Table 1.6-2 Material Referenced as Technical Reports (Sheet 2 of 5)

Report Number(1)	Title	DCD Section Number(2)	
[*MUAP-07028-P MUAP-07028-NP*]*	[*Probability of Missile Generation From Low Pressure Turbines, Revision 2, June 2013.*]*	3.5.1, 10.2.3	DCD_14.03.07-94
[MUAP-07029-P MUAP-07029-NP]*	[*Probabilistic Evaluation of Turbine Valve Test Frequency, Revision 3, June 2013.*]*	3.5.1, 10.2.3	DCD_14.03.07-94
MUAP-07030	US-APWR Probabilistic Risk Assessment, Revision 3, June 2011.	6.2.5, 7.1.3, 7.5.1, 17.4.7, 19.0, 19.1.4, 19.2.3 19B	
MUAP-07031-P MUAP-07031-NP	Subcompartment Analysis for US-APWR Design Confirmation, Revision 1, October 2009.	6.2.1	
MUAP-07032-P MUAP-07032-NP	Criticality Analysis for US-APWR New and Spent Fuel Storage Racks, Revision ~~1~~2, ~~December,~~March 20~~09~~14.	9.1.1	MIC-04-01-00012
MUAP-07033-P MUAP-07033-NP	Mechanical Analysis for US-APWR New and Spent Fuel Racks, Revision ~~0~~1, March~~,~~ 20~~09~~14.	9.1.2	MIC-04-01-00012
MUAP-07035	Structural Analysis for US-APWR Reactor Coolant Pump Motor Flywheel, Revision 0, December 2007.	5.4.1	
MUAP-07036	Justification for Deviations Between NUREG-1431 Revision 3.1 and US-APWR Technical Specifications, Revision 2, November 2009.	16	
MUAP-08001-P MUAP-08001-NP	US-APWR Sump Strainer Performance, Revision 8, June 2013	5.2.3, 6.2.2, 6.3.2	
MUAP-08007-P MUAP-08007-NP	Evaluation Results of US-APWR Fuel System Structural Response to Seismic and LOCA Loads, Revision 2, December 2010.	4.2.3	
MUAP-08009	US-APWR Test Program Description, Revision 1, October 2009.	1.8.1, 14.2.1, 14.2.2, 14.2.3, 14.2.4, 14.2.5, 14.2.6, 14.2.13, 14.3.4	
MUAP-08011-P MUAP-08011-NP	US-APWR Sump Debris Chemical Effects Test Results, Revision 3, June 2013.	6.2.2	
MUAP-08012-NP	US-APWR Sump Strainer Stress Report, Revision 2, June 2013.	6.2.2	
MUAP-08013-P MUAP-08013-NP	US-APWR Sump Strainer Downstream Effects, Revision 5, June 2013.	6.2.2, 6.3.2	
MUAP-08014-P MUAP-08014-NP	Human System Interface Verification and Validation (Phase 1a), Revision 1, May 2011.	1.5.2, 18.1.1, 18.1.5, 18.2.3, 18.2.1,18.7.2,18.10.2, 18.10.3	
MUAP-08015	US-APWR Equipment Qualification Program, Revision 1, November 2009.	1.8.1, 3.11, 3.11.2, 3.11.4, 3.11.5, 3.11.6, 3.11.7, 3D.1.7, 3D.3, 7.1.3, 7.5.1, ~~1.8.1,3.11.2,3D.3~~, 19.1	MIC-04-01-00010 DCD_19-516S01
MUAP-09001-P MUAP-09001-NP	Summary of Design Transient, Revision 0, February 2009.	3.9.1	

Table 1.6-2 Material Referenced as Technical Reports (Sheet 3 of 5)

Report Number(1)	Title	DCD Section Number(2)	
MUAP-09010-P MUAP-09010-NP	Summary of Stress Analysis Results for Reactor Coolant Loop Piping, Revision 3, March 2011.	3B.3.2.4	
MUAP-09013-P MUAP-09013-NP	Summary of Stress Analysis Results for Main Steam Piping inside Containment, Revision 2, March 2011.	3B.3.2.4	
MUAP-09014-P MUAP-09014-NP	Thermal-Hydraulic Analysis for US-APWR Spent Fuel Racks, Revision ~~0~~1, ~~June~~March 20~~09~~14.	9.1.2	MIC-04-01-00012
MUAP-09016	US-APWR Reactor Vessel Pressure and Temperature Limits Report, Revision 3, February 2013.	5.3.2, 16 (5.6.4)	
MUAP-09017-P MUAP-09017-NP	Justification for 20 Years Inspection Interval for Reactor Coolant Pump Flywheel, Revision 0, July 2009.	5.4.1	
MUAP-09018-P MUAP-09018-NP	Calculation Methodology for Reactor Vessel Neutron Flux and Fluence, Revision 1, October 2009.	4.3.2	
MUAP-09019-P MUAP-09019-NP	HSI Design, Revision 2, October 2012.	18.1.1, 18.1.2, 18.1.3, 18.1.4, 18.1.5, 18.3.3, 18.4.2, 18.4.3, 18.6.1, 18.6.3, 18.7.2	
MUAP-09020-P MUAP-09020-NP	Function Assignment Analysis for Safety Logic System, Revision 2, May 2011.	7.3.1	
MUAP-09021-P MUAP-09021-NP	Response Time of Safety I&C System, Revision 3, August 2013.	7.9.2, 16(B3.3.1), 16(B3.3.2)	
MUAP-09022-P MUAP-09022-NP	US-APWR Instrument Setpoint Methodology, Revision 3, July 2013.	7.2.1, 7.2.2, 7.3.2, 7.5.1, 16(B3.3.1), 16(B3.3.2), 16(B3.3.3), 16(B3.3.4), 16(B3.3.5), 7.8.1	
MUAP-09023-P MUAP-09023-NP	Onsite AC Power System Calculation, Revision ~~0~~1, ~~March~~August 201~~0~~3.	8.3.1	MIC-04-01-00009
MUAP-09025-P MUAP-09025-NP	CFD Analysis for Advanced Accumulator, Revision 3, June 2013.	6.3.2	
MUAP-10002-P MUAP-10002-NP	Damping Ratio of SC Structure, Revision 0, March 2011.	3.7.1, 3.7.2, 3.7.3	
MUAP-10003	US-APWR Physical Security Hardware ITAAC Abstracts, Revision 1, March 2011.	14.3.4	
MUAP-10006	Soil-Structure Interaction Analyses and Results for the US-APWR Standard Plant, Revision 3, November 2012.	3.7.1, 3.7.2, Appendix 3H (3H.1), Appendix 3I (3I.1)	
MUAP-10008	Staffing and Qualifications Implementation Plan, Revision 2, October 2012.	18.1.1, 18.1.5, 18.5.1, 18.5.3	
MUAP-10009	HSI Design Implementation Plan, Revision 2, October 2012.	18.1.1, 18.1.5, 18.6.3, 18.7.2, 18.7.3	
MUAP-10012	Verification and Validation Implementation Plan, Revision 2, October 2012.	18.1.1, 18.1.5, 18.6.3	

The spent fuel racks are composed of individual vertical cells, and several tiers of grid structures which interconnect each cell to rigidly maintain the cell array configuration. Each rack module is vertically supported by a base plate with ~~5~~4 legs on the pit floor without anchoring. Additionally, each rack cell is vertically supported by a base plate on the pit floor without anchoring. The grid structures are designed such that a fuel assembly cannot be inserted between the cells. MIC-04-09-00008

Moderate density racks containing a neutron absorber material are provided in the SFP. Center-to-center spacing of the rack array is 11.1 inches to maintain the required degree of subcriticality as shown in Figure 9.1.2-2.

Materials used in rack construction are compatible with the SFP environment, and surfaces that come into contact with the fuel assemblies are made of annealed austenitic stainless steel, and are smooth (~~250 µ in.~~125AA) in accordance with the requirement of ANSI/ANS-57.2. Structural materials are corrosion resistant and will not contaminate the fuel assemblies or pit environment. Metamic™ is selected the neutron absorber material. Following program for monitoring the effectiveness of neutron poison by incorporating basic tests assures that the subcriticality requirements of the stored fuel array are maintained. DCD_09.01.02-45

Purpose of Surveillance Program

The purpose of the surveillance program is to characterize certain properties of the Metamic™ with the objective of providing data necessary to assess the capability of the Metamic™ panels in the racks to continue to perform their intended function. The surveillance program is also capable of detecting the onset of any significant degradation with ample time to take such corrective action as may be necessary.

The Metamic™ surveillance program depends primarily on representative coupon samples to monitor performance of the absorber material without disrupting the integrity of the storage system. The principal parameters to be measured are the thickness (to monitor for swelling) and Boron-10 loading (to monitor for the continued presence of boron in the Metamic™).

Coupon Surveillance Program

Coupon Description

The coupon measurement program includes coupons suspended on a mounting (called a tree), placed in a designated cell, and surrounded by spent fuel. Coupons are removed from the array on a prescribed schedule and certain physical measurements from which the stability and integrity of the Metamic™ in the fuel storage racks may be inferred.

The coupon surveillance program uses a tree with a total of 10 test coupons. In mounting the coupons on the tree, the coupons are positioned axially within the central eight feet (approximate) of the active fuel zone where the gamma flux is expected to be reasonably uniform.

The coupons will be taken from the same lot as that used for construction of the racks. Each coupon will be carefully pre-characterized prior to insertion in the pool to provide

9.1.7-2 'Criticality Accident Requirements,' "Domestic Licensing of Production and Utilization Facilities," Energy. NRC Regulations Title 10, Code of Federal Regulations, 10 CFR Part 50.68.

9.1.7-3 Kopp, L. Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light-Water Reactor Power Plants. U.S. Nuclear Regulatory Commission, February 1998.

9.1.7-4 Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors. ANSI/ANS-8.17-2004, American National Standards Institute/American Nuclear Society.

9.1.7-5 Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors. ANSI/ANS-8.1-1998 (2007), American National Standards Institute/ American Nuclear Society.

9.1.7-6 Criticality Analysis for US-APWR New and Spent Fuel Storage Racks, MUAP-07032, ~~December~~March 20~~09~~14. MIC-04-09-00008

9.1.7-7 Design Requirements for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants. ANS 57.2-1983, American Nuclear Society.

9.1.7-8 Mechanical Analysis for US-APWR New and Spent Fuel Racks, MUAP-07033, March~~,~~ 20~~09~~14. MIC-04-09-00008

9.1.7-9 Design Requirements for New Fuel Storage Facilities at Light Water Reactor Plants. ANS 57.3-1983, American Nuclear Society.

9.1.7-10 Rules for Construction of Nuclear Components. ASME Boiler and Pressure Vessel Code, Division 1, Section III, 2001 Edition through the 2003 Addenda.

9.1.7-11 EPRI Primary Water Chemistry Guidelines:
Revision 6, 2007

9.1.7-12 Spent Fuel Storage Facility Design Basis. Regulatory Guide 1.13, Rev. 2, U.S. Nuclear Regulatory Commission.

9.1.7-13 Design Requirements For Light Water Reactor Fuel Handling Systems. ANSI/ ANS57.1-1992, American National Standards Institute/American Nuclear Society.

9.1.7-14 "Occupational Safety and Health Standards," Labor. Title 29 Code of Federal Regulations, Part 1910, U.S. Nuclear Regulatory Commission,.

9.1.7-15 "Standards for Protection against Radiation," Energy. Title 10, Code of Federal Regulations, Part 20, U.S. Nuclear Regulatory Commission,

9.1.7-16 "Rules for Construction of Nuclear Facility Components," Boiler and Pressure Vessel Code Section III, American Society of Mechanical Engineers, 2001 Edition through the 2003 Addenda.

9.1.7-17 "Shippers – General Requirements for Shipments and Packagings." Transportation. Title 49, Code of Federal Regulations, Part 173, U.S. Nuclear Regulatory Commission, Washington, DC.

9.1.7-18 "Packaging and Transportation of Radioactive Material." Energy. Title 10, Code of Federal Regulations, Part 71, U.S. Nuclear Regulatory Commission, Washington, DC.

9.1.7-19 Single-Failure-Proof Cranes for Nuclear Power Plants. NUREG-0554, U.S. Nuclear Regulatory Commission, Washington, DC, May 1979.

9.1.7-20 Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder). ASME NOG-1, 2004, American Society of Mechanical Engineers.

9.1.7-21 Control of Heavy Loads at Nuclear Power Plants. NUREG-0612, U.S. Nuclear Regulatory Commission, Washington, DC, July 1980.

9.1.7-22 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist). ANSI/ASME B30.2-2005, American Society of Mechanical Engineers.

9.1.7-23 American National Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More for Nuclear Materials. American National Standards Institute, ANSI N14.6-1993, American Nuclear Society, IL.

9.1.7-24 Slings. ANSI/ASME B30.9-2003, American Society of Mechanical Engineers.

9.1.7-25 Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes. CMAA Specification No.70, 2000, Crane Manufacturers Association of America, Inc.

9.1.7-26 Thermal-Hydraulic Analysis for US-APWR Spent Fuel Racks, MUAP-09014~~P (R0) and MUAP-09014NP (R0), Mitsubishi Heavy Industries, Ltd.~~, ~~June~~March 20~~09~~14. MIC-04-09-00008

9.1.7-27 Plant Support Engineering: Guidance for Replacing Heat Exchangers at Nuclear Power Plants with Plate Heat Exchangers, July 2006.

9.1.7-28 Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning. RG 4.21, Rev.0, U.S. Nuclear Regulatory Commission, Washington, DC, June 2008.

9.1.7-29 Combined License Applications for Nuclear Power Plants (LWR Edition), Regulatory Guide (RG) 1.206, U.S. Nuclear Regulatory Commission, Washington, DC, June 2007.

9.1.7-30 Rules for Construction of Cranes, Monorails, and Hoists (With Bridge or Trolley or Hoist of the Underhung Type). ASME NUM-1, 2004, American Society of Mechanical Engineers.

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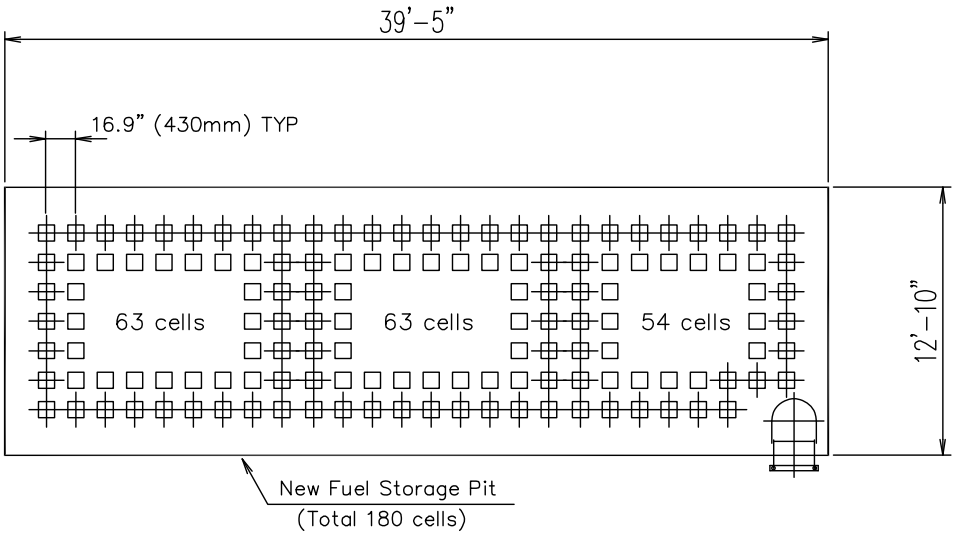

Figure 9.1.1-1 New Fuel Storage Pit

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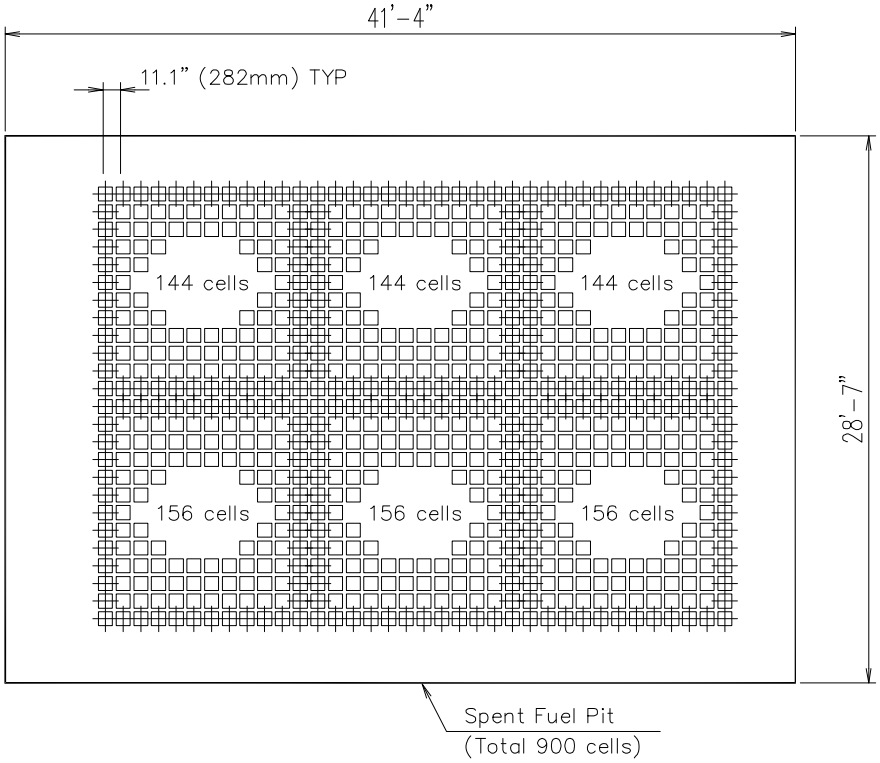

Figure 9.1.1-2 Spent Fuel Pit

MIC-04-09-00008

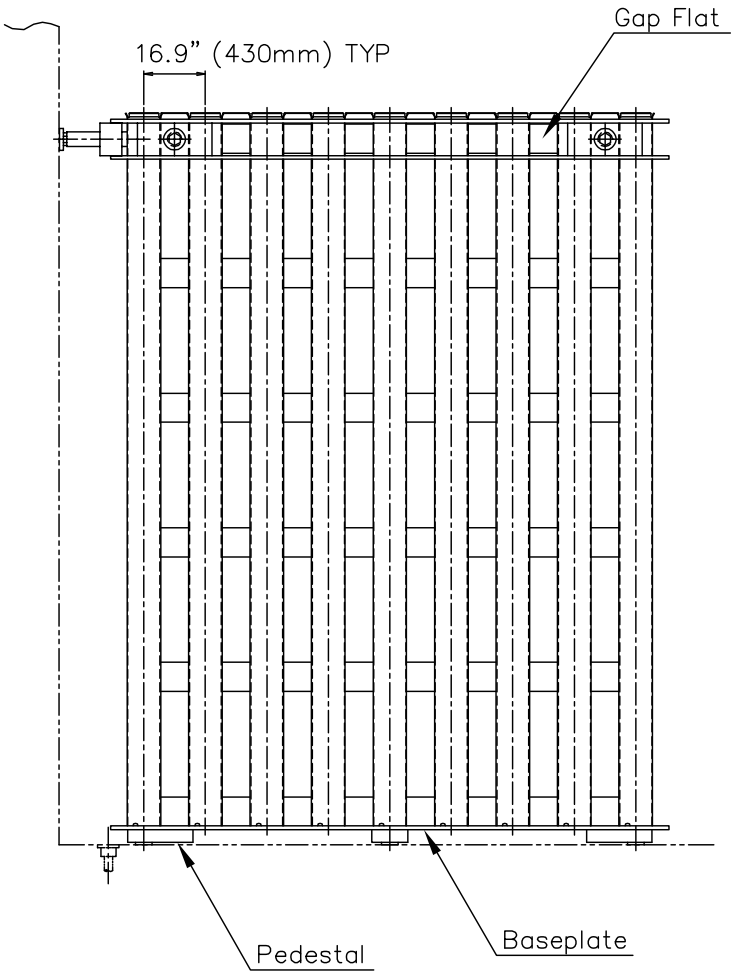

Figure 9.1.2-1 New Fuel Rack Array

MIC-04-09-00008

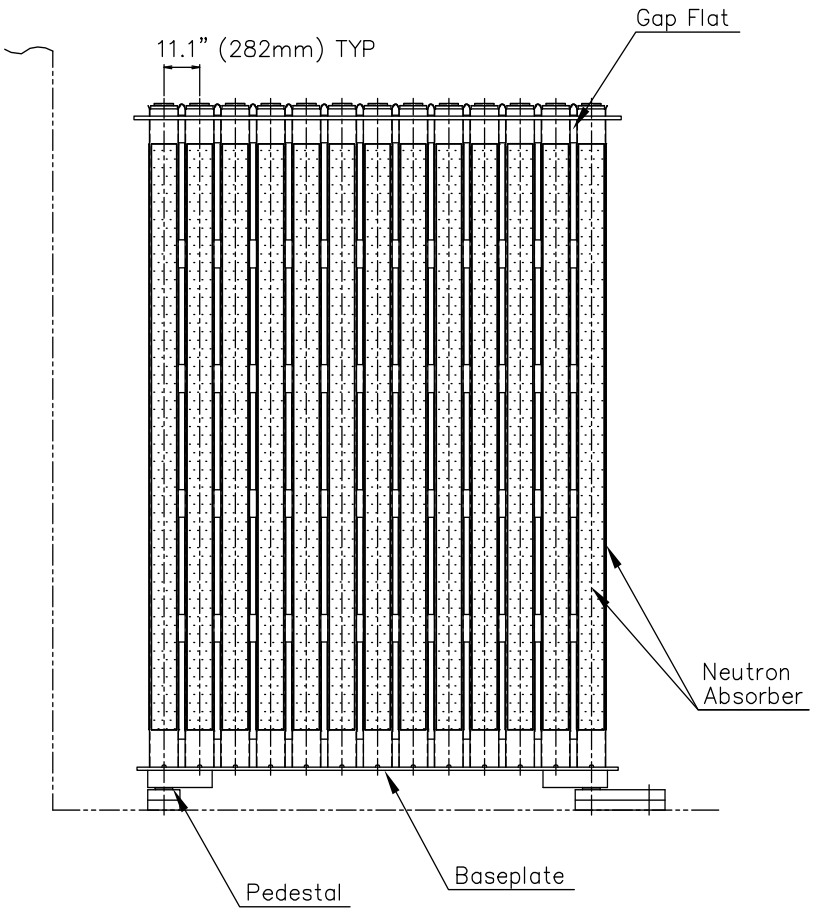

Figure 9.1.2-2 Spent Fuel Rack Array

DCD_09.01.02-55

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Security-Related Information – Withheld Under 10 CFR 2.390

Security-Related Information – Withheld Under 10 CFR 2.390

Figure 9.1.4-2 Section View of Light Load Handling System