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May 8, 2009

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffery A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-09232

Subject: MHI's Response to US-APWR DCD RAI No. 276-2043 (60-day response)

References: 1) "Request for Additional Information No. 276-2043 Revision 1, SRP Section: 03.02.02 – System Quality Group Classification, Application Section: 3.2.2" dated 3/11/2009.
2) "MHI's Response to US-APWR DCD RAI No. 276-2043," UAP-HF-09195, dated 4/24/2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 276-2043 Revision 1."

Enclosed are the responses to questions 3.2.2-3, 5, 6, 7, and 8 of the RAI (Reference 1). This completes the response to RAI 276-2043. Previous responses for 3.2.2-1, 2, 4, and 9 were transmitted in Reference 2.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,



Yoshiaki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosures:

1. Response to Request for Additional Information No. 276-2043, Revision 1

DOST
NRC

CC: J. A. Ciocco
C. K. Paulson

Contact Information

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Docket No. 52-021
MHI Ref: UAP-HF-09232

Enclosure 1

UAP-HF-09232
Docket No. 52-021

Response to Request for Additional Information No. 276-2043,
Revision 1

May, 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/8/2009

**US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021**

RAI NO.: NO. 276-2043 REVISION 1
SRP SECTION: 03.02.02 - System Quality Group Classification
APPLICATION SECTION: 03.02.02
DATE OF RAI ISSUE: 03/11/09

QUESTION NO. RAI 03.02.02-3:

DCD Subsection 3.2.2.4 states for Class 4 components, the requirements for RG 1.26, Quality Group D will be applied. DCD Table 3.2-3 contains footnote 4 that states a graded approach to quality assurance of Class 4 components will be applied. This footnote references a description of a graded approach as provided in Chapter 17, but no mention of "graded approach" is found in Chapter 17. Describe how this proposed graded approach is consistent with the quality requirements in RG 1.26 for Quality Group D components and any applicable special treatment requirements.

This same footnote 4 is also referenced to attribute a graded approach to Equipment Class 5 components. Per Section 3.2.2.5, components in Equipment Class 5 are non safety-related components that are not part of the RWMS, are not within the purview of RG 1.26, and to which Appendix B requirement do not apply. Provide further information on how this "graded approach" is to be applied to non-safety components classified as Equipment Class 5.

ANSWER:

Those structures, systems and components (SSC) classified as seismic category II will meet the pertinent requirements of 10 CFR 50, Appendix B as indicated in Table 3.2-3, in accordance with the seismic design requirements of Regulatory Guide (RG) 1.29, Rev. 4. Refer to DCD Tier 2, Subsection 3.2.1.1.2.

DCD Tier 2, Subsection 3.2.2.5 and Table 3.2-3, Note 4 has been reworded to indicate seismic category II SSCs meet the pertinent Quality Assurance (QA) requirements of 10 CFR 50, Appendix B. Additionally, Note 12 of Table 3.2-3 will be deleted.

Impact on DCD

See Attachment 1 for the mark-up of DCD Tier 2, Section 3.2, Revision 2 changes to be incorporated:

- Revise the third paragraph of Subsection 3.2.2.5, to:
"Equipment Class 5 SSCs are classified NS or seismic category II. Seismic category II SSCs meet the pertinent QA requirements of 10 CFR 50, Appendix B. Codes and standards, as defined in the design bases, are applied to Equipment Class 5 components."
- Table 3.2-3, Note 4 will be revised as follows:
"4. Seismic category II SSCs meet the pertinent QA requirements of 10 CFR 50, Appendix B. (Refer to Subsection 3.2.1.1.2)"
- Note 12 of Table 3.2-3 will be deleted.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/8/2009

**US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021**

RAI NO.: NO. 276-2043 REVISION 1
SRP SECTION: 03.02.02 - System Quality Group Classification
APPLICATION SECTION: 03.02.02
DATE OF RAI ISSUE: 03/11/09

QUESTION NO. RAI 03.02.02-5:

10 CFR 50.55a identifies specific editions of certain codes to be applied and SECY-93-087 identifies that the latest codes and standards endorsed by the NRC are to be used or to review editions on a case-by-case basis. DCD Table 1.9.5-2 for treatment of SECY-93-087 "requirements", Issue Number II.A, references DCD 3.2.4. In the referenced Subsection 3.2.4 of the DCD, editions of codes and standards are either omitted or are not current. Clarify how this 10 CFR 50.55a requirement and SECY position is fulfilled.

ANSWER:

Subsection 3.2.4 of the DCD has been revised to update or add the current editions of codes and standards, as required. Refer also to the response to RAI 03.02.02-6 for further discussion and a summary listing of codes and standards to be applied.

Additional codes and standards or later additions will be applied, as required, during the development of detailed "Design Specifications" as discussed in response to RAI 03.02.02-8.

Impact on DCD

See Attachment 1 for the mark-up of DCD Tier 2, Section 3.2, Revision 2 for changes to be incorporated:

- Revise Subsection 3.2.4, Reference 3.2-14, Boiler and Pressure Vessel Code, Section III to include "2001 Edition including Addenda through 2003".
- Revise Subsection 3.2.4, Reference 3.2-19, Boiler and Pressure Vessel Code, Section VIII to include "2001 Edition including Addenda through 2003".
- Revise Subsection 3.2.4, Reference 3.2-20, from "ASME/ANSI B31.1-1989" to "ASME/ANSI B31.1-2004".
- Revise Subsection 3.2.4, Reference 3.2-21, from "API-650-80, February 1984" to "API-650-07, Eleventh Edition with Addenda".

- Revise Subsection 3.2.4, Reference 3.2-22, from "AWWA D100-84" to "AWWA D100-05".
- Revise Subsection 3.2.4, Reference 3.2-23, from "ANSI B96.1-81" to "ANSI B96.1-99".
- Revise Subsection 3.2.4, Reference 3.2-24, from "API-620-82, Revision 1, April 1985" to "API-620-08, Eleventh Edition with Addenda".

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/8/2009

**US-APWR Design Certification
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Docket No. 52-021**

RAI NO.: NO. 276-2043 REVISION 1
SRP SECTION: 03.02.02 - System Quality Group Classification
APPLICATION SECTION: 03.02.02
DATE OF RAI ISSUE: 03/11/09

QUESTION NO. RAI 03.02.02-6:

DCD Table 3.2-3 Note 5 states that codes and standards defined in design basis are applied. For example, Equipment Class 5 references note 5 for the codes and standards. Clarify what codes and standards including their editions will be used when note 5 is referenced.

ANSWER:

The list of SSC Codes and Standards (below) includes a summary listing of industry codes/standards that will be applied to those structures systems and components (SSC) that were identified in Table 3.2-2 by Note 3 (5), "Codes and standards as defined in design basis".

The listing includes industry codes/standards for pumps, piping, valves, tanks, HVAC, compressed gas, and cooling tower related codes. Additional codes and standards or later additions will be applied, as required, during the development of detailed "Design Specifications" as discussed in response to RAI 03.02.02-8.

List of SSC Codes and Standards

Piping and Valves

ASME/ANSI

- B1.20.1-1983 (R 2001), Pipe Threads, General Purpose (Inch)
- B16.5-2003, Pipe Flanges and Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard
- B16.10-2000 (R 2003), Face-to-Face and End-to-End Dimension of Valves
- B16.11-2005, Forged Steel Fittings, Socket-Welding and Threaded
- B16.25-2007, Buttwelding Ends
- B16.34-2004, Valves – Flanged, Threaded and Welding End
- B16.42-1998, Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300
- B31.1-2004, Power Piping
- B31.3-2006, Process Piping
- B31.5-2005, Refrigeration Piping and Heat Transfer Components
- B36.10-2004, Welded and Seamless Wrought Steel Pipe
- B36.19M-2004, Stainless Steel Pipe

American Water Works Association (AWWA)

- C200-05 Steel Water Pipe – 6 in. (150mm) and Larger, 2nd Edition
- C203-02, Coal-Tar Protective Coatings and Linings for Steel Water Pipelines – Enamel and Tape – Hot Applied
- C303-02, Reinforced Concrete Pressure Pipe, Steel Cylinder Type, Pretensioned for Water and Other Liquids

Other

- Manufacturers Standardization Society of the Valve and Fittings Industry, Inc (MSS), Latest Editions

Pumps

ASME/ANSI

- PTC 8.2-1990, Centrifugal Pumps

Hydraulic Institute (HI)

- ANSI/HI 1.6 (M104) 2000, Centrifugal Tests
- ANSI/HI 2.6 (M108) 2000, American National Standard for Vertical Pump Tests
- ANSI/HI 9.8 1998, American National Standard for Centrifugal and Vertical Pump Intake Design
- Various IDs; 2000; Standards for Centrifugal, Rotary and Reciprocating Pumps

Tanks

- ASME BPVC Section VIII, 2001 including Addenda through 2003, Rules for Construction of Pressure Vessels
- American Petroleum Institute (API) 620-08, 2008, Design and Construction of Large, Welded, Low-Pressure Storage Tanks - Eleventh Edition with Addenda
- API 650-07, Welded Steel Tanks for Oil Storage - Eleventh Edition with Addenda
- AWWA D100-05, Welded Steel Tanks for Water Storage

Heat Exchangers

- TEMA 1999, Standards of Tubular Exchanger Manufacturers Association, Eighth Edition
- Heat Exchanger Institute (HEI), 2006, Standards for Steam Surface Condensers, 10th Edition, 2006

HVAC (Refer also to DCD Subsection 9.4.8)

ASME/ANSI

- AG-1-2003, Code on Nuclear Air and Gas Treatment - including Addenda
- ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components
- ASME N510-1989, Testing of Nuclear Air-Cleaning Units and Components

Air-Conditioning and Refrigeration Institute (ARI)

- 410-01, Force-circulation Air-cooling and Air-heating Coils
- 430-99, Central Station Air Handling Units
- 440-05, Performance Rating of Room Fan Coils
- 450-2007, Water-Cooled Refrigerant Condensers, Remote Type
- 550/590-03, Water Chilling Packages Using the Vapor Compression Cycle
- 575-94, Method of Measuring Machinery Sound within an Equipment Space

Air Movement and Control Association (AMCA)

- 99-03, Standards Handbook
- 200-95, (R 2000) - Air Systems
- 201-02, Fans and Systems
- 203-90, Field Performance Measurements of Fan Systems
- 210-07, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating
- 230-99, Laboratory Methods for Testing Fans for Ratings
- 300-05, Reverberant Room Method for Sound Testing of Fans
- 301-90, Methods for Calculating for Sound Ratings from Laboratory Test Data
- 303-79, Sound Power Level Ratings Applications Publication
- 801-01, Industrial Process/Power Generation Fans: Specification Guidelines
- 802-02, Industrial Process/Power Generation Fans: Establishing Performance Using Laboratory Models

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)

- 52.1-1992, Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter
- 52.2-2007, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
- 62.1-2007, Ventilation for Acceptable Indoor Air Quality

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

- 1143-1985, HVAC Air Duct Leakage Test Manual, 1st Edition
- 1208-1990, HVAC Systems – Duct Design, 3rd Edition
- 1299-1980, Rectangular Industrial Duct Construction Standards, 1st Edition
- 1481-2005, HVAC Duct Construction Standards – Metal and Flexible, 3rd Edition
- 1520-1999, Round Industrial Duct Construction Standards, 2nd Edition
- 1780-2002, HVAC Systems – Testing, Adjusting and Balancing, 3rd Edition

- 1819-2002, Fire, Smoke and Radiation Damper Installation Guides for HVAC Systems – Fifth Edition

National Air Filtration Association (NAFA)

- 2006, Installation, Operation and Maintenance of Air Filtration Systems, 2nd Edition

Underwriters Laboratories, Inc. (UL)

- 555-2006, UL Standard for Safety Fire Dampers, 7th Edition
- 555S-1999, UL Standard for Smoke Dampers, 4th Edition

Compressors

- CAGI, ANSI/ISA S-7.3, 1981, Quality Standards for Instrument Air
- CAGI, ANSI/CGA G-7.1, 2004, Specifications for Air

Cooling Towers

- Cooling Technology Institute (CTI) - ATC-105 (00), 2000 Acceptance Test Code for Water Cooling Towers

Others

- CMAA-70, 2000, Crane Manufacturers Association of America, Specification No. 70
- ASME-NOG-1 - 2004, Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)
- ASME/ANSI B30.2-2005, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
- IFC, 2006, International Fire Code
- IBC, 2006, International Building Code
- IMC, 2006, International Mechanical Code
- IPC, 2006, International Plumbing Code
- American Welding Society (AWS) - D1.1/D1.1M:06, Structural Welding Code – Steel
- ANSI/ANS-51.1-1988, Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants
- ANSI/ANS 57.1 – 1992, Design Requirements for Light Water Reactor Fuel Handling Systems
- ANSI/ANS 57.2 – 1983, Design Objectives for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Stations
- ANSI/ANS 57.3 – 1983, Design Requirements for New Fuel Storage Facilities at Light Water Reactor Plants
- ANSI/ANS 57.5 – 1996, Light Water Reactors Fuel Assembly Mechanical Design and Evaluation

Impact on DCD

There is no impact to the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/8/2009

**US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021**

RAI NO.: NO. 276-2043 REVISION 1
SRP SECTION: 03.02.02 - System Quality Group Classification
APPLICATION SECTION: 03.02.02
DATE OF RAI ISSUE: 03/11/09

QUESTION NO. RAI 03.02.02-7:

GDC 1 of 10 CFR Part 50, Appendix A states in part that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Section 3.1.1.1.1 of the DCD uses the term safety-related and Section 3.2.2 uses both terms to identify the SSCs that must be designed to satisfy the requirements of GDC 1. Refer to definitions in 10 CFR 50, memo to NRC Staff from Harold Denton, dated 11/20/81, (accession numbers 8201200446 and 8201200448) and ANS 58.14 regarding application of these terms. Clarify the application of the terms "safety-related" and "important to safety" to the quality group classification of SSCs and compliance with GDC 1. Also clarify to what extent those SSCs that are important to safety that are not considered safety-related are classified so that they are designed to appropriate quality standards.

ANSWER:

As discussed in the US-APWR, Tier 2, Section 3.2, the following safety classifications and seismic categories are used:

- safety-related (seismic category I)
- non safety-related (seismic category II)
- non safety-related (non-seismic)

In addition, seismic design criteria and quality standards are applied to SSCs that are related to "significant licensing requirements or commitments" that are based on current NRC regulations and guidance as discussed below.

The term "safety-related" is defined in NRC regulations (e.g., 10 CFR 50.2, "Definitions"), industry standards (e.g., ANSI/ANS-58.14-1993), NRC Generic Letter (GL) 84-01, and the memo to NRC Staff from Harold Denton, dated 11/20/81. The US-APWR structures, systems and components (SSC) are classified as either safety-related as defined in 10 CFR 50.2 or non safety-related. As defined in 10 CFR 50.2, safety-related SSCs are those that are relied upon to remain functional during and following a design basis accident (DBA) to assure:

- (1) The integrity of the reactor coolant pressure boundary,
- (2) The capability to shut down the reactor and maintain it in a safe shutdown condition, or
- (3) The capability to prevent or mitigate the consequences of accidents, which could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100."

The term "important to safety" is used in direct quotations of the General Design Criteria (GDC) and other regulatory requirements (e.g., 10 CFR 50.49). This issue was evaluated by the NRC in GL 84-01. GL 84-01 states that NRC has not been consistent in the use of these terms, and in many cases has used these terms interchangeably.

The definition of the "safety-related" functions is the same as that in the current version of 10 CFR 100 and is comparable to the definition of "safety-related" in 10 CFR 50.2.

The NRC notes in GL 84-01:

"NRC regulatory jurisdiction involving a safety matter is not controlled by the use of terms such as 'safety-related' and 'important to safety,' and our conclusion that pursuant to our regulations, nuclear power plant permittees or licensees are responsible for developing and implementing quality assurance programs for plant design and construction or for plant operation which meet the more general requirements of General Design Criterion (GDC) for plant equipment 'important to safety,' and the more prescriptive requirements of Appendix B to 10 CFR 50 for "safety-related" plant equipment."

The intent of GL 84-01 was to avoid having nuclear plants make changes to the safety classifications used in their QA program. The QA requirements of 10 CFR 50, Appendix B have always been applied to SSCs that meet the definition of "safety-related" in 10 CFR 50.2 regardless of how the terms "safety related" or "important to safety" have been used in regulations. However, as noted in GL 84-01, in specific situations the NRC has imposed additional quality assurance (QA) requirements commensurate with the importance to safety of the equipment involved.

As discussed in DCD Tier 2 Section 3.11, electrical, mechanical, and instrumentation and control (I&C) (both analog and digital) equipment designated as safety-related or important to safety is addressed in the US-APWR Equipment Environmental Qualification (EQ) Program to verify it is capable of performing its design function(s) under all anticipated service conditions defined in 10 CFR 50.49(b). 10 CFR 50.49 defines "safety-related" and "important to safety" consistent with 10 CFR 50.2 discussed above. Non safety-related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions defined above by safety-related equipment are also required to be qualified. Certain post-accident monitoring equipment defined by Regulatory Guide (RG) 1.97 are also required to be environmentally qualified. Safety-related and non safety-related instrumentation and electrical equipment required to be EQ qualified in accordance with 10 CFR 50.49 are identified in Table 3D-2. QA requirements will be applied as discussed in Subsection 3.11.1.1 (Sections III, XI, and XVII). QA requirements for I&C systems is discussed in DCD Subsection 7.1.3.18. The overall Quality Assurance Program (QAP) for the US-APWR I&C systems is described in Chapter 17. The specific QAP for the safety system digital platform, MELTAC, is described in Topical Report, MUAP-07005, Section 6.0. These QAPs address all requirements of 10 CFR 50, Appendix B, and IEEE Std 7-4.3.2-2003.

The NRC requests that MHI clarify the application of the terms "safety-related" and "important to safety" to the quality group classification of SSCs and compliance with GDC 1. GDC 1 of 10 CFR Part 50, Appendix A states in part:

"that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. A quality assurance program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions."

DCD Tier 2, Table 3.2-3 provides a comparison of US-APWR equipment classifications and corresponding quality groups consistent with the requirements of RG 1.26, Revision 4. 10 CFR 50, Appendix B requirements will be applied to those SSCs that are classified as safety-related (seismic category I). Those SSCs classified as seismic category II will meet the pertinent requirements of 10 CFR 50 Appendix B as indicated in Table 3.2-3, and in accordance with the seismic design requirements of RG 1.29, Rev. 4. Refer also to the response to request for additional information (RAI) 03.02.02-3 for clarification of QA requirements for seismic category II SSCs.

QA program controls will be applied to NS (non-safety-related) SSCs as discussed in QAP (PQD-HD-19005, Rev.1), Part III titled, "Nonsafety-Related SSC Quality Control". The specific program controls will be consistent with applicable sections 1-18 of the QAP and are applied to those items in a selected manner, and will be focused at those characteristics or critical attributes that render the SSC a significant contributor to plant safety. This will include NS category SSCs that are designated as Equipment Class 4 or 5.

In addition, quality standards will be applied to the following SSCs:

- Quality requirements will be implemented for the fire protection system in accordance with Regulatory Position 1.7, "Quality Assurance," in RG 1.189, "Fire Protection for Operating Nuclear Power Plants." Fire Protection Program SSCs are designated as Equipment Class 7.
- Quality requirements will be implemented for anticipated transient without scram (ATWS) equipment in accordance with Generic Letter 85-06 "Quality Assurance Guidance for ATWS Equipment That Is Not Safety Related."
- Quality requirements will be implemented for station blackout (SBO) equipment in accordance with Regulatory Position 3.5, "Quality Assurance and Specific Guidance for SBO Equipment That Is Not Safety Related," and Appendix A, "Quality Assurance Guidance for Non-Safety System and Equipment," in RG 1.155, "Station Blackout."
- RG 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants", provides specific guidance on the classification of Radioactive Waste Management Systems (RWMS). Codes and standards, seismic requirements and QA requirements are applied consistent with RG 1.143. The requirements of 10 CFR 50, Appendix B are not applied to RWMS SSCs. Equipment Class 6 is assigned to the RWMS SSCs.
- RG 1.151 is used as guidance for the seismic design and classification of safety-related instrumentation sensing lines. The seismic classification of safety-related instrumentation sensing lines is in accordance with RG 1.151, Positions C.2 and C.3. The use of this guidance assures that the instrument sensing lines used to actuate or monitor safety-related systems are appropriately classified and are capable of withstanding the effects of the safe shutdown earthquake (SSE). RG 1.151 provides additional guidance in meeting RG 1.26 quality group classifications for instrument sensing lines.

Please refer to the response to RAI 03.02.01-12 regarding the application of the terms "safety-related" and "important to safety" regarding to the seismic classification of SSCs and compliance with GDC 2.

In summary, SSCs are designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed in accordance with GDC 1 of 10 CFR 50, Appendix A. 10 CFR 50, Appendix B QA requirements are applied to safety-related and non safety-related SSCs (as required) consistent with NRC regulations and guidance (e.g., fire protection and seismic category II SSCs). Additional quality standards are applied to non safety-related SSCs commensurate with the functions of the SSC and contribution to plant safety.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/8/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 276-2043 REVISION 1
SRP SECTION: 03.02.02 - System Quality Group Classification
APPLICATION SECTION: 03.02.02
DATE OF RAI ISSUE: 03/11/09

QUESTION NO. RAI 03.02.02-8:

10 CFR Part 52.47 identifies that the Commission will require prior to design certification, that information normally contained in certain procurement specifications and construction and installation specifications be completed and available for audit. The applicant is requested to clarify if the design basis information on quality group classification for all important to safety SSCs within the scope of the DCD, including structures, is included in specifications and if this information is now available for audit.

ANSWER:

"Design Specifications" for important to safety structures, systems, and components (SSCs) will be prepared by MHI during the DCD review phase. In addition, for risk significant, unique-fabrication-required and/or newly designed SSCs, as-designed "Stress Reports" for important to safety SSCs will be prepared by MHI during the DCD review phase.

For the remaining low risk and/or more conventional SSCs, "Design Specifications" will be prepared by MHI during the DCD review phase. Numerous ASME qualified vendors are available to manufacture these SSCs. "Stress Reports" will be prepared by those vendors prior to material procurement. The "Design Specification" will be met by those experienced vendors.

The MHI design completion plan for US-APWR SSCs is summarized in MHI Letter UAP-HF-08123, Table 1, dated July 14, 2008. In this table, the schedule of the available information is presented. This information will be available for NRC audit. The detailed plan for all of the Piping Systems and Components is presented in Enclosure 3 in this letter.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

This completes MHI's responses to the NRC's questions.

- Pressure Vessels ASME Code, Section VIII, Division 1
(Reference 3.2-19)
- Piping ASME B31.1 (Reference 3.2-20)
- Pumps Manufacturers' standards
- Valves ASME B31.1 (Reference 3.2-20)
- Atmospheric Storage Tanks API-650 (Reference 3.2-21), AWWA D-100
(Reference 3.2-22), or ASME B96.1
(Reference 3.2-23)
- 0-15 psig Storage Tanks API-620 (Reference 3.2-24)
- Supports Manufacturers' standards

3.2.2.5 Other Equipment Classes

Equipment Class 5

Equipment Class 5 is assigned to non safety-related components that are not part of the RWMS and not within the purview of RG 1.26 (Reference 3.2-13).

This equipment class is also assigned to non safety-related structures and structural components, instrumentation, controls, and electrical components.

~~Equipment Class 5 SSCs are classified NS or seismic category II. Seismic category II SSCs meet the pertinent QA requirements of 10 CFR 50, Appendix B, and 10 CFR 50, Appendix B (Reference 3.2-8) is not applied. Specific quality assurance program controls are applied to non safety-related SSCs, to a degree consistent with their importance to safety (graded approach), as described in Chapter 17. Codes and standards, as defined in the design bases, are applied to Equipment Class 5 components.~~

Equipment Class 6

Equipment Class 6 is assigned to the components of the RWMS.

The seismic category defined in RG 1.143 (Reference 3.2-10) is applied and 10 CFR 50, Appendix B (Reference 3.2-8) is not applied.

The codes and standards defined in RG 1.143 (Reference 3.2-10), Table 1, are applied to equipment Class 6 components.

Equipment Class 7

Equipment Class 7 is assigned to the system, design, and components of the Fire Protection Program.

3. DESIGN OF STRUCTURES, US-APWR Design Control SYSTEMS, COMPONENTS, AND EQUIPMENT

ATTACHMENT 1
to RAI 276-2043

- 3.2-4 General Design Criteria for Nuclear Power Plants, Domestic Licensing of Production and Utilization Facilities, Energy. Title 10, Code of Federal Regulations, Part 50, Appendix A, U.S. Nuclear Regulatory Commission, Washington, DC.
- 3.2-5 Seismic Design Classification. Regulatory Guide 1.29, Rev. 4, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 3.2-6 Earthquake Engineering Criteria for Nuclear Power Plants, Domestic Licensing of Production and Utilization Facilities, Energy. Title 10, Code of Federal Regulations, Part 50, Appendix S, U.S. Nuclear Regulatory Commission, Washington, DC.
- 3.2-7 Geologic and Seismic Siting Criteria, Reactor Site Criteria, Energy. Title 10, Code of Federal Regulations, Part 100.23, U.S. Nuclear Regulatory Commission, Washington, DC.
- 3.2-8 Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, Domestic Licensing of Production and Utilization Facilities, Energy. Title 10, Code of Federal Regulations, Part 50, Appendix B.
- 3.2-9 Instrument Sensing Lines. Regulatory Guide 1.151, U.S. Nuclear Regulatory Commission, Washington, DC, July 1983.
- 3.2-10 Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants. Regulatory Guide 1.143, Rev. 2, U.S. Nuclear Regulatory Commission, Washington, DC, November 2001.
- 3.2-11 Fire Protection for Nuclear Power Plants. Regulatory Guide 1.189, Rev. 1, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 3.2-12 Codes and Standards, Domestic Licensing of Production and Utilization Facilities, Energy. Title 10, Code of Federal Regulations, Part 50.55a, U.S. Nuclear Regulatory Commission, Washington, DC.
- 3.2-13 Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants. Regulatory Guide 1.26, Rev. 4, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 3.2-14 Boiler and Pressure Vessel Code. "Section III, Division 1, Nuclear Power Plant Components," American Society of Mechanical Engineers, 2001 Edition including Addenda through 2003.
- 3.2-15 Resolution of Generic Issue 70, "Power-Operated Relief Valve and Block Valve Reliability," and Generic Issue 94, "Additional Low-Temperature Overpressure Protection for Light-Water Reactors," NRC Generic Letter 90-06, June 25, 1990.

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- 3.2-16 System Quality Group Classification, "Design of Structures, Components, Equipment, and Systems," Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants. NUREG-0800 Standard Review Plan 3.2.2, Rev. 2, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 3.2-17 Instrument Lines Penetrating Primary Reactor Containment (Safety Guide 11) Supplement to Safety Guide 11, Backfitting Considerations,. Regulatory Guide 1.11, U.S. Nuclear Regulatory Commission, Washington, DC, March 1971.
- 3.2-18 Equipment and Floor Drainage System, "Auxiliary Systems," Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants. NUREG-0800, Standard Review Plan 9.3.3, Rev. 3, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 3.2-19 Boiler and Pressure Vessel Code. "Section VIII, Division 1, Pressure Vessels," American Society of Mechanical Engineers, 2001 Edition including Addenda through 2003.
- 3.2-20 Power Piping, ASME Code for Pressure Piping, Standards of Pressure Piping. ASME/ANSI B31.1-~~2004~~1989, American Society of Mechanical Engineers/American National Standards Institute.
- 3.2-21 Welded Steel Tanks for Oil Storage. Revision 1, API-650-07, Eleventh Edition with Addenda~~80~~, February 1984.
- 3.2-22 Welded Steel Tanks for Water Storage. AWWA DI00-~~05~~84, American Water Works Association.
- 3.2-23 Welded Aluminum-Alloy Storage Tanks. ANSI B96.1-~~99~~84, American National Standards Institute.
- 3.2-24 Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks. API-620-08, Eleventh Edition with Addenda. ~~82~~, Revision 1, April 1985.
- 3.2-25 Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants. NFPA 804, 2006 Edition, National Fire Protection Association, Quincy, MA.

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Table 3.2-3 Comparison of Various Requirements to Equipment Class

US-APWR Equipment Class	ASME Code, Section III (Reference 3.2-14), Class	RG1.29 (Reference 3.2-5) Seismic Category	RG1.26 (Reference 3.2-13) NRC Quality Group	10 CFR 50 Appendix B (Reference 3.2-8)
1	1 ¹	I	A	YES ²
2	2 ¹	I	B	YES ²
3	3 ¹	I	C	YES ²
4	N/A ³	NS or II	D	N/A ⁴
5	N/A ⁵	NS or II	N/A	N/A ⁴
6	N/A ⁶	N/A ⁷	N/A	N/A ⁸
7	N/A ⁹	N/A ¹⁰	N/A	N/A ¹¹

Notes:

1. Items not covered by the ASME Code are designed to other applicable codes and standards.
2. "Yes" means QA Program is required according to 10 CFR 50, Appendix B (Reference 3.2-8).
3. Refer to Subsection 3.2.2.4.
4. Seismic category II SSCs meet the pertinent QA requirements of 10 CFR 50, Appendix B. (Refer to Subsection 3.2.1.1.2) A-graded approach QA Program meeting Chapter 17, as applicable.
5. Code and standard as defined in design bases are applied.
6. Code and standard meeting RG 1.143 (Reference 3.2-10) are applied.
7. Seismic category meeting RG 1.143 (Reference 3.2-10) is applied.
8. A QA program meeting RG 1.143 (Reference 3.2-10) is applied.
9. Code and standard meeting RG 1.189 (Reference 3.2-11) is applied.
10. Seismic category meeting RG 1.189 (Reference 3.2-11) is applied.
11. A QA Program meeting RG 1.189 (Reference 3.2-11) is applied.
12. ~~Seismic category II SSCs meet the QA requirement of 10 CFR, Appendix B. (Refer to sub-section 3.2.1.1.2)~~