3.3.1.1- Function 21	

Parameter Characteristics

Response Time Ref	28 sec Table 15.2-14	MSIV starts to close 28 secs after loss of unit auxiliary power transformer
MIN Variable Ref:		
MAX Variable	Ref:	
Bounding Rate Ref :		
Bounding Analytical Limit:	Ref	
MIN Freq Ref:		
MAX Freq Re:		

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Main Steamline Isolation Valve	
Protective Ref	29 Main Steam Tunnel Temperature - High Chap16 - B3.3.1.1- Function 22	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	Main Steamline Isolation Valve	
Protective Ref	29 Main Turbine Area Temperature - High Chap16 - B3.3.1.1- Function 23	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 RCIC Steamline Flow - High Chap16 - B3.3.1.1- Function 25	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 RCIC Steam Supply Line Pressure - Low Chap16 - B3.3.1.1- Function 26	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 RCIC Equipment Area Temperature - Chap16 - B3.3.1.1- Function 27	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time Ref

MIN Variable Ref:

MAX Variable

Ref:

Bounding Rate Ref :

Bounding Analytical Limit: Ref

MIN Freq Ref:

MAX Freq Re:

System Name:	Engineered Safety Feature Actuation	
Subsystem Name:	RCIC System Isolation	
Protective Ref	30 CUW Area Temperature - High Chap16 - B3.3.1.1- Function 30	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name: Engineered Safety Feature Actuation

Subsystem Name: RCIC System Isolation

Protective Ref: 30 RCIC Turbine Exhaust Pressure - High Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time Ref

MIN Variable Ref:

MAX Variable Ref:

Bounding Rate Ref :

Bounding Analytical Limit: Ref

MIN Freq Ref:

MAX Freq Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Recirculation Flow (Part of APRM STP) Chap16 - B3.3.1.1- Function 2b	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time Ref	
MIN Variable Ref:	
MAX Variable	Ref:
Bounding Rate Ref :	
Bounding Analytical Limit:	Ref
MIN Freq Ref:	
MAX Freq Re:	

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Oscillation Power Range Monitor Chap16 - B3.3.1.1- Function 2f	Accident analysis contains no requirements for this function

Parameter Characteristics

Response Time
Ref

MIN Variable
Ref:

MAX
Variable
Ref:

Bounding Rate
Ref :

Bounding
Analytical Limit: Ref

MIN Freq
Ref:

MAX Freq
Re:

System Name:	Reactor Trip System	
Subsystem Name:	N/A	
Protective Ref	16 Average Power Range Monitor - High Chapter 16, Table 3.3.1.1-1, Function	

Parameter Characteristics

Response Time Ref	3.7 sec T15.0-1 and T15.0-6	Time delay is to time of full insertion of control rods. Actual RTS delay must be less than this time minus maximum rod insertion time. Maximum rod insertion time is not specified in draft tech specs.
MIN Variable Ref:	0 %RTP Figure 15.2-2	Value obtained from figure 15.2-2
MAX Variable	140 %RTP Ref: Figure 15.2-2	
Bounding Rate Ref :	88 Figure 15.2-2	
Bounding Analytical Limit:	128 Ref Table 15.0-1 item 30	The analytical limit is expressed in % NBR
MIN Freq Ref:	0 Hz F15.2-1	APRMs should be capable of monitoring steady state.
MAX Freq Re:	2 Hz Figure 15.4-3	Value extracted from figure 15.4-3

Appendix D: Component Functional Requirements and Comparison with Specifications

Component: <u>Remote Multiplexer Unit</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Mounting				
Electrical connections				
Electrical interface requirements				
Frequency Range	7 Hz			
Signal rate of change	175 %/sec			
Signal Span	0 to 100 %			
Sampling Interval				
Resolution				
Response Time	0 sec			

Component: <u>Multiplexer</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Electrical interface requirements				
Response Time	0 sec			
Electrical connections				
Frequency Range	7 Hz			
Signal rate of change	175 %/sec	1 Mbps	File 299X700-071 Sec 4.5.2	
Signal Span	0 to 100 %			
Mounting				
Sampling Interval	0.014 sec	0.01 secs	File 299X700-071 Sec 4.4.1.2.1	Based on 1/(10*max freq.)
Resolution		12 bits minimum	File 299X700-071 Sec 4.6.1+4.6.2.4	

Component: <u>**Digital Trip Module**</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Sampling Interval	0.014 sec			Based on 1/(10*max freq). Actual response time needs may impose a more stringent requirement.
Mounting				
Resolution				
Command functions				
Signal Span	0 to 100%			
Signal rate of change	175 % per sec			
Frequency Range	7 Hz			
Analytical Limit	0 to 100%			
Electrical interface requirements				
Electrical connections				
Response Time	0 sec			Not realizable. More info needed.

Component: <u>**Tripl Logic Unit**</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Sampling Interval				
Response Time	0 sec	< 50 ms	23A1302 sec 2.1.2.13.1.2	The 50 msec requirement applies to the OLU and TLU together
Mounting				
Electrical connections				
Electrical interface requirements				
Signal Span				
Resolution				

Component: <u>**Output Logic Unit**</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Response Time	0	< 50 msec	23A1302 sec 2.1.2.13.1.2	The 50 msec requirement applies to the OLU and TLU together
Sampling Interval				
Electrical connections				
Signal Span				
Mounting				
Execute function				
Electrical interface requirements				

Component: **Trip Actuator**

Topic	Expected	Actual Requirements	GE Reference	Comments
Response Time	<< 4 sec			
Execute function				
Mounting				
Electrical interface requirements				
Signal Span				

Component: <u>Start-up Range Neutron</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Signal Span		3-5x10E5 cps	22A8477 - Table 3.4	
Signal rate of change				
Frequency Range				
Parameter location				
Sense element				
Electrical interface requirements		120 Vac (1E UPS)	22A8477 - Sec 2.8.1.1.0	
Electrical connections		Class 1E	22A8477 - Sec 2.4.2.5.3a	
Mounting		Fixed in core	23A6301 Sec 1.3.1	
Measurement errors		2% full scale	22A8477 - Sec 2.4.2.4.2a	
Response Time	<< 4 sec	< 1 micro seconds	22A8477 - Sec 2.4.2.4.2d	

Component: <u>Start-up Range Neutron</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Electrical connections				
Signal Span		10Khz - 10 Mhz	22A8477 - Sec 2.4.2.2.2	
Signal rate of change		0.1Sec	22A8477 - Sec 2.4.2.3.7c	
Electrical interface requirements				
Mounting				
Response Time		0.2 Sec	22A8477 - Sec 2.4.2.3.7e	
Frequency Range				

Component: <u>APRM detector</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Signal Span	0 to 140% RTP	2 to118% RTP	22A8477 - Table 3.6	
Electrical interface requirements				
Sense element				
Mounting				
Parameter location				
Frequency Range	2 Hz			
Measurement errors		2%	22A8477 - Table 3.6	
Response Time	<< 4 sec	< 0.04 sec	23A6301 Sec 4.4.5	
Electrical connections				
Signal rate of change	> 88 % RTP/sec			

Component: **APRM Preamplifier**

Topic	Expected	Actual Requirements	GE Reference	Comments
Electrical interface requirements				
Signal Span	0 to 140% RTP			
Signal rate of change	> 88% RTP/sec			
Frequency Range	2 Hz			
Response Time	<< 4 sec			
Electrical connections				
Mounting				

Component: <u>APRM Processor</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Resolution				
Response Time	<< 4 sec			
Frequency Range	2 Hz	0 to 10 kHz	23A6301 Sec. 4.4.1.3.2.a	
Electrical interface requirements				
Signal rate of change	>88 %RTP/sec			
Electrical connections				
Signal Span	0 to 140% RTP			
Mounting				
Sampling Interval	0.05 sec			Taken as 1/(10*max freq.)

Component: <u>Core Flow Sensor</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Signal Span	0 to 100% Flow			
Response Time	<< 4 sec			
Measurement errors				
Mounting				
Electrical connections				
Electrical interface requirements				
Sense element				
Parameter location				
Signal rate of change	12 % per sec			
Frequency Range				

Component: <u>**Steam Dome Pressure**</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Parameter location				
Signal Span		0 to 105.0 kg/sqcm	23A1302 Table 3.1	
Frequency Range				
Signal rate of change				
Response Time	<< 344 sec	0.5 sec	23A1302 Table 3.1	
Measurement errors				
Mounting				
Electrical connections				
Sense element		Pressure transmitter	23A1302 Sec 2.3.4.2.3.1	
Electrical interface requirements				

Component: <u>Reactor Water Level Sensor</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Electrical interface requirements				
Measurement errors				
Electrical connections				
Sense element		Differential pressure transmitter	23A1302 Sec 2.3.4.2.3.2	
Parameter location				
Frequency Range	7 Hz			
Signal rate of change	2 m/sec			
Signal Span	-2 to 1 m	-.069 to .1456 m	23A1302 Table 3.1	Level 3 transmitter only
Response Time	<< 4 sec	< = 1.0 secs	23A1302 Table 3.1	
Mounting				

Component: <u>MSIV Position Switch</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Signal Span	0 to 100%	0 to 100%	23A1302 Table 3.1	
Mounting		on the MSIVs	23A1302 Sec 2.3.4.2.3.4	
Parameter location		MSIVs		
Response Time	<< 4 sec	< 0.01 sec	23A1302 Table 3.1	
Electrical connections		Hard wired to DTM	23A1302 Sec 2.3.4.2.3.4	
Electrical interface requirements				
Sense element		Limit switch	23A1302 Sec 2.3.4.2.4	
Signal rate of change				

Component: <u>Drywell Pressure Sensor</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Response Time	<< 30 sec	0.6 sec	23A1302 Table 3.1	
Signal rate of change				
Frequency Range				
Parameter location				
Sense element		Pressure transmitter	23A1302 Sec 2.3.4.2.3.3	
Electrical interface requirements				
Electrical connections				
Signal Span		-0.35 to 0.35 kg/sqcm	23A1302 Table 3.1	
Measurement errors				
Mounting				

Component: **Turbine Stop Valve Position**

Topic	Expected	Actual Requirements	GE Reference	Comments
Electrical connections		Hard wired to DTM	23A1302 Sec 2.3.4.1.1	
Mounting		on TSV		
Signal Span	0 to 100%	0 to 100%	23A1302 Table 3.1	
Sense element		Limit switch	23A1302 Sec 2.3.4.1.1	
Parameter location		Mounted on TSV	23A1302 Sec 2.3.4.1.1	
Signal rate of change				
Electrical interface requirements				
Response Time	<< 4 sec	< 0.01 sec		

Component: <u>Turbine Control Valve Oil</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Frequency Range				
Parameter location		TCV emergencey trip system hudraulic fluid		
Signal rate of change				
Sense element		Pressure switch	23A1302 Sec 2.3.4.1.3	K6/K7 also includes TCV solenoid position that is in addition to the base GE design.
Electrical interface requirements				
Electrical connections		Hard wired to DTM		
Mounting		one switch mounted on each TCV	23A1302 Sec 2.3.4.1.3 a	
Signal Span		0 to 112 kg/sqcm	23A1302 Table 3.1	
Measurement errors				
Response Time	<< 4 sec	< 0.03 sec	23A1302 Table 3.1	

Component: **Suppression Pool Level**

Topic	Expected	Actual Requirements	GE Reference	Comments
Sense element				
Electrical interface requirements				
Parameter location				
Response Time	<< 4 sec			
Measurement errors				
Signal Span				
Mounting				
Frequency Range				
Signal rate of change	49 ¡C			
Electrical connections				

Component: **Main Steam Line Pressure**

Topic	Expected	Actual Requirements	GE Reference	Comments
Response Time				
Electrical connections				
Measurement errors				
Mounting				
Signal Span	-2 to 1 Mpa			
Signal rate of change	4 Mpa/sec			
Frequency Range	5 Hz			
Parameter location				
Sense element				
Electrical interface requirements				

Component: <u>Main Steam Line Flow</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Electrical connections				
Signal Span				
Response Time	0 sec			
Measurement errors				
Mounting				
Electrical interface requirements				
Parameter location				
Frequency Range				
Signal rate of change				
Sense element				

Component: <u>Condensor Vacuum Sensor</u>

Topic	Expected	Actual Requirements	GE Reference	Comments
Measurement errors				
Signal Span				
Mounting				
Electrical connections				
Electrical interface requirements				
Sense element				
Parameter location				
Frequency Range				
Signal rate of change				
Response Time	<< 28sec			

Appendix E: Component Internal Integrity Hazards

Component **APRM detector**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
NMS divisional average is incorrect	Random	Failure to trip at high power setpoint		Trip will occur late depending on magnitude of error

Component **APRM Preamplifier**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
NMS divisional average is incorrect	Random	Failure to trip at high power setpoint		Trip will occur late depending on magnitude of error

Component **APRM Processor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
NMS divisional average is incorrect	Random	Failure to trip at high power setpoint		Trip will occur late depending on magnitude of error

Component **Bypass Switches**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Fails to transfer from bypass	Random	Reduces the logic to one-of-one		Increases the probability of spurious initiation of ECCS

Component **Bypass Unit**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Fails to transfer from bypass	Random	Reduces the logic to one-of-one		Increases the probability of spurious initiation of ECCS

Component **Channel Manual Trip Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Condensate Storage Tank Level Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Condenser Vacuum Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Core Flow Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **CRD Water Header Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **CUW Area Temperature Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Single failure makes system inoperable	Random	Protection function is lost if one of the redundant system is under maintenance.		RCIC, HPCF B and C are considered one triply redundant systems

Component **CUW Differential Flow Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Single failure makes system inoperable	Random	Protection function is lost if one of the redundant system is under maintenance.		RCIC, HPCF B and C are considered one triply redundant systems

Component **Digital Trip Module**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Setpoint Drift	Common Mode	Failure to trip or initiate ESF		

Component **Division Manual Trip Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Division Trip Reset Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Drywell Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **HPCF Pump Discharge Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The HPCF sensors are not themselves quad redundant, but HPCF is a redundant and has RCIC as a backup. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Component **Main Steam Line Flow Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Main Steam Line Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Main Steam Tunnel Radiation Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Main Steam Tunnel Temperature Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Main Turbine Area Temperature Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Manual Scram Logic Unit (MLU)**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Manual Scram Reset Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Manual Scram Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **MSIV Position Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Multiplexer**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division I EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		EMS cannot initiate any protection System.RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from yhe control room

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division II EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		EMS cannot initiate any protection System.RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from yhe control room

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division III EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		EMS cannot initiate any protection System.RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from yhe control room

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division IV EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		Although the voters are reduced to 2/3, all protection system can be initiated.

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		

Component **Output Logic Unit**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	

Component **RCIC Equipment Area Temperature Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Sensor	Common Mode	Failure to trip or initiate ESF			The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Component **RCIC Steam Line Flow Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Sensor	Common Mode	Failure to trip or initiate ESF			The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Component **RCIC Steam Supply Line Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Sensor	Common Mode	Failure to trip or initiate ESF			The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Component **RCIC Turbine Exhaust Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The RCIC sensors are not themselves quad redundant, but RCIC is treated as redundant to HPCF B and C. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant sensor.

Component **Reactor Building / Fuel Handling Area Exhaust Radiation Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Reactor Mode Switch**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Fails to transfer	Random	Failure to trip on placing mode switch into shutdo		Only failure of transfer from run to shutdown has an safety impact. Failure to transfer between any other pair of states in unimportant

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of signal to one division	Random	Individual trip signals inhibited		

Component **Reactor Water Level Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Remote Multiplexer Unit**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division I EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		EMS cannot initiate any protection System.RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from yhe control room

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division II EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		EMS cannot initiate any protection System.RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from yhe control room

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division III EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		EMS cannot initiate any protection System.RPS and ESF TLU reduced to two out of three voters. Some systems could not be initiated automatically or manually from yhe control room

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division IV EMS failure not detected by other modules	Random	Loss of one signal for each quadruply redundant set of		Although the voters are reduced to 2/3, all protection system can be initiated.

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		
Loss of Cooling	Common Mode	Failure to trip or initiate ESF		
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		
Loss of DC Power	Common Mode	Failure to trip or initiate ESF		
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Maintenance or Test Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Manufacturing Error	Common Mode	Failure to trip or initiate ESF		
Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		
RMU Miscalibration	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		
Software Fault	Common Mode	Failure to trip or initiate ESF		

Component **RHR Area Temperature Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The RHR sensors are not themselves quad redundant, but there are three RHR systems. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Sensor	Common Mode	Failure to trip or initiate ESF			The RHR sensors are not themselves quad redundant, but there are three RHR systems. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant

Component **RHR Pump Discharge Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed	The RHR sensors are not themselves quad redundant, but there are three RHR systems. This redundancy together with the redundancy within RCIC makes the system less dependent upon sensor failure it is on failure of a single quad redundant

Component **Start-up Range Neutron Detector**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
NMS divisional average is incorrect	Random	Failure to trip at high power setpoint		Trip will occur late depending on magnitude of error

Component **Start-up Range Neutron Preamplifier**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
NMS divisional average is incorrect	Random	Failure to trip at high power setpoint		Trip will occur late depending on magnitude of error

Component **Steam Dome Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Suppression Pool Level Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Trip Actuator**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Trip Logic Unit**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division I ESF TLU 1 or 2 failure cannot be detected by other modules	Random	ESF systems controled solely by TLU cannot be automatically initiated.		TLU cannot initiate any protection system

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division I ESF TLU 3 or 4 failure cannot be detected by other modules	Random	ESF systems controled solely by TLU cannot be automatically initiated.		TLU cannot initiate any protection system

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division II ESF TLU 1 or 2 failure cannot be detected by other modules	Random	ESF systems controled solely by TLU cannot be automatically initiated.		TLU cannot initiate any protection system

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division II ESF TLU 3 or 4 failure cannot be detected by other modules	Random	ESF systems controled solely by TLU cannot be automatically initiated.		TLU cannot initiate any protection system

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division III ESF TLU 1 or 2 failure cannot be detected by other modules	Random	ESF systems controled solely by TLU cannot be automatically initiated.		TLU cannot initiate any protection system

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Division III ESF TLU 3 or 4 failure cannot be detected by other modules	Random	ESF systems controled solely by TLU cannot be automatically initiated.		TLU cannot initiate any protection system

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Component **Turbine Control Valve Oil Pressure Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Component **Turbine Stop Valve Position Sensor**

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Component not included in FMEA because failure of any one of the four redundant components will not affect initiation of the protection system or result in unwanted activationof the protection system, even in the presence of a single bypassed

Failure Mode:	Failure Type:	Failure Effect:	Failure Likelihood:	Notes:
Sensor	Common Mode	Failure to trip or initiate ESF		

Appendix F: Normal and Accident Environment Hazards

Component:	APRM detector
Location:	LPRM Detectors

Environment	*data*
Normal	
Tmax and Tmin:	0 °C to 0 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	0 % to 0 %
Radiation:	0 REM
Fluid, Chemical or Gas:	Reactor coolant
EMI and RFI:	
Notes:	
References	
Accident	
Duration:	8760 Hours
Temperature::	0 °C
Pressure:	0 kg/cm2 g
Humidity	0 %
Fluid, Chemical	None
Gamma Radiation:	0 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	None
Notes:	Neutron detector radiation requirements must be the same as functional requirements.
References	T3I-13, F12-3-13, T9.5-5

Component:	APRM Preamplifier
Location:	SC Instrument Rack Rooms

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	APRM Processor
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Bypass Switches
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T315, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T31-15,F12.3-54, T9.5-5

Component:	Bypass Unit
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T315, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T31-15,F12.3-54, T9.5-5

Component:	Channel Manual Trip Switch
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Condensate Storage Tank Level Sensor
Location:	SC General Floor Area

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, F12-3-14, T9.5-5

Component:	Condenser Vacuum Sensor
Location:	SC Instrument Rack Rooms

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	Core Flow Sensor
Location:	SC Instrument Rack Rooms

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	CRD Water Header Pressure
Location:	SC General Floor Area

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, F12-3-14, T9.5-5

Component:	CUW Area Temperature Sensor
Location:	SC General Floor Area

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, F12-3-14, T9.5-5

Component:	CUW Differential Flow Sensor
Location:	SC General Floor Area

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, F12-3-14, T9.5-5

Component:	Digital Trip Module
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T315, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Division Manual Trip Switch
Location:	CB Main Control Room

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Division Trip Reset Switch
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Drywell Pressure Sensor
Location:	SC Instrument Rack Rooms

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	HPCF Pump Discharge Pressure Sensor
Location:	SC HPCF Pump Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	Main Steam Line Flow Sensor
Location:	SC Instrument Rack Rooms

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	Main Steam Line Pressure Sensor
Location:	SC Instrument Rack Rooms

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	Main Steam Tunnel Radiation
Location:	SC Main Steam Tunnel Room

Environment	***data***
Normal	
Tmax and Tmin:	60 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-5 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	171 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products, Water
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-16, T9.5-5

Component:	Main Steam Tunnel Temperature Sensor
Location:	SC Main Steam Tunnel Room

Environment	*data*
Normal	
Tmax and Tmin:	60 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-5 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	171 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products, Water
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T3I-13, T3I-17, F12-3-16, T9.5-5

Component:	Main Turbine Area Temperature Sensor
Location:	SC Main Steam Tunnel Room

Environment	*data*
Normal	
Tmax and Tmin:	60 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-5 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	171 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products, Water
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T3I-13, T3I-17, F12-3-16, T9.5-5

Component:	Manual Scram Reset Switch
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Manual Scram Switch
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	MSIV Position Switch
Location:	SC Main Steam Tunnel Room

Environment	*data*
Normal	
Tmax and Tmin:	60 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-5 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	171 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products, Water
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-16, T9.5-5

Component:	Multiplexer
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Output Logic Unit
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T315, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T31-15,F12.3-54, T9.5-5

Component:	RCIC Equipment Area Temperature Sensor
Location:	SC RCIC Pump Room

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	142 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	RCIC Steam Line Flow Sensor
Location:	SC RCIC Pump Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	142 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	RCIC Steam Supply Line Pressure Sensor
Location:	SC RCIC Pump Room

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	142 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	RCIC Turbine Exhaust Pressure Sensor
Location:	SC RCIC Pump Room

Environment	*data*

Normal

Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life

Accident

Duration:	8760 Hours
Temperature::	142 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	Reactor Building / Fuel Handling Area Exhaust Radiation Sensor
Location:	SC General Floor Area

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, F12-3-14, T9.5-5

Component:	Reactor Mode Switch
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T315, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T31-15,F12.3-54, T9.5-5

Component:	Reactor Water Level Sensor
Location:	SC Instrument Rack Rooms

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	Remote Multiplexer Unit
Location:	SC RCIC Pump Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	142 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C equipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	RHR Area Temperature Sensor
Location:	SC HPCF Pump Room

Environment *data*

Normal

Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3 (assumed as same as for general floor area), Rad calcuated from F12.3-1 assuming 60 yr life

Accident

Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	RHR Pump Discharge Pressure Sensor
Location:	SC HPCF Pump Room

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313 (assumed as same as for general floor area). Rad calcuated from F12.3-1 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	Start-up Range Neutron Detector
Location:	LPRM Detectors

Environment	*data*
Normal	
Tmax and Tmin:	0 °C to 0 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	0 % to 0 %
Radiation:	0 REM
Fluid, Chemical or Gas:	Reactor coolant
EMI and RFI:	
Notes:	
References	
Accident	
Duration:	8760 Hours
Temperature::	0 °C
Pressure:	0 kg/cm2 g
Humidity	0 %
Fluid, Chemical	None
Gamma Radiation:	0 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	None
Notes:	Neutron detector radiation requirements must be the same as functional requirements.
References	T31-13, F12-3-13, T9.5-5

Component:	Start-up Range Neutron Preamplifier
Location:	SC Instrument Rack Rooms

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T31-13, T31-17, F12-3-12, T9.5-5

Component:	Steam Dome Pressure Sensor
Location:	SC Instrument Rack Rooms

Environment	*data*

Normal

Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-3 assuming 60 yr life

Accident

Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	Suppression Pool Level Sensor
Location:	SC Instrument Rack Rooms

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	3000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-3 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	120 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat, Combustion Products
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.
References	T3I-13, T3I-17, F12-3-12, T9.5-5

Component:	Trip Actuator
Location:	CB Main Control Room

Environment	***data***
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Trip Logic Unit
Location:	CB Main Control Room

Environment	*data*
Normal	
Tmax and Tmin:	40 °C to 5 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	300 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I5, Rad calcuated from F12.3-46 and 47 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	50 °C
Pressure:	0 kg/cm2 g
Humidity	90 %
Fluid, Chemical	None
Gamma Radiation:	2190 REM
Beta Radiation	0 REM
Mechanical:	None
Fire:	Heat
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event.
References	T3I-15,F12.3-54, T9.5-5

Component:	Turbine Control Valve Oil Pressure Sensor
Location:	SC Main Steam Tunnel Room

Environment	*data*
Normal	
Tmax and Tmin:	60 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T313, Rad calcuated from F12.3-5 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	171 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products, Water
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T31-13, T31-17, F12-3-16, T9.5-5

Component:	Turbine Stop Valve Position Sensor
Location:	SC Main Steam Tunnel Room

Environment	*data*
Normal	
Tmax and Tmin:	60 °C to 10 °C
Pressure:	0 kg/cm2 g
Hmax and Hmin:	90 % to 10 %
Radiation:	53000 REM
Fluid, Chemical or Gas:	None
EMI and RFI:	
Notes:	No information on chemical environment. Assume none
References	T, P, H T3I3, Rad calcuated from F12.3-5 assuming 60 yr life
Accident	
Duration:	8760 Hours
Temperature::	171 °C
Pressure:	1 kg/cm2 g
Humidity	100 %
Fluid, Chemical	None
Gamma Radiation:	21900 REM
Beta Radiation	0 REM
Mechanical:	Pipe Whip & Jet Impingement
Fire:	Heat, Combustion Products, Water
Notes:	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed
References	T3I-13, T3I-17, F12-3-16, T9.5-5

Appendix G: Component Natural Phenomena Hazards

Component : **Remote Multiplexer Unit**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Multiplexer**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Digital Trip Module**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Trip Logic Unit**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Bypass Unit**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Output Logic Unit**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Trip Actuator**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Manual Scram Logic Unit (MLU)**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Manual Scram Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Reactor Mode Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Manual Scram Reset Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Division Manual Trip Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Division Trip Reset Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Bypass Switches**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Channel Manual Trip Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Start-up Range Neutron Detector**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	1.5	Unknown	No	

Component : **Start-up Range Neutron Preamplifier**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **APRM detector**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Wall	1.5	Unknown	No	

Component : **APRM Preamplifier**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **APRM Processor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
CB Floor	7.9	Fig 3G.5-14, Fig 3G.5-12	Yes	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Component : **Core Flow Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Steam Dome Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Reactor Water Level Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **MSIV Position Switch**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Wall	18.1	Fig 3G.4-19, Fig 3G.4-8	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Drywell Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **CRD Water Header Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Turbine Stop Valve Position Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	18.1	Fig 3G.4-19, Fig 3G.4-8	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Turbine Control Valve Oil Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	18.1	Fig 3G.4-19, Fig 3G.4-8	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Main Steam Tunnel Radiation Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	18.1	Fig 3G.4-19, Fig 3G.4-8	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Condensate Storage Tank Level Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
Outside	12.3	Unknown	No	

Component : **Suppression Pool Level Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Main Steam Line Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Main Steam Line Flow Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Condenser Vacuum Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Main Steam Tunnel Temperature Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	18.1	Fig 3G.4-19, Fig 3G.4-8	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Main Turbine Area Temperature Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	18.1	Fig 3G.4-19, Fig 3G.4-8	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **Reactor Building / Fuel Handling Area Exhaust Radiation Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
RB Wall	31.7	Unknown	No	

Component : **RCIC Steam Line Flow Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **RCIC Steam Supply Line Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **RCIC Equipment Area Temperature Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **RHR Area Temperature Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **CUW Differential Flow Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **CUW Area Temperature Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	4.8	Fig 3G.4-7, Fig 3G.4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **RHR Pump Discharge Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **HPCF Pump Discharge Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Component : **RCIC Turbine Exhaust Pressure Sensor**

Building:	Elevation:	Seismic Spectra:	Flood:	Notes:
SC Floor	8.2	Fig 3G.4-20, Fig 3G4-9	No	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different. Values are taken for the calculated elevation nearest to but above the actual elevation of interest. This should produce a conservative result as multiplication factors increase as the elevation

Appendix H: Component Process Hazards

Component : **Remote Multiplexer Unit**

Location: SC RCIC Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Multiplexer**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Digital Trip Module**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Trip Logic Unit**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Bypass Unit**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Output Logic Unit**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Trip Actuator**

Location:	CB Main Control Room
elevation:	CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Manual Scram Logic Unit (MLU)**

Location:	CB 7900 (1.2-19)
elevation:	CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Manual Scram Switch**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Reactor Mode Switch**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Manual Scram Reset Switch**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Division Manual Trip Switch**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Pr	Chem Proc:	Notes:
No Process Connection						

Component : **Division Trip Reset Switch**

Location:	CB Main Control Room
elevation:	CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Bypass Switches**

Location:	CB Main Control Room
elevation:	CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Channel Manual Trip Switch**

Location: CB Main Control Room

elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Start-up Range Neutron Detector**

Location: LPRM Detectors

elevation: RB 1750(1.2-3b)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **Start-up Range Neutron Preamplifier**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **APRM detector**

Location: LPRM Detectors

elevation: RB 1750(1.2-3b)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **APRM Preamplifier**

Location: SC Instrument Rack Rooms
elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **APRM Processor**

Location: CB Main Control Room
elevation: CB 7900 (1.2-19)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Core Flow Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **Steam Dome Pressure Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **Reactor Water Level Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **MSIV Position Switch**

Location: SC Main Steam Tunnel Room

elevation: RB 12300(1.2-8)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Drywell Pressure Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Drywell Atmosphere				46		Pressure in kg/cm2 - 23A1302 table 3.1(2). Radiaton= person-Rem/yr

Component : **CRD Water Header Pressure Sensor**

Location: SC General Floor Area

elevation: RB 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
CRD Water	66		190		See note	Chemistry information available in the ref.

Component : **Turbine Stop Valve Position Sensor**

Location: SC Main Steam Tunnel Room

elevation: RB 12300(1.2-8)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Turbine Control Valve Oil Pressure Sensor**

Location: SC Main Steam Tunnel Room

elevation: RB 12300(1.2-8)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
TCV Hydraluic Fluid						No information available in FSAR

Component : **Main Steam Tunnel Radiation Sensor**

Location: SC Main Steam Tunnel Room

elevation: RB 12300(1.2-8)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
No Process Connection						

Component : **Condensate Storage Tank Level Sensor**

Location: SC General Floor Area

elevation: Out 12300 (1.2-25)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Condensate	157				See note	Temperature in C.Value is Design value. Chemistry information available in the ref.

Component : **Suppression Pool Level Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Main Steam	316		88			Pressure in Kgf/cm2 and temperature in C.Values are Design values

Component : **Main Steam Line Pressure Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Main Steam	316		88			Pressure in Kgf/cm2 and temperature in C.Values are Design values

Component : **Main Steam Line Flow Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Main Steam	316		88			Pressure in Kgf/cm2 and temperature in C.Values are Design values

Component : **Condenser Vacuum Sensor**

Location: SC Instrument Rack Rooms

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Condensor Vapor	316					

Component : **Main Steam Tunnel Temperature Sensor**

Location: SC Main Steam Tunnel Room

elevation: RB 12300(1.2-8)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Main Steam Tunnel						

Component : **Main Turbine Area Temperature Sensor**

Location: SC Main Steam Tunnel Room

elevation: RB 12300(1.2-8)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Main Steam Tunnel						

Component : **Reactor Building / Fuel Handling Area Exhaust Radiation Sensor**

Location: SC General Floor Area

elevation: RB 31700 (1.2-2)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Building				14		Radiaton= person-Rem/yr

Component : **RCIC Steam Line Flow Sensor**

Location: SC RCIC Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
RCIC Drive Steam	316		83			Pressure in Kgf/cm2 (minimum at high pressure condition)

Component : **RCIC Steam Supply Line Pressure Sensor**

Location: SC RCIC Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
RCIC Drive Steam	316		83			Pressure in Kgf/cm2 (minimum at high pressure condition)

Component : **RCIC Equipment Area Temperature Sensor**

Location: SC RCIC Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Building				14		Radiaton= person-Rem/yr

Component : **RHR Area Temperature Sensor**

Location: SC HPCF Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Building				14		Radiaton= person-Rem/yr

Component : **CUW Differential Flow Sensor**

Location: SC General Floor Area

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
CUW	276		78			Pressure in Kgf/cm2 and temperature in C. Design values for normal operartion.

Component : **CUW Area Temperature Sensor**

Location: SC General Floor Area

elevation: RB 4800 (1.2-6)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Building				14		Radiaton= person-Rem/yr

Component : **RHR Pump Discharge Pressure Sensor**

Location: SC HPCF Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **HPCF Pump Discharge Pressure Sensor**

Location: SC HPCF Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
Reactor Coolant	278				See note	Temperature in C. Chemistry information available in the ref.

Component : **RCIC Turbine Exhaust Pressure Sensor**

Location: SC RCIC Pump Room

elevation: RB - 8200 (1.2-4)

Process	Tmax Proc:	Tmin Proc:	P Proc:	Rad Proc:	Chem Proc:	Notes:
RCIC Drive Steam	316		83			Pressure in Kgf/cm2 (minimum at high pressure condition)

Appendix I: Component Power Supply Hazards

Component
Remote Multiplexer Unit

Voltage (V)		Frequency		Power Quality
Max	132	Max	62	Conducted EMI
Min	108	Min	58	Transients
				Harmonic Distortion

Power Source
1E Inverters

Air		References	Notes
Pressure kg/sqcm		8.3.1.1.4.1	
Max	0		
Min	0		
Purity			

Component
Multiplexer

Voltage (V)		Frequency		Power Quality
Max	132	Max	62	Conducted EMI
Min	108	Min	58	Transients
				Harmonic Distortion

Power Source
1E Inverters

Air		References	Notes
Pressure kg/sqcm		8.3.1.1.4.1	
Max	0		
Min	0		
Purity			

Component
Digital Trip Module

Voltage (V)		Frequency		Power Quality
Max	132	Max	62	Conducted EMI
Min	108	Min	58	Transients
				Harmonic Distortion

Power Source
1E Inverters

Air		References	Notes
Pressure kg/sqcm		8.3.1.1.4.1	
Max	0		
Min	0		
Purity			

Component						**Power Source**			
Trip Logic Unit						1E Inverters			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	132	Max	62	Conducted EMI		Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component						**Power Source**			
Bypass Unit						1E Inverters			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	132	Max	62	Conducted EMI		Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component						**Power Source**			
Output Logic Unit						1E Inverters			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	132	Max	62	Conducted EMI		Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component					Power Source			
Trip Actuator					1E Inverters			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	132	Max	62	Conducted EMI	Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
Manual Scram Logic Unit (MLU)					1E Inverters			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	132	Max	62	Conducted EMI	Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
Manual Scram Switch					1E Inverters			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	132	Max	62	Conducted EMI	Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
Reactor Mode Switch					Not Powered			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			Not applicable
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
Manual Scram Reset Switch					Not Powered			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			Not applicable
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
Division Manual Trip Switch					Not Powered			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			Not applicable
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component
Division Trip Reset Switch

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Not Powered

Air		References	Notes
Pressure kg/sqcm			Not applicable
Max	0		
Min	0		
Purity			

Component
Bypass Switches

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Not Powered

Air		References	Notes
Pressure kg/sqcm			Not applicable
Max	0		
Min	0		
Purity			

Component
Channel Manual Trip Switch

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Not Powered

Air		References	Notes
Pressure kg/sqcm			Not applicable
Max	0		
Min	0		
Purity			

Component					Power Source			
Start-up Range Neutron Detector					Not Powered			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			Not applicable
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
Start-up Range Neutron Preamplifier					1E Inverters			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	132	Max	62	Conducted EMI	Pressure kg/sqcm		8.3.1.1.4.1	
Min	108	Min	58	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
APRM detector					LPRM High Voltage			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component
APRM Preamplifier

Voltage (V)		Frequency		Power Quality
Max	132	Max	62	Conducted EMI
Min	108	Min	58	Transients
				Harmonic Distortion

Power Source
IE Inverters

Air		References	Notes
Pressure kg/sqcm		8.3.1.1.4.1	
Max	0		
Min	0		
Purity			

Component
APRM Processor

Voltage (V)		Frequency		Power Quality
Max	132	Max	62	Conducted EMI
Min	108	Min	58	Transients
				Harmonic Distortion

Power Source
IE Inverters

Air		References	Notes
Pressure kg/sqcm		8.3.1.1.4.1	
Max	0		
Min	0		
Purity			

Component
Core Flow Sensor

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Instrument Loop Power Supply

Air		References	Notes
Pressure kg/sqcm			No information available in SAR
Max	0		
Min	0		
Purity			

Component						Power Source		
Steam Dome Pressure Sensor						Instrument Loop Power Supply		
Voltage (V)		Frequency		Power Quality		Air	References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm		No information available in SAR
Min	0	Min	0	Transients		Max 0		
				Harmonic Distortion		Min 0		
						Purity		

Component						Power Source		
Reactor Water Level Sensor						Instrument Loop Power Supply		
Voltage (V)		Frequency		Power Quality		Air	References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm		No information available in SAR
Min	0	Min	0	Transients		Max 0		
				Harmonic Distortion		Min 0		
						Purity		

Component						Power Source		
MSIV Position Switch						Not Powered		
Voltage (V)		Frequency		Power Quality		Air	References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm		Not applicable
Min	0	Min	0	Transients		Max 0		
				Harmonic Distortion		Min 0		
						Purity		

Component						Power Source			
Drywell Pressure Sensor						Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component						Power Source			
CRD Water Header Pressure Sensor						Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component						Power Source			
Turbine Stop Valve Position Sensor						Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component				Power Source			
Turbine Control Valve Oil Pressure Sensor				Instrument Loop Power Supply			
Voltage (V)		Frequency	Power Quality	Air		References	Notes
Max	0	Max 0	Conducted EMI	Pressure kg/sqcm			No information available in SAR
Min	0	Min 0	Transients	Max	0		
			Harmonic Distortion	Min	0		
				Purity			

Component				Power Source			
Main Steam Tunnel Radiation Sensor				Instrument Loop Power Supply			
Voltage (V)		Frequency	Power Quality	Air		References	Notes
Max	0	Max 0	Conducted EMI	Pressure kg/sqcm			No information available in SAR
Min	0	Min 0	Transients	Max	0		
			Harmonic Distortion	Min	0		
				Purity			

Component				Power Source			
Condensate Storage Tank Level Sensor				Instrument Loop Power Supply			
Voltage (V)		Frequency	Power Quality	Air		References	Notes
Max	0	Max 0	Conducted EMI	Pressure kg/sqcm			No information available in SAR
Min	0	Min 0	Transients	Max	0		
			Harmonic Distortion	Min	0		
				Purity			

Component						Power Source		
Suppression Pool Level Sensor						Instrument Loop Power Supply		
Voltage (V)		Frequency		Power Quality		Air	References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm		No information available in SAR
Min	0	Min	0	Transients		Max 0		
				Harmonic Distortion		Min 0		
						Purity		

Component						Power Source		
Main Steam Line Pressure Sensor						Instrument Loop Power Supply		
Voltage (V)		Frequency		Power Quality		Air	References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm		No information available in SAR
Min	0	Min	0	Transients		Max 0		
				Harmonic Distortion		Min 0		
						Purity		

Component						Power Source		
Main Steam Line Flow Sensor						Instrument Loop Power Supply		
Voltage (V)		Frequency		Power Quality		Air	References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm		No information available in SAR
Min	0	Min	0	Transients		Max 0		
				Harmonic Distortion		Min 0		
						Purity		

Component						Power Source			
Condenser Vacuum Sensor						Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component						Power Source			
Reactor Building / Fuel Handling Area Exhaust Radiation Sensor						Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component						Power Source			
RCIC Steam Line Flow Sensor						Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality		Air		References	Notes
Max	0	Max	0	Conducted EMI		Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients		Max	0		
				Harmonic Distortion		Min	0		
						Purity			

Component
RCIC Steam Supply Line Pressure Sensor

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Instrument Loop Power Supply

Air
Pressure kg/sqcm
Max 0
Min 0
Purity

References

Notes
No information available in SAR

Component
CUW Differential Flow Sensor

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Instrument Loop Power Supply

Air
Pressure kg/sqcm
Max 0
Min 0
Purity

References

Notes
No information available in SAR

Component
CUW Area Temperature Sensor

Voltage (V)		Frequency		Power Quality
Max	0	Max	0	Conducted EMI
Min	0	Min	0	Transients
				Harmonic Distortion

Power Source
Instrument Loop Power Supply

Air
Pressure kg/sqcm
Max 0
Min 0
Purity

References

Notes
No information available in SAR

Component					Power Source			
HPCF Pump Discharge Pressure Sensor					Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Component					Power Source			
RCIC Turbine Exhaust Pressure Sensor					Instrument Loop Power Supply			
Voltage (V)		Frequency		Power Quality	Air		References	Notes
Max	0	Max	0	Conducted EMI	Pressure kg/sqcm			No information available in SAR
Min	0	Min	0	Transients	Max	0		
				Harmonic Distortion	Min	0		
					Purity			

Appendix J: Internal Hazard Strategies, Requirements, and Comparison with Specifications

APRM detector

Failure Mode	Integrity Strategy (Requirements Topic) Expected Requirement	Actual requirement	Reference	Notes
NMS divisional average is incorrect	Failure Detection			
Random	Out of range annunciation	Upscale and down scale alarms shall be provided	22A8477 sec 2.4.4.3.1	
NMS divisional average is incorrect	Diversity			
Random or Common Mode	Trips from other than NMS	Core Flow Rapid Coastdown Trip unit actuates when the reactor core average power is more than 80% of		

APRM Preamplifier

Failure Mode	Integrity Strategy (Requirements Topic) Expected Requirement	Actual requirement	Reference	Notes
NMS divisional average is incorrect	Failure Detection			
Random	Out of range annunciation	Upscale and down scale alarms shall be provided	22A8477 sec 2.4.4.3.1	
NMS divisional average is incorrect	Diversity			
Random or Common Mode	Trips from other than NMS	Core Flow Rapid Coastdown Trip unit actuates when the reactor core average power is more than 80% of		

APRM Processor

Failure Mode	Integrity Strategy (Requirements Topic) Expected Requirement	Actual requirement	Reference	Notes
NMS divisional average is incorrect	Diversity			
Random or Common Mode	Trips from other than NMS	Core Flow Rapid Coastdown Trip unit actuates when the reactor core average power is more than 80% of		

NMS divisional average is incorrect	Process Quality			
Random	Software Engineering	The self test application program should be ablr to detect failures in the microprocessor system and respond with a diagnosis	22A8477 sec 2.4.4.2.7d	
NMS divisional average is incorrect	Failure Detection			
Random	Out of range annunciation	Upscale and down scale alarms shall be provided		

Bypass Switches

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Fails to transfer from bypass	Inherently safe design			
Random	Prevention of placing more than one division in bypass.	Interlock to prevent bypassing more than one division at at time.	23A1317 sec 2.2.5.1.c	
Fails to transfer from bypass	Failure Detection			
Random	Annunciation of bypass	Bypass status indicated to operator	23A1317 sec 2.2.5.1.c	

Bypass Unit

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Fails to transfer from bypass	Failure Detection			
Random	Annunciation of bypass	Bypass status indicated to operator	23A1317 sec 2.2.5.1.c	
Fails to transfer from bypass	Inherently safe design			
Random	Prevention of placing more than one division in bypass.	Interlock to prevent bypassing more than one division at at time.	23A1317 sec 2.2.5.1.c	

Channel Manual Trip Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Random				

Condensate Storage Tank Level

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

Condenser Vacuum Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

Core Flow Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes

Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

CRD Water Header Pressure Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

CUW Area Temperature Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Single failure makes system inoperable	Procedures			
Random	Limits (e.g., tech specs) on disabling redundant systems			

Single failure makes system inoperable	Redundancy
Random	Redundant system

CUW Differential Flow Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Single failure makes system inoperable	Procedures			
Random	Limits (e.g., tech specs) on disabling redundant systems			
Single failure makes system inoperable	Redundancy			
Random	Redundant system			

Digital Trip Module

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Setpoint Drift	Inherently safe design			
Common Mode	Digitally programmed and stored setpoints - imune to drift			

Division Manual Trip Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes

Not Applicable
Not Applicable

Division Trip Reset Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Drywell Pressure Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

HPCF Pump Discharge Pressure

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Main Steam Line Flow Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Main Steam Line Pressure Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Main Steam Tunnel Radiation Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Failure Mode	Expected Requirement	Actual requirement	Reference	Notes
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Main Steam Tunnel Temperature

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Main Turbine Area Temperature

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

Manual Scram Logic Unit (MLU)

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes

Not Applicable
Not Applicable

Manual Scram Reset Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Manual Scram Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

MSIV Position Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Multiplexer

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Division I EMS failure not detected by other modules	Failure Detection			
Random	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a	
Maintenance or Test Error	Failure Detection			
Common Mode	Self test	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a	
Maintenance or Test Error	Failure Detection			
Common Mode	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a	
Maintenance or Test Error	Procedures			
Common Mode	Prohibitions against same technician working on redundant divisions.			
Maintenance or Test Error	Inherently safe design			
Common Mode	Prevention of simultaneous mutiple division bypass	Interlock to prevent bypassing more than one division at at time.	23A1317 sec 2.2.5.1.c	
Manufacturing Error	Process Quality			
Common Mode	Automated manufacture and multiple tests at successive levels of			

Manufacturing Error Common Mode	Burn-in Burn-in of final product			
RMU Miscalibration Common Mode	Procedures Cross-channel check of calibration			
RMU Miscalibration Common Mode	Design for maintainability A/D calibration is automated	Digital, microprocessor-controlled, SSLC circuitry does not require calibration. Analog inputs will be calibrated one division at a time	23A1317 sec 2.2.6a	
Software Fault Common Mode	Process Quality Software eingineering	Program response for all detected failure. Process inputs, including ranges, accuracies, sampling intervals, and cpnversion of input signals into engineering unit values.	23A1317 sec 2.7.2 a,g	
Software Fault Common Mode	Diversity Diverse protection system and manual displays and controls			
Software Fault Common Mode	Procedures Root cause investigation of failures			

Output Logic Unit

Failure Mode	Integrity Strategy (Requirements Topic) Expected Requirement	Actual requirement	Reference	Notes
Not Applicable Not Applicable				

RCIC Equipment Area Temperature

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

RCIC Steam Line Flow Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

RCIC Steam Supply Line Pressure

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

RCIC Turbine Exhaust Pressure Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Reactor Building / Fuel Handling Area

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

Reactor Mode Switch

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Fails to transfer	Diversity			
Random	Manual trip capable from other than mode switch			
Loss of signal to one division	Redundancy			
Random	Redundant signals from mode switch			

Reactor Water Level Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes

Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Remote Multiplexer Unit

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Division I EMS failure not detected by other modules	Failure Detection			
Random	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a	
Division II EMS failure not detected by other modules	Failure Detection			
Random	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a	
Division III EMS failure not detected by other modules	Failure Detection			
Random	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a	

Division IV EMS failure not detected by other modules	Failure Detection		
Random	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a
Loss of Cooling	Physical Independence		
Common Mode	Redundant divisions served by independent cooling systems		
Loss of DC Power	Redundancy		
Common Mode	Separate power supplies for each division	Redundant Low voltage DC power supply should be provided. Failure of supply should be annunciated to the operator.	23A1317 sec 2.3.5.1 and 2
Maintenance or Test Error	Inherently safe design		
Common Mode	Prevention of simultaneous mutiple division bypass	Interlock to prevent bypassing more than one division at at time.	23A1317 sec 2.2.5.1.c
Maintenance or Test Error	Failure Detection		
Common Mode	Self test	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a
Maintenance or Test Error	Failure Detection		
Common Mode	Surveillance testing	Testing shall be by test pattern generation of simulated normal and abnormal input signals to the TLU or SLU, either by automatic or manual means.	23A1317 sec 2.6.2.1a
Maintenance or Test Error	Failure Detection		
Common Mode	Surveillance testing		

Maintenance or Test Error Common Mode	Procedures Prohibitions against same technician working on redundant divisions.			Requirements would be in procedures, not equipment specifications. Procedures were not available for review.
Manufacturing Error Common Mode	Process Quality Automated manufacture and multiple tests at successive levels of			
Manufacturing Error Common Mode	Burn-in Burn-in of final product			
RMU Miscalibration Common Mode	Design for maintainability A/D calibration is automated	Digital, microprocessor-controlled, SSLC circuitry does not require calibration. Analog inputs will be calibrated one division at a time	23A1317 sec 2.2.6a	
RMU Miscalibration Common Mode	Procedures Cross-channel check of calibration	Digital, microprocessor-controlled, SSLC circuitry does not require calibration. Analog inputs will be calibrated one division at a time	23A1317 sec 2.2.6a,b	
Software Fault Common Mode	Diversity Diverse protection system and manual displays and controls			
Software Fault Common Mode	Process Quality Software eingineering	Program response for all detected failure. Process inputs, including ranges, accuracies, sampling intervals, and cpnversion of input signals into engineering unit values.	23A1317 sec 2.7.2 a,g	

Software Fault	Procedures
Common Mode	Root cause investigation of failures

RHR Area Temperature Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable Not Applicable				
Sensor Miscalibration Common Mode	Diversity Signal diversity			

RHR Pump Discharge Pressure Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable Not Applicable				

Start-up Range Neutron Detector

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
NMS divisional average is incorrect Random	Failure Detection Out of range annunciation	Upscale and down scale alarms and trip signal shall be provided	22A8477 sec 2.4.2.8.1	
NMS divisional average is incorrect Random	Process Quality Software Engineering	Not found		

NMS divisional average is incorrect	Diversity			
Random or Common Mode	Trips from other than NMS	When the MODE switch is in RUN, SRNM trip is not activated.	22A8477 sec 2.4.2.8.2	

Start-up Range Neutron Preamplifier

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
NMS divisional average is incorrect	Diversity			
Random or Common Mode	Trips from other than NMS	When the MODE switch is in RUN, SRNM trip is not activated.	22A8477 sec 2.4.2.8.2	
NMS divisional average is incorrect	Failure Detection			
Random	Out of range annunciation	Upscale and down scale alarms and trip signal shall be provided	22A8477 sec 2.4.2.8.1	
NMS divisional average is incorrect	Process Quality			
Random	Software Engineering	Not found		

Steam Dome Pressure Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Suppression Pool Level Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity			

Trip Actuator

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Trip Logic Unit

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Division I ESF TLU 1 or 2 failure cannot be detected by other	Failure Detection			
Random	Surveillance testing	Surveillance test for coincident 2-out-of-4 trip logic shall verify each combination of trip conditions for each set of input scram variable in the RPS trip channel. This test should be performed at least each outage	23A1302 sec 2.6.1.5	

Division I ESF TLU 3 or 4 failure cannot be detected by other	Failure Detection		
Random	Surveillance testing	Surveillance test for coincident 2-out-of-4 trip logic shall verify each combination of trip conditions for each set of input scram variable in the RPS trip channel. This test should be performed at least each outage	23A1302 sec 2.6.1.5
Division II ESF TLU 1 or 2 failure cannot be detected by other	Failure Detection		
Random	Surveillance testing	Surveillance test for coincident 2-out-of-4 trip logic shall verify each combination of trip conditions for each set of input scram variable in the RPS trip channel. This test should be performed at least each outage	23A1302 sec 2.6.1.5
Division II ESF TLU 3 or 4 failure cannot be detected by other	Failure Detection		
Random	Surveillance testing	Surveillance test for coincident 2-out-of-4 trip logic shall verify each combination of trip conditions for each set of input scram variable in the RPS trip channel. This test should be performed at least each outage	23A1302 sec 2.6.1.5
Division III ESF TLU 1 or 2 failure cannot be detected by other	Failure Detection		
Random	Surveillance testing	Surveillance test for coincident 2-out-of-4 trip logic shall verify each combination of trip conditions for each set of input scram variable in the RPS trip channel. This test should be performed at least each outage	23A1302 sec 2.6.1.5

Division III ESF TLU 3 or 4 failure cannot be detected by other	Failure Detection			
Random	Surveillance testing	Surveillance test for coincident 2-out-of-4 trip logic shall verify each combination of trip conditions for each set of input scram variable in the RPS trip channel. This test should be performed at least each outage	23A1302 sec 2.6.1.5	
Not Applicable				
Not Applicable				

Turbine Control Valve Oil Pressure

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				
Sensor Miscalibration	Diversity			
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2	

Turbine Stop Valve Position Sensor

Failure Mode	Integrity Strategy (Requirements Topic)			
	Expected Requirement	Actual requirement	Reference	Notes
Not Applicable				
Not Applicable				

Sensor Miscalibration	Diversity		
Common Mode	Signal diversity	RPS does not have diversity for sensors. One channel bypass is assumed and 2 out of 3 channel signal system logic is assumed. Only one sensor at a time can be bypassed.	23A1302 sec 2.1.1.3a/ 2.3.4.2

Appendix K: Normal Environment Strategies, Requirements, & Comparison with Specifications

Note the following abbreviations used in this appendix.

Rad Norm	Normal radiation environment total integrated dose (Rad)
Vf Min	Minimum frequency of normal vibration (Hz)
Vf Max	Maximum frequency of normal vibration (Hz)
Vacc	Maximum normal vibration amplitude (g)
Hmax Norm	Maximum normal humidity (%RH)
Tmax Norm	Maximum normal temperature (°C)
Tmin NOrm	Maximum normal temperature (°C)
Chem Norm	Normal chemical environment
EMI Norm	Normal electromagenetic environment
P Norm	Normal pressure (kg/cm^2)
CofC	Certificate of conformance

APRM detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Rad Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Hmax Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmax Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Hmin Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Chem Norm	Reactor coolant	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available

Vacc	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	Only references are available
P Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmin Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	Only references are available

APRM Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available

Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	No information on chemical environment. Assume none	Only references are available
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg		Only references are available

APRM Processor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Chem Norm	None	Environmental Qualification Specification of the expected nonnal énvironment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	No information on chemical environment. Assume none	Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg		Only references are available

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	Only references are available

Bypass Switches

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Bypass Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Channel Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Condensate Storage Tank Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Condenser Vacuum Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Core Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

CRD Water Header Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

CUW Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

CUW Differential Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Digital Trip Module

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Division Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Division Trip Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Drywell Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

HPCF Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Tunnel Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	60	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Tunnel Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	60	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Turbine Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	60	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Manual Scram Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Manual Scram Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

MSIV Position Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmax Norm	60	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Multiplexer

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-I,e (H23-4010)	No information on chemical environment. Assume none	Only references are available
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-I,e (H23-4010)		Only references are available
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-I,e (H23-4010)		Only references are available
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	10	299X700-071-4.5.1.1.3a		References are given in section 2.2
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-I,e (H23-4010)		Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-I,e (H23-4010)		Only references are available
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	60	299X700-071-4.5.1.1.3b		References are given in section 2.2
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	10	299X700-071-4.5.1.1.3b		References are given in section 2.2

Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-l,e (H23-4010)	Only references are available
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-l,e (H23-4010)	Only references are available
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	40	299X700-071-4.5.1.1.3a	References are given in section 2.2

Output Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Equipment Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Steam Supply Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Turbine Exhaust Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Reactor Building / Fuel Handling Area Exhaust Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Reactor Mode Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Reactor Water Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302,. A30-3030, .		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Remote Multiplexer Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	90	299X700-071- 4.5.1.2.7b		References are given in section 2.2
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	10	299X700-071- 4.5.1.2.7a		References are given in section 2.2
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-l,e (H23-4010)		Only references are available
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	10	299X700-071- 4.5.1.2.7b		References are given in section 2.2
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	40	299X700-071- 4.5.1.2.7a		References are given in section 2.2
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	2000	299X700-070- 4.5.1.2.8d		References are given in section 2.2
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-l,e (H23-4010)	No information on chemical environment. Assume none	Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A5761-2.1.2-l,e (H23-4010)		Only references are available

Vacc	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A5761-2.1.2-I,e (H23-4010)	Only references are available
P Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A5761-2.1.2-I,e (H23-4010)	Only references are available
Vf Max	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A5761-2.1.2-I,e (H23-4010)	Only references are available

RHR Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RHR Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Start-up Range Neutron Detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmax Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	302 C	22A8477-2.4.2.10 e	Ambient Temperature
Tmin Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	1.033 Kg/cm2 abs	22A8477-2.4.2.10 h	Operating pressure
Hmax Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Chem Norm	Reactor coolant	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available

Vf Min	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Rad Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	8E8 R/h (Gamma)	22A8477-2.4.2.10 b	Gamma Flux-Operating
Hmin Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available

Start-up Range Neutron Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		22A8477-1.5.2-a,c, m,ee,gg	Only references are available

Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg	No information on chemical environment. Assume none	Only references are available
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg		Only references are available
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	22A8477-1.5.2-a,c, m,ee,gg		Only references are available

Steam Dome Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Suppression Pool Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	3000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

P Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Trip Actuator

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Trip Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	300	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	40	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Tmin Norm	5	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Turbine Control Valve Oil Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Tmax Norm	60	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Turbine Stop Valve Position Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Hmax Norm	90	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Norm	53000	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Chem Norm	None	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.		23A1302, A30-3030,	No information on chemical environment. Assume none	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

EMI Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Norm	60	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vacc		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Vf Max		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Vf Min		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
P Norm		Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmin Norm	10	Environmental Qualification Specification of the expected normal environment and vendor statement (e.g., CofC or catalog data) that component is suitable for the specified environment.	23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Appendix L: Accident Environment Strategies, Requirements, & Comparison with Specifications

Note the following abbreviations used in this appendix.

Chem Acc	Chemical accident environment
Duration	Required post accident operating time (hours)
Hmax Acc	Maximum accident humidity (%RH)
Mechanical	Accident mechanical hazards
Pmax Acc	Maximum accident pressure (kg/cm^2)
Rad Beta Acc	Maximum accident beta radiation environment total integrated dose (Rad)
Rad Gamma Acc	Maximum accident gamma radiation environment total integrated dose (Rad)
Tmax Acc	Maximum accident temperature (°C)

APRM detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc		Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc			23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	Environmental Qualification			
	Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Neutron detector radiation requirements must be the same as functional requirements.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	Environmental Qualification			
	Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

APRM Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

APRM Processor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Bypass Switches

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Bypass Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Channel Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Condensate Storage Tank Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Condenser Vacuum Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Core Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

CRD Water Header Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

CUW Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

CUW Differential Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Chem Acc	None			23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Digital Trip Module

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Division Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification			
		Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Division Trip Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Drywell Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

HPCF Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Tunnel Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification			
		Separation of redundant instruments into different rooms. The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	171	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Steam Tunnel Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	171	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Main Turbine Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Physical separation sufficient to prevent a single break from affecting redundant instruments. The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	171	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Manual Scram Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification			
		Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Manual Scram Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

MSIV Position Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	171	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Multiplexer

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Output Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Equipment Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification			
		Separation of redundant instruments into different rooms. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	142	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	142	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Steam Supply Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	142	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RCIC Turbine Exhaust Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification			
		Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	142	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Reactor Building / Fuel Handling Area Exhaust Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Chem Acc	None			23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Reactor Mode Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Reactor Water Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Remote Multiplexer Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedited Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification			
		Separation of redundant instruments into different rooms. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc					
			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	142	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RHR Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

RHR Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Separation of redundant instruments into different rooms. The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to withstand the mechanical environment. Integrity	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Start-up Range Neutron Detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc		Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	Environmental Qualification			
	Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Neutron detector radiation requirements must be the same as functional requirements.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Start-up Range Neutron Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equpipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Steam Dome Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Suppression Pool Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	1	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	120	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Trip Actuator

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Trip Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	90	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	None	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc		23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc		23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	2160	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	50	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Turbine Control Valve Oil Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Physical separation sufficient to prevent a single break from affecting redundant instruments. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	171	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Turbine Stop Valve Position Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Chem Acc	None			23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Duration	2400	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Hmax Acc	100	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.		23A1302, A30-3030,	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Mechanical	Pipe Whip & Jet Impingement	Environmental Qualification Physical separation sufficient to prevent a single break from affecting redundant instruments. The design basis is that I&C equipment subject to the mechanical environment is assumed to fail. Therefore, I&C enquipment need not be designed to	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Pmax Acc	I	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Rad Beta Acc			23A1302, A30-3030,	The design basis is that I&C equipipment subject to the mechanical environment is assumed to fail. A correlary to this is that failure is assumed when the may be exposure to Beta, thus potential Beta dose is not considered. Integrity design must account for the assumed failures.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Rad Gamma Acc	21600	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,	Radiation requirements are very conservative because they assume that the dose rate remains at the highest value over the entire duration of the event. The requirements could be significantly reduced if necessary. Radiation requirements, however, assume no degraded core as this is a beyond design basis condition.	Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.
Tmax Acc	171	Environmental Qualification Environmental qualification per Reg. Guide 1.89 for the specified environment.	23A1302, A30-3030,		Document A30-3030 specifies environments, A11-4100 specifies qualification requirements. Neither document was available for review.

Appendix M: Natural Phenomena Strategies, Requirements, & Comparison with Specifications

APRM detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Unknown	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

APRM Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

APRM Processor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	Yes	Inherently safe design Mounted above flod level			
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Bypass Switches

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	Yes	Inherently safe design Mounted above flod level			

Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Bypass Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Channel Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Condensate Storage Tank Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Seismic	Unknown	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Condenser Vacuum Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Core Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

CRD Water Header Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

CUW Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

CUW Differential Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Digital Trip Module

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	Yes	Inherently safe design Mounted above flod level			

Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Division Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Division Trip Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Drywell Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

HPCF Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expeded Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Main Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expeded Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Main Steam Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Main Steam Tunnel Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Seismic	Fig 3G.4-19, Fig 3G.4-8	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Main Steam Tunnel Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-19, Fig 3G.4-8	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Main Turbine Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Seismic	Fig 3G.4-19, Fig 3G.4-8	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	

Manual Scram Logic Unit (MLU)

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Manual Scram Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments

Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Manual Scram Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	Yes	Inherently safe design Mounted above flod level			

Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

MSIV Position Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-19, Fig 3G.4-8	Environmental Qualification			
		Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Multiplexer

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments

Flood	Yes	Inherently safe design Mounted above flod level			
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Output Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

RCIC Equipment Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

RCIC Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

RCIC Steam Supply Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

RCIC Turbine Exhaust Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Reactor Building / Fuel Handling Area Exhaust Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Unknown	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Reactor Mode Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	Yes	Inherently safe design Mounted above flod level			

Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Reactor Water Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Remote Multiplexer Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments

Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

RHR Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

RHR Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-20, Fig 3G4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Start-up Range Neutron Detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Unknown	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Start-up Range Neutron Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Steam Dome Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Suppression Pool Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments

Flood	No					
Seismic	Fig 3G.4-7, Fig 3G.4-9	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	

Trip Actuator

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Trip Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments	
Flood	Yes	Inherently safe design Mounted above flod level				
Seismic	Fig 3G.5-14, Fig 3G.5-12	Environmental Qualification				
		Environmental qualification per Reg. Guide 1.100 for seismic conditions	Seismic design for conditions specified in A11-3550 per (future document) and qualification of design per A30-3030	23A1302, Sections 2.1.3.2 and 1.5	Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.	The referenced documents containing detailed requirements are unavailable. JEAC 4601 (the Japaneese equivalent of IEEE 344) is referenced as an applicable code and Reg Guide 1.100 is referenced for guidance.

Turbine Control Valve Oil Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				

Seismic	Fig 3G.4-19, Fig 3G.4-8	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Turbine Stop Valve Position Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Flood	No				
Seismic	Fig 3G.4-19, Fig 3G.4-8	Environmental Qualification Environmental qualification per Reg. Guide 1.100 for seismic conditions			Figures are in amendment 16 of the FSAR. The final revision does not have this information and it it likely that actual seismic requirements are different.

Appendix N: Power Supply Hazard Strategies, Requirements, & Comparison with Specifications

Note the following abbreviations used in this appendix.

EMI:	Conducted electromagnetic interference at power inputs
Fmax	Maximum power supply frequency (Hz)
Fmin	Minimum power supply frequency (Hz)
Mechanical	Accident mechanical hazards
Pmax	Maximum air supply pressure (kg/cm^2)
Pmin	Minimum air supply pressure (kg/cm^2)
Vmax	Maximum power supply voltage (V)
Vmax	Maximum power supply voltage (V)

APRM detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons	For NMS the maximum frequecy is 52.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Fmin		Electrical energy source Specification of required operating conditons	For NMS the minimum frequecy is 47.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.

Power Source	LPRM High Voltage	Electrical interface			
			At least two High Viltage Power Supply source sholud be provided for each APRM. Each HVPS should be avle to provide variable 0 to 200 VDC to power the LPRM detectors	23A6301 sec 4.4.1.3.4a,b	
References					
Total Harmonic Disortion		Energy source noise			
		Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements	For NMS noise filters should be suppied. They shold be able to operate during normal power source transients.	23A6301 sec 2.4.4.4d	The value refers to whole NMS
Vmax		Electrical energy source Specification of required operating conditons	For NMS the maximum voltage is 132 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Vmin		Electrical energy source Specification of required operating conditons	For NMS the minimum voltage is 102 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS

APRM Preamplifier

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons	For NMS the maximum frequecy is 52.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Fmin	58	Electrical energy source Specification of required operating conditons	For NMS the minimum frequecy is 47.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.

Power Source	IE Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,IIand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements	For NMS noise filters should be suppied. They shold be able to operate during normal power source transients.	23A6301 sec 2.4.4.4d	The value refers to whole NMS
Vmax	132	Electrical energy source Specification of required operating conditons	For NMS the maximum voltage is 132 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Vmin	108	Electrical energy source Specification of required operating conditons	For NMS the minimum voltage is 102 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS

APRM Processor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons	For NMS the maximum frequecy is 52.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Fmin	58	Electrical energy source Specification of required operating conditons	For NMS the minimum frequecy is 47.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.

Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements	For NMS noise filters should be suppied. They shold be able to operate during normal power source transients.	23A6301 sec 2.4.4.4d	The value refers to whole NMS
Vmax	132	Electrical energy source Specification of required operating conditons	For NMS the maximum voltage is 132 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Vmin	108	Electrical energy source Specification of required operating conditons	For NMS the minimum voltage is 102 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS

Bypass Switches

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Bypass Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Channel Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Condensate Storage Tank Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Condenser Vacuum Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedited Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References				
Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Core Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

CRD Water Header Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

CUW Area Temperature Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

CUW Differential Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Digital Trip Module

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Division Manual Trip Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Division Trip Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Drywell Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References				
Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

HPCF Pump Discharge Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References				
Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Main Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Main Steam Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface			
			Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References				
Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Main Steam Tunnel Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	...ual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Manual Scram Logic Unit (MLU)

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
References	8.3.1.1.4.1				

Total Harmonic Disortion		Energy source noise			
		Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Manual Scram Reset Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Manual Scram Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

MSIV Position Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Multiplexer

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	- 108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Output Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	IE Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

RCIC Steam Line Flow Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface			
			Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References				
Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

RCIC Steam Supply Line Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

RCIC Turbine Exhaust Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expected Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Reactor Building / Fuel Handling Area Exhaust Radiation Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source		Electrical interface			
References					

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Reactor Mode Switch

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	Not applicable				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Not Powered	Electrical interface			
References					

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Reactor Water Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References				
Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Remote Multiplexer Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
References	8.3.1.1.4.1				

Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Start-up Range Neutron Detector

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	108	Electrical energy source Specification of required operating conditons	For NMS the maximum frequecy is 52.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Fmin	62	Electrical energy source Specification of required operating conditons	For NMS the minimum frequecy is 47.5 Hz	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Notes	8.3.1.1.4.1				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.

Power Source	Start-up Range Neutron Preamplifier	Electrical interface	Class 1E triple shielded coaxial cables or solid sheathed silica insulated cables should be used to connect detector to preamplifier. High voltage power supply	22A8477Sec 2.4.2.5.3 d/ 23A6301 sec 3.5.1.3.5b	
References					
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	58	Energy source noise Qualification requirements	For NMS noise filters should be suppied. They shold be able to operate during normal power source transients.	23A6301 sec 2.4.4.4d	The value refers to whole NMS
Vmax	1E Inverters	Electrical energy source Specification of required operating conditons	For NMS the maximum voltage is 132 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS
Vmin	132	Electrical energy source Specification of required operating conditons	For NMS the minimum voltage is 102 V	23A6301 sec 2.4.3.1.1	The value refers to whole NMS

Steam Dome Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise			
	Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Suppression Pool Level Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Trip Actuator

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	IE Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Trip Logic Unit

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax	62	Electrical energy source Specification of required operating conditons			
Fmin	58	Electrical energy source Specification of required operating conditons			
Notes					
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	1E Inverters	Electrical interface	120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

References	8.3.1.1.4.1				
Total Harmonic Disortion		Energy source noise Qualification requirements			No information available about harmonic distortion
Transients		Energy source noise Qualification requirements			No information about power transients found
Vmax	132	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	108	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Turbine Control Valve Oil Pressure Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			

Notes	No information available in SAR				
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface			
			Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply
References					
References					

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component

Turbine Stop Valve Position Sensor

Hazard	Hazard Value	Integrity Strategy / Req. Topic Expedted Requirement	Actual Requirement	Actual Rqmt. Ref.	Comments
Air Purity					There are no air-powered components in the protection system.
EMI		Noise immunity Grounding, shielding, and qualification requirements	Protection against high electrical noise. Use of fiber optic cables to reduce EMI effects, eliminate ground loops and provide signal isolation	23A1317 sec	Specific countermesures are presented in (item1.5-d) document A11-3050 -Design Specification
Fmax		Electrical energy source Specification of required operating conditons			
Fmin		Electrical energy source Specification of required operating conditons			
Notes	No information available in SAR				
Pmax					There are no air-powered components in the protection system.
Pmin					There are no air-powered components in the protection system.
Power Source	Instrument Loop Power Supply	Electrical interface	Four independent 120 VAC vital power source and two 125 VDC batteries.	23A1302 sec 2.3.3/2.3.4.2	For design specifications, see documents R46-4010 and R42-4010 Design Specifications for Vital AC Power Supply and DC Power Supply

References

Total Harmonic Disortion	Energy source noise Qualification requirements			No information available about harmonic distortion
Transients	Energy source noise Qualification requirements			No information about power transients found
Vmax	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component
Vmin	Electrical energy source Specification of required operating conditons	Nominal 120 VAC ininterruptable power source provide logic and power control in the for four divisions. Divisions I,Iiand III, one DC supply is thr plant 125 VDC.	23A1317 sec 2.2.2.1 and 2	No specific information is provided for each component