ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Friday, February 20, 2009 2:40 PM
To: Getachew Tesfaye
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 173 (1853), FSARCh. 9
Attachments: RAI 173 Response US EPC DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 173 Response US EPR DC.pdf" provides technically correct and complete responses to 3 of the 19 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 173 Questions 9.01.05-2, 9.01.05-3 and 9.01.05-19.

The following table indicates the respective pages in the response document, "RAI 173 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

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A complete answer is not provided for 16 of the 19 questions. The schedule for technically correct and complete responses to these questions is unchanged and provided below.

Question #	Response Date
RAI 173 — 9.01.05-1	April 20, 2009
RAI 173 — 9.01.05-4	May 21, 2009
RAI 173 — 9.01.05-5	May 21, 2009
RAI 173 — 9.01.05-6	May 21, 2009
RAI 173 — 9.01.05-7	May 21, 2009

RAI 173 — 9.01.05-8	July 27, 2009
RAI 173 — 9.01.05-9	July 27, 2009
RAI 173 — 9.01.05-10	July 27, 2009
RAI 173 — 9.01.05-11	April 20, 2009
RAI 173 — 9.01.05-12	April 20, 2009
RAI 173 — 9.01.05-13	July 27, 2009
RAI 173 — 9.01.05-14	July 27, 2009
RAI 173 — 9.01.05-15	May 21, 2009
RAI 173 — 9.01.05-16	July 27, 2009
RAI 173 — 9.01.05-17	May 21, 2009
RAI 173 — 9.01.05-18	May 21, 2009

Sincerely,

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Thursday, January 22, 2009 9:37 AM
To: ZZ-DL-A-USEPR-DL
Cc: Gerard Purciarello; Peter Wilson; John Segala; Peter Hearn; Joseph Colaccino; Michael Miernicki; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 173 (1853), FSARCh. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on January 9, 2009, and on January 16, 2009, you informed us that the RAI is clear and no further clarification is needed. Draft RAI Questions 09.01.05-4 and 09.01.05-12 were modified to correct typographical errors. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
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Response to

Request for Additional Information No. 173 (1853), Revision 0

01/22/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.01.05 - Overhead Heavy Load Handling Systems
Application Section: 9.1.5

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

Question 09.01.05-1:

FSAR Section 9.1.5.1, “Design Bases,” specifies that the cranes for the U.S. EPR are designed in accordance with the requirements of American Society of Mechanical Engineers (ASME) NOG-1, “Rules for Construction of Overhead and Gantry Cranes.” and ASME NUM-1, “Rules for Construction of Cranes, Monorails, and Hoists (With Bridge or Trolley or Hoist of the Under hung Type).” These standards have been developed using guidance provided by NUREG-0612, “Control of Heavy Loads at Nuclear Power Plants,” NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants,” ASME B30.2, "Overhead and Gantry Cranes," and CMAA-70, “Specification for Top Running and Gantry Type Multiple Girder Electric Overhead Traveling Cranes.” Cranes are designated as ASME NOG-1, Type I, II, or III based on their requirements to handle critical loads and their seismic design criteria. FSAR Table 3.2.2-1 lists the design code for each crane (NUM-1 or NOG-1), but does not list the Type (I, II, or III). FSAR Section 9.1.5 also does not specify Type. Since the crane type defines the crane’s ability to withstand a safe shutdown earthquake (SSE) and hold its load during an SSE, the applicant needs to clearly define which design code (NUM-1 or ASME NOG-1) and Type (I, II, or III) is applicable for each crane in FSAR Table 3.2.2-1. The FSAR needs to be changed accordingly.

Response to Question 09.01.05-1:

A response to this question will be provided by April 20, 2009.

Question 09.01.05-2:

FSAR Section 9.1.5.1,"Design Basis," states that "cranes for the US EPR are designed in accordance with the requirements of American Society of Mechanical Engineers (ASME) NOG-1." SRP Section 9.1.5 states that cranes designed to the criteria of ASME NOG-1 2004, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)" for a Type 1 crane are acceptable under the guidelines of NUREG 0554 for construction of a single failure proof crane. The reactor building (RB) polar crane and the fuel building (FB) auxiliary crane are single failure-proof and therefore should be meeting the requirements of ASME NOG-1, Type 1, and NUREG-0554. However, FSAR Section 9.1.5.2.2 for the RB polar crane and Section 9.1.5.2.3 for the FB auxiliary crane specify the design codes for these cranes but do not refer ASME NOG-1 (reference 5) and "Type 1." Justify Section 9.1.5.2.2 for the RB polar crane and Section 9.1.5.2.3 for the FB auxiliary not referring to these cranes as being designed to ASME NOG-1 (reference 5) and "Type 1".

Response to Question 09.01.05-2:

The RB polar crane and the FB auxiliary crane are both designed to meet the requirements of NOG-1 for Type I cranes. Clarification will be added to U.S. EPR FSAR Tier 2, Section 9.1.5.2 to indicate that these cranes are designed in accordance with ASME NOG-1 as single failure-proof cranes (Type I).

FSAR Impact:

U.S. EPR FSAR Tier 2, Sections 9.1.5.2.2 and 9.1.5.2.3 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.05-3:

Regulatory Position C.2 of Regulatory Guide 1.29, “Seismic Design Classification,” describes the guidance for seismic category II systems, structure and components (SSC). This guidance states, in part, that seismic category II SSC are designed to preclude structural failure during a safe shutdown earthquake (SSE) from affecting safety related SSC. Section 2.5 of NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants,” specifies that single failure proof cranes be designed to retain control and hold the load during an SSE. The reactor building (RB) polar crane and the fuel building (FB) auxiliary crane are classified as seismic category II. In addition to not failing structurally, such that safety related equipment would not be degraded, the applicant is requested to verify that these cranes will continue to hold their maximum load (not drop the load) during an SSE. The applicant needs to revise the FSAR to clarify the ability of this equipment to hold its maximum load during an SSE.

Response to Question 09.01.05-3:

The RB polar crane and the auxiliary crane in the FB are designed in accordance with ASME NOG-1 as Type I cranes. By definition, these Type I cranes are designed to hold their maximum critical load (i.e., not drop the load) during a safe shutdown earthquake (SSE). The U.S. EPR FSAR details of the RB polar crane and the FB auxiliary crane in U.S. EPR FSAR Tier 2, Section 9.1.5.2 will be revised to clarify the capability of these cranes to not drop their load during an SSE.

FSAR Impact:

U.S. EPR FSAR Tier 2, Sections 9.1.5.2.2 and 9.1.5.2.3 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.05-4:

In FSAR Section 9.1.5.2.2 the applicant identified that the reactor building (RB) polar crane is used for the following heavy loads:

- The multiple-stud tensioning machine.
- The reactor vessel closure head.
- The missile shields.
- The Reactor Building platform.
- The control rod drive shafts.
- The upper and lower head lifting rigs.
- The reactor vessel upper and lower internals.
- The pool liner slot and the set-down area partition gates.

In FSAR Section 9.1.5.2.3 the applicant identified that the fuel building (FB) auxiliary crane heavy loads include:

- Slot gates.
- New fuel containers.

The applicant needs to identify the approximate weight of each of the above listed loads and how it compares to the RB polar crane and FB auxiliary crane maximum critical load rating. Provide this information in the FSAR.

Response to Question 09.01.05-4:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-5:

FSAR Section 9.1.5.2.2 indicates that the reactor building (RB) polar crane can be used as a backup tool for handling fuel assemblies. FSAR Section 9.1.5.2.3 indicates that the fuel building (FB) auxiliary crane can be used as backup tool for handling fuel assemblies. American Society of Mechanical Engineers (ASME) NOG-1, "Rules for Construction of Overhead and Gantry Cranes," and NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants" and single failure criteria for Type 1 cranes, do not specify interlocks for moving fuel assemblies. Section 6.3 of American National Standards Institute/American Nuclear Society (ANSI/ANS)-57.1, "Design Requirements for Light Water Reactor Fuel Handling Systems," specify interlocks for machines handling fuel assemblies in order to prevent damage to fuel and prevent excessive personnel exposure. The applicant needs to explain the interlocks that are provided for the RB polar crane and the FB auxiliary crane to move fuel safely as discussed in ANSI 57.1 Section 6.3. This information should be added to the FSAR.

Response to Question 09.01.05-5:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-6:

The applicant did not specify the licensing basis for lifting devices for the single failure proof handling systems. Guidelines in SRP Section 9.1.5.III.4.C.ii specify that lifting devices for use with single-failure-proof handling system are to satisfy the criteria of American National Standards Institute (ANSI) N14.6, "Special Lifting Devices for Shipping Containers Weighing 10000 Pounds (4500 kg) or More." If special lifting devices are not used, slings should be selected to satisfy the criteria of American Society of Mechanical Engineers (ASME) B30.9, "Slings". In addition, slings for use with single-failure-proof handling systems should be constructed of metallic material (chain or wire rope). Guidelines in SRP Section 9.1.5.III.4.C.ii also specify that special lifting device and slings used in single failure proof handling systems have either dual, independent load paths or a single load path with twice the design safety factor specified. Justify not specifying these guidelines for lifting devices and slings in single failure proof handling systems. The FSAR needs to be changed accordingly.

Response to Question 09.01.05-6:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-7:

FSAR section 9.1.5.2.4, “Other Overhead Load Handling Systems,” indicates that the ultimate heat sink and essential service water structures contain heavy load handling cranes and safety-related components, however, heavy load handling equipment in these structures is not included in FSAR Table 9.1.5-1, “Heavy Load Handling Equipment” and FSAR Table 3.2.2-1, “Classification Summary.” Justify not inclding the heavy load handling equipment in the ultimate heat sink and essential service water structures in FSAR Table 9.1.5-1 and Table 3.2.2-1. Change the FSAR accordingly.

Response to Question 09.01.05-7:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-8:

The guidelines of SRP 9.1.5 Section I.1 state that design layout drawings showing the geometric arrangement of the handling equipment and important plant features are to be reviewed for safety of handling operations. The applicant has not provided figures showing the design layout of the heavy load handling equipment and important plant features. The applicant needs to provide these figures showing heavy load handling equipment geometric arrangement for areas that contain fuel or safety related structures, systems or components (SSC).

Response to Question 09.01.05-8:

A response to this question will be provided by July 27, 2009.

Question 09.01.05-9:

SRP 9.1.5.III.3.A and NUREG-0612, “Control of Heavy Loads at Nuclear Power Plants” section 5.1.1 indicates safe load paths are to be defined for movement of heavy loads to minimize the potential for a load drop on irradiated fuel in the reactor vessel or spent fuel pool or on safe shutdown equipment. The FSAR does not provide any heavy load area layout drawings/figures and SRP 9.1.5 indicates that safe load paths should be clearly defined in procedures and equipment layout drawings. Justify not providing in the FSAR the layout drawings/figures that identify safe load paths in areas containing fuel or safe shutdown equipment for the heavy loads identified in the FSAR.

Response to Question 09.01.05-9:

A response to this question will be provided by July 27, 2009.

Question 09.01.05-10:

The applicant stated in FSAR Section 9.1.5.2.4, “Other Overhead Load Handling Systems,” that the Safeguard Buildings, Emergency Power Generating Buildings, and ultimate heat sink/essential service water structures are equipped with cranes that are rated for heavy loads. The applicant stated that for these divisionally separated buildings, the local effect of a load drop is restricted to the affected division. However, the applicant did not address the effect of a common mode failure (i.e. loss of electrical power) causing multiple heavy load handling equipment (HLHE) to be inoperable and result in multiple load drops that would damage more than one division. In addition, the applicant did not address the potential for heavy load lifts to occur simultaneously in more than one division such that divisional separation is ineffective in preventing a total loss of safety function if multiple drops occurred. This potential problem is more pronounced when less that four divisions of safety equipment are available because a division is out of service for maintenance. The applicant needs to address the effects of common mode failures of non-single failure proof, non-seismic HLHE identified in FSAR Tier 2 Table 9.1.5-1, “Heavy Load Handling Equipment” [including the HLHE in the ultimate heat sink/essential service water structure] upon safety related structures, systems or components (SSC) and whether a loss of a safety function can occur.

Response to Question 09.01.05-10:

A response to this question will be provided by July 27, 2009.

Question 09.01.05-11:

FSAR Section 9.1.5.1,"Design Basis," states that all cranes in the heavy load handling system are non seismic, except the reactor building (RB) polar crane and the refueling (RB) building crane. This statement conflicts with FSAR Table 3.2.2-1, "Classification Summary," which lists the main steam valve cranes and the steam generator cubicle cranes as seismic category II. The applicant needs to change the FSAR to make FSAR Section 9.1.5.1 and FSAR Table 3.2.2-1 consistent.

Response to Question 09.01.05-11:

A response to this question will be provided by April 20, 2009.

Question 09.01.05-12:

The non seismic cranes in the divisionally separated Safeguard Buildings, Emergency Power Generating Buildings, and ultimate heat sink/essential service water structures can all structurally fail during safe shutdown earthquake (SSE) causing loss of multiple divisions of safety related SSC. Also, the non seismic cranes in the non- divisionally separated Containment Building, Reactor Building Annulus and the Fuel Building (i.e. HVAC equipment room cranes, assembly crane, equipment lock crane, etc.) can also all structurally fail during an SSE causing loss of multiple divisions of safety related SSC. With the potential failure of multiple safety related divisions, the applicant has not met Regulatory Position C.2 of RG 1.29 and therefore has not met the requirements of GDC 2.

FSAR Section 9.1.5.1, “Design Basis,” states that General Design Criteria (GDC) 2 is satisfied because heavy load handling equipment (HLHE) is located inside structures which are designed to withstand the effects of natural phenomena, such as earthquake, tornados, and hurricanes. However, that does not satisfy GDC 2 either because as stated above, the cranes also must be designed to meet the guidelines of RG 1.29 and Section 2.5 of NUREG -00554 (if single failure proof) for cranes in areas that contain nuclear fuel or safety related structures, systems or components (SSC)

a) Explain how the requirements of GDC 2 are met when some cranes in the Safeguard Buildings, Emergency Power Generating Buildings, Containment Building, Reactor Building Annulus, and the Fuel Building and ultimate heat sink/essential service water structures are not seismically qualified and can possibly damage multiple divisions of safety related SSC during an SSE.

b) The applicant needs to establish the correct design basis for meeting the requirements of GDC 2 and correct FSAR Section 9.1.5.1 to state an accurate design basis as to why the heavy load handling equipment meets GDC 2.

Response to Question 09.01.05-12:

A response to this question will be provided by April 20, 2009.

Question 09.01.05-13:

The applicant has not clearly presented how non single failure proof cranes in the containment building and the fuel building will not drop a critical load. Furthermore, for buildings that are not completely divisionally separated (containment building, reactor building annulus, and the fuel building), the applicant has stated in FSAR Section 9.1.5.2.4 that analyses are performed to determine if a simultaneous loss of more than one redundancy of a system is possible and acceptable due to a postulated load drop. Identify the specific analyses that have been performed for each of the non single failure proof cranes (HVAC equipment room cranes, steam generator cubicle cranes, assembly crane, equipment lock cranes) in these buildings and provide the results of the analysis. The results should be added to the FSAR.

Response to Question 09.01.05-13:

A response to this question will be provided by July 27, 2009.

Question 09.01.05-14:

Except for the equipment lock cranes, FSAR Table 9.1.5-1, “Heavy Load Handling Equipment,” indicates that the non single failure proof cranes are not located in the fuel building and thus are not physically able to carry heavy loads over the spent fuel facility. Therefore, all the non single-failure cranes, with exception of equipment lock cranes, meet the intent of RG 1.13, “Spent Fuel Storage Facility Design Basis.” The staff cannot conclude whether the equipment lock cranes meet RG 1.13, since it is not clear whether they can travel over spent fool pool. The applicant needs to include layout drawings and load path diagram as specified in other RAIs and specify whether the equipment lock cranes are physically able to carry heavy loads over the spent fuel pool. This information should be added to the FSAR.

Response to Question 09.01.05-14:

A response to this question will be provided by July 27, 2009.

Question 09.01.05-15:

FSAR Section 9.1.5.3, “Safety Evaluation,” states “Movement of heavy loads is restricted by design (including interlocks) and/or administrative controls to areas away from stored fuel and equipment necessary for the safe shutdown of the reactor.” The applicant did not describe any interlocks or administrative controls in the application for heavy load handling equipment (HLHE). The applicant needs to describe the interlocks and administrative procedures for which they are taking credit and place this information in the FSAR.

Response to Question 09.01.05-15:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-16:

FSAR Section 9.1.5.2.4, Other Overhead Load Handling System," states that "The FB contains bridge cranes in the equipment lock area. Load drop analyses are performed for this building to demonstrate that no unacceptable radiological release to the environment results from a heavy load drop." The applicant did not explain the purpose of these cranes nor provide the location and potential load drop considerations for these cranes. Therefore, the applicant needs to provide to the staff the load drop analysis specified above and in FSAR Section 9.1.5.2.4 and the results of the analysis. This information should be added to the FSAR.

Response to Question 09.01.05-16:

A response to this question will be provided by July 27, 2009.

Question 09.01.05-17:

The applicant stated that preoperational inspection and testing of the heavy-load handling equipment is in accordance with ASME NOG-1, 2004 “Rules for Construction of Overhead and Gantry Cranes.” The application of ASME NOG-1 2004 criteria for Type 1 cranes satisfies NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants. NUREG-0554, Section 8.3, “Two Block Test,” calls for a two block test. The applicant needs to address why a two-block test is not listed in the Initial Test Program in FSAR Tier 2, Section 14.2, test abstract #040 for the performance testing of the containment polar crane and #041 for performance testing of the fuel handling auxiliary crane.

Response to Question 09.01.05-17:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-18:

The EPR FSAR/ Tier 1 Section 2.10 does not list “single failure proof” as certified design information with ITAAC for either the reactor building (RB) polar crane, or the fuel building (FB) auxiliary crane. The staff believes that “single failure proof” design criteria for the above listed cranes should be listed in Tier 1 as described below.

One design criteria, among several design criteria for Tier 1 information, is that it should include features and functions which could have a significant effect on the safety of a nuclear plant or are important in preventing or mitigating severe accidents. A drop of the reactor vessel head or a heavy load into the spent fuel pool could affect plant safety. Therefore, design features that reduce the risk and/or analyses that provide assurance of safety after a dropped load are important to safety. The staff considers “single failure proof” design criteria for the RB polar crane and the FB auxiliary crane as Tier 1 safety significant design criteria. As a minimum, the following analyses would have to be performed in order to not consider “single failure proof” design criteria as safety significant criteria for the RB polar crane and the FB auxiliary crane:

1) 1) A heavy load analysis proving that a heavy load drop in safety related areas of the plant from these two cranes will not be the cause any of Items I through IV of section 5.1 of NUREG 0612, “Control of Heavy Loads at Nuclear Power Plants.”
2) 2) SRP 9.1.5, “Overhead Heavy Load Handling Systems,” Section III. 4, states that without “single failure proof” design criteria, analyses are required for a dropped load on the reactor vessel, among other analyses. The FSAR does not describe results of this analysis.

Without the analyses and design criteria stated above, the “single failure proof” design feature of the containment polar crane and the FB auxiliary crane becomes safety significant design criteria.

Both the RB polar crane and the FB auxiliary crane are classified seismic category II, such that an earthquake will not cause these cranes to damage safety related structure, systems, and components (SSC).

Please justify why the applicant did not include “seismic category II” and “single failure proof” design criteria and ITAAC in Tier 1 of the FSAR, which are safety significant design criteria, for the RB polar crane and the FB auxiliary crane.

Response to Question 09.01.05-18:

A response to this question will be provided by May 21, 2009.

Question 09.01.05-19:

The Reactor Building polar crane and the Fuel Building auxiliary crane are designed to seismic category II criteria as identified in FSAR Tier 1, Table 2.10.1-1. It is noted that Table 2.10.1-1 is included in the FSAR chapter on Cranes but is titled "Fuel Pool Cooling and Purification System Equipment Mechanical Design." The applicant is requested to explain why Table 2.10.1-1 is titled "Fuel Pool Cooling and Purification System Equipment Mechanical Design."

Response to Question 09.01.05-19:

The title of U.S. EPR FSAR Tier 1, Table 2.10.1-1 will be revised by changing it from "Fuel Pool Cooling and Purification System Equipment Mechanical Design" to "Crane Equipment Mechanical Design."

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.10.1-1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

09.01.05-2

9.1.5.2.2 Reactor Building Polar Crane

09.01.05-3

The RB polar crane is designed in accordance with ASME NOG-1 as a single failure-proof crane ~~designed to handle~~ (Type I) capable of handling the maximum critical load (i.e., not drop the load) during and following a safe shutdown earthquake (SSE). The maximum critical load is defined as the maximum load, not necessarily the rated load, the uncontrolled movement or release of which could adversely affect any safety-related system when such a system is required for unit safety or could result in potential offsite exposure in excess of established limits. This designation meets the requirements of RG 1.13. Single failure-proof cranes are designed in conformance with Reference 1, Reference 2, Reference 3 and Reference 4. See Section 3.8.3.4.4 for a description of the seismic analyses for the polar crane.

The RB polar crane is primarily used during plant outages to assist in refueling and maintenance activities. The major heavy loads it normally handles include:

- The multiple-stud tensioning machine.
- The reactor vessel closure head.
- The missile shields.
- The RB platform.
- The drive rod shafts.
- The upper and lower head lifting rigs.
- The upper and lower internals.
- The pool liner slot and the setdown area partition gates.

In addition, the RB polar crane can be used as a backup tool for handling of fuel assemblies due to the unavailability of the refueling machine.

The RB polar crane is supported by a circular runway, which rests on brackets attached to the containment structure. The structure is a rigid assembly. The bridge framework consists of two girders and two end trucks. The two main girders are welded box sections which are attached with end ties and are supported on the crane end trucks. The end trucks consist of structural frames containing wheel assemblies (bogies). The polar crane girders are provided with full-length walkways that allow access to the associated electrical and mechanical components.

The RB polar crane is equipped with trolleys that traverse the length of the bridge. The trolleys provide structural support for the associated hoisting equipment.

The RB polar crane is provided with three electric hoists. The main hoist is supported by a single trolley and has a rated capacity of 320 metric tons. The secondary trolley supports two hoist units, one rated at 35 metric tons and another rated at five metric tons.

9.1.5.2.3 Fuel Building Auxiliary Crane

09.01.05-2

The FB auxiliary crane, located over the spent pool, is designed in accordance with ASME NOG-1 as a ~~to~~ single failure-proof crane (Type I).~~criteria.~~ As a Type I crane, the FB auxilary crane is capable of handling the maximum critical load (i.e., not drop the load) during an SSE. ~~As such, this~~The FB auxiliary crane is designed to Seismic Category II criteria and in conformance with Reference 1, Reference 2, Reference 3 and Reference 4.

09.01.05-3

The heavy loads the FB auxiliary crane normally handles include:

- Slot gates.
- New fuel containers.

In addition, the auxiliary crane can be used to handle spent fuel assemblies in the event that the spent fuel mast bridge is not available.

9.1.5.2.4 Other Overhead Load Handling Systems

Other than the RB polar crane, other major cranes in the RB include four single girder bridge cranes used for servicing heating, ventilation and air conditioning (HVAC) equipment, four jib cranes located within the steam generator cubicles and an assembly crane located near an accumulator tank. These cranes provide lifting capabilities during plant outages.

The FB contains bridge cranes in the equipment lock area. Load drop analyses are performed for this building to demonstrate that no unacceptable radiological release to the environment results from a heavy load drop.

The Safeguard Buildings, Emergency Power Generating Buildings, and ultimate heat sink/essential service water structures are also equipped with cranes that are rated for heavy loads. For these divisionally separated buildings, the local effect of a load drop is restricted to the affected division. Accordingly, the loss of a safety system inside the affected division is acceptable from a nuclear safety standpoint.

For buildings that are not completely divisionally separated (Containment Building, Reactor Building Annulus, and the FB), analyses are performed to determine if a simultaneous loss of more than one redundancy of a system is possible due to a postulated local load drop. If it is possible, the acceptability is evaluated. If single failure-proof crane designs are used, load drop analyses are not required.

2.10 Other Systems

2.10.1 Cranes

1.0 Description

The containment polar crane and the auxiliary crane provide for the lifting of heavy loads. The cranes can be operated during shutdown and refueling conditions. Some components of the cranes may be operated during plant operation.

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2.0 Arrangement

2.1 The component locations of the cranes are as listed in Table 2.10.1-1—Crane~~Fuel Pool Cooling and Purification System~~ Equipment Mechanical Design.

3.0 Mechanical Design Features

3.1 The equipment identified in Table 2.10.1-1 can withstand seismic design basis loads without loss of safety function.

4.0 Equipment and System Performance

4.1 The containment polar crane prevents the uncontrolled lowering of a heavy load.

4.2 The auxiliary crane prevents the uncontrolled lowering of a heavy load.

5.0 Inspections, Tests, Analyses and Acceptance Criteria

Table 2.10.1-2~~—Cranes Inspections, Tests, Analyses, and Acceptance Criteria specifies the inspections, tests, analyses, and associated acceptance criteria (ITAAC)~~ lists the ~~for the~~ cranes ITAAC.

Table 2.10.1-1—~~Fuel Pool Cooling and Purification System~~ Crane Equipment Mechanical Design

Equipment Description	Equipment Tag Number(1)	Equipment Location	Function	Seismic Category
Containment Polar Crane	SMJ-01	Containment Building	Avoid uncontrolled lowering of heavy load.	II
Auxiliary Crane	SMF-01	Fuel Building	Avoid uncontrolled lowering of heavy load.	II

1) Equipment tag numbers are provided for information only and are not part of the certified design.