Enclosure 2

MFN 14-071, Supplement 1, Revision 1

GEH Response and Revised Supplemental Response to RAI 01.05-1

ABWR DCD DRAFT Revision 6 Markups

2.6.2 Fuel Pool Cooling and Cleanup System

Design Description

The Fuel Pool Cooling and Cleanup (FPC) System (Figure 2.6.2) removes decay heat generated by the spent fuel assemblies in the spent fuel storage pool. The system also maintains the water quality and monitors and maintains the water level above the spent fuel in the spent fuel storage pool. Figure 2.6.2 shows the basic FPC System configuration and scope.

The FPC System is classified non-safety-related, except for piping connections and valves for safety-related fuel pool makeup and supplemental cooling by the Residual Heat Removal (RHR) System.

The safety-related makeup water source for the spent fuel storage pool is provided by the RHR System, which pumps suppression pool water to the FPC System.

The spent fuel storage pool has no piping connections (inlet, outlet, drains or other piping) located below a point 3m above the top of active fuel located in the spent fuel storage racks.

The FPC System components, with the exception of the filter/demineralizer unit, are classified as Seismic Category I. Figure 2.6.2 shows the ASME Code class for the FPC System piping and components.

(for example, narrow range water level)

The FPC System is located in the Reactor Building.

The FPC System has non-safety parameter displays in the main control room for instruments shown on Figure 2.6.2. In addition, two safety-related spent fuel pool wide range level instruments are provided. Indication of the spent fuel pool level is provided in the Main Control Room (MCR) as well as in another appropriate area that is accessible post-accident.

The check valves (CVs) shown on Figure 2.6.2 have active safety-related functions to open, close, or both open and close under system pressure, fluid flow, and temperature conditions.

The piping and components of the FPC System at the suction side of the RHR System from the upstream isolation valve have a design pressure of 2.82 MPaG for intersystem LOCA (ISLOCA) conditions.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.6.2 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria, which will be undertaken for the FPC System.

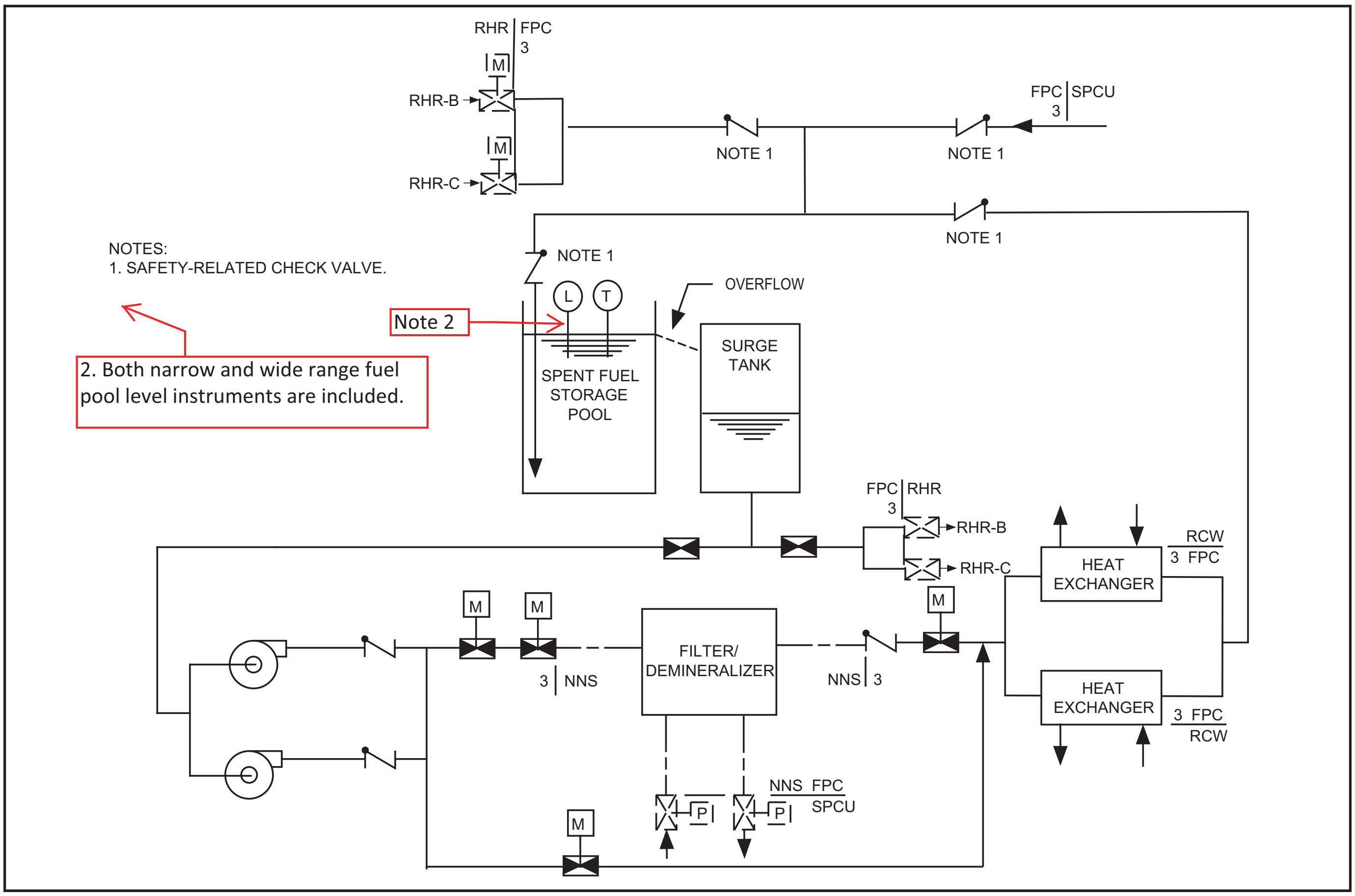

Figure 2.6.2 Fuel Pool Cooling and Cleanup System

Table 2.6.2 Fuel Pool Cooling and Cleanup System

Inspections, Tests, Analyses and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The basic configuration of the FPC System is as shown on Figure 2.6.2.	1. Inspection of the as-built system will be conducted.	1. The as-built FPC System conforms with the basic configuration shown on Figure 2.6.2.
2. The ASME Code components of the FPC System retain their pressure boundary integrity under internal pressures that will be experienced during service.	2. A hydrostatic test will be conducted on those Code components of the FPC System required to be hydrostatically tested by the ASME Code.	2. The results of the hydrostatic test of the ASME Code components of the FPC System conform with requirements in the ASME Code, Section III.
3. The safety-related makeup water source for the spent fuel storage pool is provided by the RHR System, which pumps suppression pool water to the FPC System.	3. Tests will conducted on the as-built FPC and RHR Systems by aligning the systems so that the RHR System draws water from the suppression pool and discharges into the spent fuel storage pool.	3. The combined RHR System and FPC System operation transfers water from suppression pool to the spent fuel storage pool.
4. The spent fuel storage pool has no piping connections (inlet, outlet, drains or other piping) located below a point 3m above the top of active fuel located in the spent fuel storage racks.	4. Inspections of the as-built spent fuel storage pool will be conducted.	4. The spent fuel storage pool has no piping connections (inlet, outlet, drains or other piping) located below a point 3m above the top of active fuel located in the spent fuel storage racks.
5. ~~Main~~Non-safety main control room displays provided for the FPC System are as defined in Section 2.6.2.	5. Inspections will be performed on the non-safety main control room displays for the FPC System.	5. Displays exist or can be retrieved in the main control room as defined in Section 2.6.2.
6. CVs designated in Section 2.6.2 as having an active safety-related function open, close, or open and close, under system pressure, fluid flow, and temperature conditions.	6. Tests of installed valves for opening, closing, or both opening and closing, will be conducted under system preoperational pressure, fluid flow, and temperature conditions.	6. Based on the direction of the differential pressure across the valve, each CV opens, close, or both opens and closes depending upon the valve's safety functions.
7. The safety related displays provided for the FPC System spent fuel pool wide range water level are as described in Section 2.6.2.	7. Inspections will be performed of the safety related FPC system displays in both the main control room and at an alternate location.	7. Displays exist or can be retrieved in both the main control room and an alternate location.

Table 1.8-21 Industrial Codes and Standards* Applicable to ABWR (Continued)

Code or Standard Number	Year	Title
[H-46855B	*1979*	*Human Engineering Requirements for Military Systems, Equipment and Facilities]*(5)
[HDBK-217	*Latest Edition*	*Reliability Prediction of Electronic Equipment]*(3)
[HDBK-251	*Latest Edition*	*Reliability/Design: Thermal Applications]*(3)
[HDBK-759A	*1981*	*Human Factors Engineering Design for Army Material]*(5)
STD-282	1956	Filter Units, Protective Clothing Gas-Mask Components and Related Products: Performance-Test Methods
[STD-461C	*1987*	*Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference]*(3)(4)
[STD-462	*1967*	*Measurement of Electromagnetic Interference Characteristics]*(3)(4)
[STD-1472D	*1989*	*Human Engineering Design Criteria for Military Systems, Equipment and Facilities]*(5)
[STD-1478	*1991*	*Task Performance Analysis]*(5)
Others		
ASCE 7	1988	Minimum Design Loads for Buildings and Other Structures
ERDA 76-21	1976	Testing of Ventilation Systems, Section 9 of Industrial Ventilation Systems
[IEC 801-2	*1991*	*Electronic Capability for Industrial-Process Measurement and Control Equipment]*(3)
[IEC 880	*1986*	*Software for Computers in the Safety Systems of Nuclear Power Stations]*(3)(4)
[IEC 964	*1989*	*Design for Control Rooms of Nuclear Power Plants, Bureau Central de la Commission Electrotechnique Internationale]*(5)
[ISO 7498	*1984*	*Open Systems Interconnection-Basic Refence Model, as the Data Link Layer and Physical Layer]*(3)
OSHA 1910.179	1990	Overhead and Gantry Cranes
NEI 12-02	2012	Industry Guidance for Compliance with NRC Order EA-12-051, “To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation”
TEMA C	1978	Standards of Tubular Exchanger Manufacturers Association
UL-44	1983	Rubber-Insulated Wires and Cables
UL-489	1991	Molded-Case Circuit Breakers and Circuit Breaker Enclosures
UL-845	1988	Standard for Safety Motor Control Centers - Low Voltage Circuit Breakers
--	--	Crane Manufacturers Association of America, Specification No. 70

Table 1.8-22 Experience Information Applicable to ABWR (Continued)

No.	Issue Date	Title	Comment
1370	9/89	Resolution of USI A-48	Subsection 19B.2.18
1275	2/91	Volume 6, Operating Experience Feedback Report Solenoid Operated Valve Problems	
1339	6/90	Resolution of Generic Safety Issue 29: Bolting Degradation of Failure in Nuclear Power Plants	Subsection 19B.2.62
CR-3922	1/85	Survey and Evaluation of System Interaction Events and Sources, Vol. 1, 2	Subsection 19B.2.59
CR-4261	3/86	Assessment of Systems Interactions in Nuclear Power Plants	Subsection 19B.2.59
CR-4262	5/85	Effects of Control System Failures on Transients, Accidents at a GE BWR, Vol. 1 and 2	
CR-4387	12/85	Effects of Control System Failures on Transient and Accidents and Core-Melt Frequencies at a GE BWR	
CR-4470	5/86	Survey and Evaluation of Vital Instrumentation and Control Power Supply Events	
CR-5055	5/88	Atmospheric Diffusion for Control Room Habitability Assessment	Subsection 19B.2.40
CR-5088	1/89	Fire Risk Scoping Study: Investigation of Nuclear Power Plant Fire Risk, Including Previously Unaddressed Issues.	
CR-5230	4/89	Shutdown Decay Heat Removal Analysis: Plant Case Studies and Special Issues	
CR-5347	6/[illegible]	[illegible]	[illegible]
CR-5458	12[illegible]	[illegible] Program	
CR-4674	84/89	Precusors to Potential Severe Core Damage Accidents: Series	

EA-12-049 3/12 Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

Commission Order

No.	Issue Date	Title	Comment
EA-12-051	3/12	Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instruments	

Interim Staff Guidance

No.	Issue Date	Title	Comment
JLD-ISG-2012-03	8/12	Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation	

Table 1.9-1 Summary of ABWR Standard Plant COL License Information (Continued)

Item No.	Subject	Subsection
5.10	RIP Installation and Verification During Maintenance	5.4.15.4
6.1	Protection Coatings and Organic Materials	6.1.3.1
6.2	Alternate Hydrogen Control	6.2.7.1
6.3	Administrative Control Maintaining Containment Isolation	6.2.7.2
6.4	Suppression Pool Cleanliness	6.2.7.3
6.5	Wetwell-to-Drywell Vacuum Breaker Protection	6.2.7.4
6.5a	Containment Penetration Leakage Test (Type B)	6.2.7.5
6.6	ECCS Performance Results	6.3.6.1
6.7	ECCS Testing Requirements	6.3.6.2
6.7a	Limiting Break Results	6.3.6.3
6.8	Toxic Gases	6.4.7.1
6.9	SGTS Performance	6.5.5.1
6.9a	SGTS Exceedi	.2
6.10	PSI and ISI Program Plans	6.6.9.1
6.11	Access Requirement	6.6.9.2
7.1a	Spent Fuel Pool Level Instruments	7.5.3.1
7.1	Cooling Temperature Profiles for Class 1E Digital Equipment	7.3.3.1
7.2	APRM Oscillation Monitoring Logic	7.6.3.1
7.3	Effects of Station Blackout on HVAC	7.8.1
7.4	Electrostatic Discharge on Exposed Equipment Components	7.8.2
7.5	Localized High Heat Spots in Semiconductor Material for Computing Devices	7.8.3
8.1	Diesel Generator Reliability	8.1.4.1
8.2	Periodic Testing of Offsite Equipment	8.2.4.1
8.3	Procedures When a Reserve or Unit Auxiliary Transformer is Out of Service	8.2.4.2
8.4	Offsite Power Systems Design Bases	8.2.4.3
8.5	Offsite Power Systems Scope Split	8.2.4.4
8.6	Capacity of Auxiliary Transformers	8.2.4.5
8.7	Not Used	8.3.4.1
8.8	Diesel Generator Design Details	8.3.4.2
8.9	Not Used	8.3.4.3
8.10	Protective Devices for Electrical Penetration Assemblies	8.3.4.4

Table 3.2-1 Classification Summary (Continued)

Principal Component[a]	Safety Class[b]	Location[c]	Quality Group Classification[d]	Quality Assurance Requirement[e]	Seismic Category[f]	Notes
1. Vessels including supports—filter/ demineralizers	N	SC	D	E	—	
2. Piping and valves including supports upstream of F/D outlet isolation valve	N	SC	D	E	—	
3. Piping and valves including supports downstream of F/D inlet isolation valve	N	SC	D	E	—	
4. Heat exchangers including supports	N	SC	C	E	I	
5. Pumps including supports	N	SC	C	E	I	
6. Pump motors	N	SC	—	E	—	
7. Piping including supports and valves—cooling portion	N	SC	C	E	I	
8. Makeup Water System (MUWC) connection including valves and supports	N	SC	C	E	I	
9. RHR piping connections and valves including supports for safety-related makeup and supplemental cooling	3	SC	C	B	I	
10. SPCU piping connections and valves including supports	3	SC	C	B	I	
11. Electrical modules and cables with no safety-related function	N	SC, X	—	E	—	
12. Spent Fuel Pool Wide Range Level Instrumentation	3	SC, X	C	B	I	

Notes and footnotes are listed on pages 3.2-52 through 3.2-59

Subsection 7.5.2.1

the lower drywell through the vents. Once drywell and wetwell water levels equalize, the increase in drywell level will be monitored by the wetwell water level monitors up to the bottom of the RPV. (See also upper drywell water level monitoring for instrument overlap.)

In addition to the above discussion of lower drywell water level monitoring, the ABWR design provides for two (2) upper drywell water level monitors. The range of these instruments in from approximately 0.5 meters below the RPV (lower drywell and above wetwell to lower drywell vents) to the maximum primary containment water level limit (MPCWLL) (upper drywell and approximately five (5) meters above TAF.). This lower range provides an approximately 0.5 meter instrument overlap with the wetwell water level instruments and therefore provides four (4) instruments for monitoring water immediately below the RPV during severe accident conditions.

Two (2) wide range upper drywell level measurements are sufficient, since there is sufficient margin between the TAF and MPCWLL to allow controlling water with the highest level measurement, should the instruments disagree, and still assure containment integrity and core coverage for containment flooding with no severe accident condition.

(p) Standby Liquid Control System Tank Level

As SLCS storage tank level is a backup variable to SLCS discharge pressure as described in the previous section (m), Category 3 qualification is appropriate instead of Category 2 suggested by Regulatory Guide 1.97.

(q) Spent Fuel Pool Wide Range Level Instrumentation

(SFP)

The Fuel Pool Cooling System (FPC) includes two safety-related wide range level spent fuel pool instruments. This instrumentation is not required by RG 1.97. However, following its review of the Fukushima accident, the USNRC introduced a requirement that ~~spent fuel pool~~ level instrumentation be added to all licensed plants (Reference 7.5-1). NEI 12-02 (Reference 7.5-2) furnished additional design/implementation guidance. The ~~spent fuel pool~~ instrumentation is required to meet all the Category 1 requirements of Table 7.5-1.

SFP

SFP

The purpose of the instrumentation is to permit the operators to monitor the ~~spent fuel pool~~ water level after an accident and to take corrective action, as necessary, based upon the information that the spent fuel level pool indications afford. Accordingly, the range of the instrumentation will extend from the normal spent fuel pool water level down to point approximately 1m below the top of active fuel (TAF) of the spent fuel bundles located in the in the spent fuel

Insert 1

storage racks. The alarms associated with the instrumentation are described in DCD subsection 9.1.3.2.

An interruption of power to the instruments will not impact the design accuracy of the instruments or require recalibration of the equipment. In addition, capability will be provided so the instrument can be powered from an independent power source. This change in power source will also not impact the design accuracy of the instrument or require recalibration of the equipment.

Insert 2

7.5.3 COL License Information

7.5.3.1 Spent Fuel Pool Level Instruments

In Commission Order EA-12-051 Attachment 2, Section 2 (Reference 7.5-3) states that the SFP instrumentation shall be maintained to be available and reliable through the appropriate development and implementation of a training program. Personnel shall be trained in the use and maintenance (including test and calibration), and in the procedures for providing alternate power to the level instrument channels.

7.5.4 References

7.5-1 USNRC JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Interim Staff Guidance, Revision 0, August 29, 2012

7.5-2 NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation", Revision 1, August 24, 2012

7.5-3 EA-12-051, Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, March 12, 2012

Insert 3

Subsection 9.1.3.2

(4) Debris from inspection or disposal operations

(5) Residual cleaning chemicals or flush water

A post-processed strainer in the effluent stream of the filter-demineralizer limits the migration of filter material. The filter-holding element can withstand a differential pressure greater than the developed pump head for the system.

The filter-demineralizer units are located separately in shielded cells with enough clearance to permit removing filter elements from the vessels.

Each cell contains only the filter-demineralizer and piping. All valves (inlet, outlet, recycle, vent, drain, etc.) are located on the outside of one shielding wall of the room, together with necessary piping and headers, instrument elements and controls. Penetrations through shielding walls are located so as not to compromise radiation shielding requirements.

The filter-demineralizers are controlled from a local panel. A differential pressure and conductivity instruments provided for each filter-demineralizer unit indicate when backwash is required. Suitable alarms, differential pressure indicators and flow indicators monitor the condition of the filter-demineralizers.

System instrumentation is provided for both automatic and remote-manual operations. A low–low level switch stops the circulating pumps when the fuel pool skimmer-surge tank reserve capacity is reduced to the volume that can be pumped in approximately one minute with one pump at rated capacity (250 m^3/h). A level switch is provided in the fuel pool to alarm locally and in the control room on high and low level. Temperature elements are provided to display and alarm pool temperature and inlet temperature to the filter-demineralizers in the main control room. In addition, leakage flow detectors in the pool drains and pool liners are provided and alarmed in the control independent

The Spent Fuel Pool is also equipped with two safety-related wide-range level transmitters that transmit water level signals to the MCR. ~~The instruments will be powered from two independent Class 1E batteries~~. In addition, the water level signals will also be provided to the Remote Shutdown Panels or other appropriate location accessible post-accident. The signals are used both for water level indication and to initiate three low-level alarms, as conditions may require. At a minimum, alarm set points will include 1) Level 1 at the top of the ~~active~~ fuel, (the lowest level); 2) Level 2 is the safe shielding level, 3.05 m above TAF (the middle level); and 3) Level 3 is an elevation at a point just below normal water level (the uppermost alarm level) in order to provide the operators with warning of a decrease in the SFP coolant level. The uppermost alarm level will be the first alarm associated with the spent fuel pool level that the operators receive. For further details on the instrumentation, refer to DCD Section 7.5. This instrumentation will meet the requirements of Reference 9.1-1 and the guidance of Reference 9.1-2.

Insert 4

assembly bail handle

Insert 1 - Section 7.5.2.1 (q)

In addition to the design basis accident conditions required for qualification in Table 7.5-1 there are additional reliability requirements for the SFP instrumentation. The reliability will be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program). The associated temperature, humidity and radiation levels will be consistent with conditions in the vicinity of the SFP and the area of use considering normal operational, event and post-event conditions for no fewer than seven days post-event or until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049 (Reference 7.5-4) should be considered. Examples of post-event (beyond-design-basis) conditions to be considered are:

- radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water at top of active fuel,
- temperatures of 100 degrees C and 100% relative humidity environment,
- boiling water and/or steam environment, and
- the impact of FLEX mitigating strategies.

Installed instrument channel equipment within the SFP shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the SFP structure. An evaluation of other hardware stored in the SFP will be conducted to ensure it will not create adverse interaction with the instrument locations.

Insert 2 - Section 7.5.2.1 (q)

The instruments will be powered from two independent Class 1E batteries.

Insert 3 - Section 7.5.4

7.5-4 EA-12-049, Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, March 12, 2012.

Insert 4- Section 9.1.3.2

The instrument channels shall be arranged in a manner that provides reasonable separation and protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. To meet Order EA-12-051 (Reference 9.1-1) the separation and location guidance outlined in NEI 12-02 (Reference 9.1-2) will be considered to provide protection for installed instruments from external hazards.

The circulating pumps are controlled from the control room and a local panel. Pump low suction pressure automatically shuts off the pumps. A pump low discharge pressure alarm is indicated in the control room and on the local panel. The circulating pump motors are powered from the normal offsite sources backed by the combustion turbine generators.

~~The water level in the spent-fuel storage pool is maintained at a height sufficient to provide shielding for normal building occupancy.~~During normal plant operation the water level in the spent-fuel storage pool is maintained at a height sufficient to provide shielding for normal building occupancy with indication of level from non-safety narrow range level transmitters. Radioactive particulates removed from the fuel pool are collected in filter-demineralizer units which are located in shielded cells. For these reasons, the exposure of plant personnel to radiation from the FPC System is minimal. Further details of radiological considerations for this system are provided in Chapter 12.

The circulation patterns within the reactor well and spent-fuel storage pool are established by placing the diffusers and skimmers so that particles dislodged during refueling operations are swept away from the work area and out of the pools.

Check valves prevent the pool from siphoning in the event of a pipe rupture.

Heat from pool evaporation is handled by the building ventilation system. Makeup water is provided through a remote-operated valve.

9.1.3.3 Safety Evaluation

The maximum possible heat load for the FPC System upon closure of the fuel gates (21 days) is the decay heat of the full core load of fuel at the end of the fuel cycle plus the remaining decay heat of the spent fuel discharged at previous refuelings upon closure of the fuel gates; the maximum capacity of the spent-fuel storage pool is 270% of a core. The temperature of the fuel pool water may be permitted to rise to approximately 60°C under these conditions. During cold shutdown conditions, if it appears that the fuel pool temperature will exceed 52°C, the operator can connect the FPC System to the RHR System. Combining the capacities enables the two systems to keep the water temperature below 52°C. The RHR System will be used only to supplement the fuel pool cooling when the reactor is shut down. The reactor will not be started up whenever portions of the RHR System are needed to cool the fuel pool.

These connections may also be utilized during emergency conditions to assure cooling of the spent fuel regardless of the availability of the FPC System. The volume of water in the storage pool is such that there is enough heat absorption capability to allow sufficient time for switching over to the RHR System for emergency cooling.

During the initial stages of refueling, the reactor cavity communicates with the fuel pool, since the reactor well is flooded and the fuel pool gates are open. Decay heat removal is provided jointly by the RHR and FPC Systems and the pool temperature kept below 60°C. Evaluation studies concluded that after 150 hours decay following shutdown (fuel pool gates open), the

9.1.6.6 Overhead Load Handling System Information

The COL applicant shall provide a list of all cranes, hoists, and elevators and their lifting capacities, including any limit and safety devices required for automatic and manual operation. In addition, for all such equipment, the COL applicant shall provide:

(1) Heavy load handling system operating and equipment maintenance procedures.

(2) Heavy load handling system and equipment maintenance procedures and/or manuals.

(3) Heavy load handling system and equipment inspection and test plans; NDE, visual, etc.

(4) Heavy load handling safe load paths and routing plans.

(5) QA program to monitor and assure implementation and compliance of heavy load handling operations and controls.

(6) Operator qualifications, training and control program.

9.1.6.7 Spent Fuel Racks Structural Evaluation

The COL applicant shall provide the NRC a confirmatory structural evaluation of the spent fuel racks, as outlined in Subsection 9.1.2.1.3.

9.1.6.8 Spent Fuel Racks Thermal-Hydraulic Analysis

The COL applicant shall provide the NRC confirmatory thermal-hydraulic analysis that evaluates the rate of naturally circulated flow and the maximum rack water exit temperatures, as required by Subsection 9.1.2.1.4.

9.1.6.9 Spent Fuel Firewater Makeup Procedures and Training

The COL applicant shall develop detailed procedures and operator training for providing firewater makeup to the spent fuel pool (Subsection 9.1.3.3).

9.1.6.10 Protection of RHR System Connections to FPC System

The COL applicant shall assure that the RHR system connections are adequately protected from the effects of pipe whip, internal flooding, internally generated missiles, and the effects of a moderate energy pipe rupture in the vicinity. (Subsection 9.1.3.3)

9.1.7 References

9.1-1 USNRC JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Interim Staff Guidance, Revision 0, August 29, 2012

9.1-2 NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation", Revision 1, August 24, 2012

NOTES:

1. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY G41 UNLESS OTHERWISE NOTED.
2. VENT AND DRAIN VALVES ARE REQUIRED AT ALL HIGH OR LOW POINTS IN PIPING NOT SERVED BY EQUIPMENT HAVING VENTS AND DRAINS.
3. SYSTEM DESIGN SPECIFICATION:

   (A) UNLESS OTHERWISE NOTED.

ITEM		APPLICATION
MAXIMUM OPERATING PRESS MPa G		1.57
MAXIMUM OPERATING TEMP °C		66
NORMAL OPERATING TEMP °C		52
SEISMIC CATEGORY		B(S1,S2)
PROCESS FLUID		W
PIPING MATERIAL		CS(SS)
PIPING THICKNESS	50A AND SMALLER	SCH 80
	80A AND LARGER	SCH 40
DESIGN CLASS	QUALITY CLASS	4D

   (B) APPLY STANDARD PIPING DIAGRAMS SHOWN IN STANDARD DESIGN SPECIFICATION FOR SMALL PIPING AND INSTRUMENTATION FOR VENTS, DRAINS AND INSTRUMENTS. ALSO, APPLY PIPE SCHEDULES AND INSULATION THICKNESS SPECIFIED.

4. VALVE POSITION INDICATING LIGHTS AND ALARMS SHALL BE INSTALLED IN THE MAIN CONTROL ROOM UNLESS OTHERWISE NOTED.
5. TWO SETS OF VALVES MARKED ** AND *** ARE SHOWN. EACH VALVE SHOULD BE LOCATED CLOSE TO OTHER VALVES IN ITS SET TO MORE EASILY PROVIDE COORDINATED MANUAL OPERATION.
6. PIPING MATERIAL, UNLESS OTHERWISE NOTED SHOULD BE CS. BUT PIPING BURRIED IN CONCRETE SHOULD BE SS.
7. WATER LEVEL INDICATOR LI620 SHOULD BE INSTALLED NEAR THE OPERATING SWITCH OF VALVE F038.
8. TEMPERATURE ELEMENT TE002 INPUT TO RECORDER TRS605 IS THE ONLY ONE ALARMED.
9. AFTER SYSTEM TEST, PX005A AND B SHOULD BE REMOVED.
10. PIPING BURIED IN CONCRETE IS SHOWN BY ////// SYMBOL.
11. FC (OR FO) INDICATES FALVES ARE FAIL CLOSED OR FAIL OPEN ON LOSS OF AIR PRESSURE TO VALVE OPERATOR OR LOSS OF ELECTIRC POWER TO AIR CONTROLLING SOLENOID VALVES.
12. ALL AIR OPERATED VALVES TO HAVE OPEN-CLOSED INDICATING LIGHTS OPERATED FROM VALVE CONTROL SWITCH ON VALVE STEMS. ALL AIR OPERATED VALVES SHALL HAVE LIMIT SWITCHES.
13. NO VALVES OR INSTRUMENTS ARE TO BE LOCATED IN THE SHIELDED COMPARTMENT CONTAINING THE FILTER/DEMINERALIZER.
14. A COMMOM TROUBLE ALARM FROM LOCAL ANNUNCIATORS SHALL ALARM IN THE MAIN CONTROL ROOM.
15. VALVE F028 IS LOCK CLOSED AND IS NOT OPENED UNLESS SPENT FUEL STORAGE POOL GATE IS IN CLOSED POSITION.
16. PIPE WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE. THICKER THAN STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
17. VALVES WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL BE A MINIMUM OF CLASS 300, OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.
18. Spent fuel pool water level signals Level 1 (lowest), Level 2 (middle) and Level 3 (near normal) alarms in MCR and alternate location.

REFERENCE DOCUMENTS:

REFERENCE DOCUMENTS	MPL NO.
1. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2. FUEL POOL COOLING & CLEANUP SYS PFD	G41-1020
3. FUEL POOL COOLING & CLEANUP SYSTEM IBD	G41-1030
4. RHR SYSTEM P&ID	E11-1010
5. RADWASTE SYSTEM P&ID	K17-1010
6. MAKEUP WATER SYSTEM (CONDENSATE)	P13-1010
7. REAC BLDG COOLING WATER SYS P&ID	P21-1010
8. SAMPLING SYSTEM P&ID	P91-1010
9. HVAC SYSTEM P&ID	U41-1010
10. SUPPRESSION POOL CLEANUP SYS P&ID	G51-1010
11. NUCLEAR BOILER SYSTEM P&ID	B21-1010
12. INSTRUMENT AIR SYSTEM P&ID	P52-1010
13. REACTOR WATER CLEANUP SYS P&ID	G31-1010
14. STANDBY GAS TREATMENT SYSTEM	T22-1010

LEGEND:

SWH – STATIC WATER HEAD
ATM – ATMOSPHERIC PRESSURE

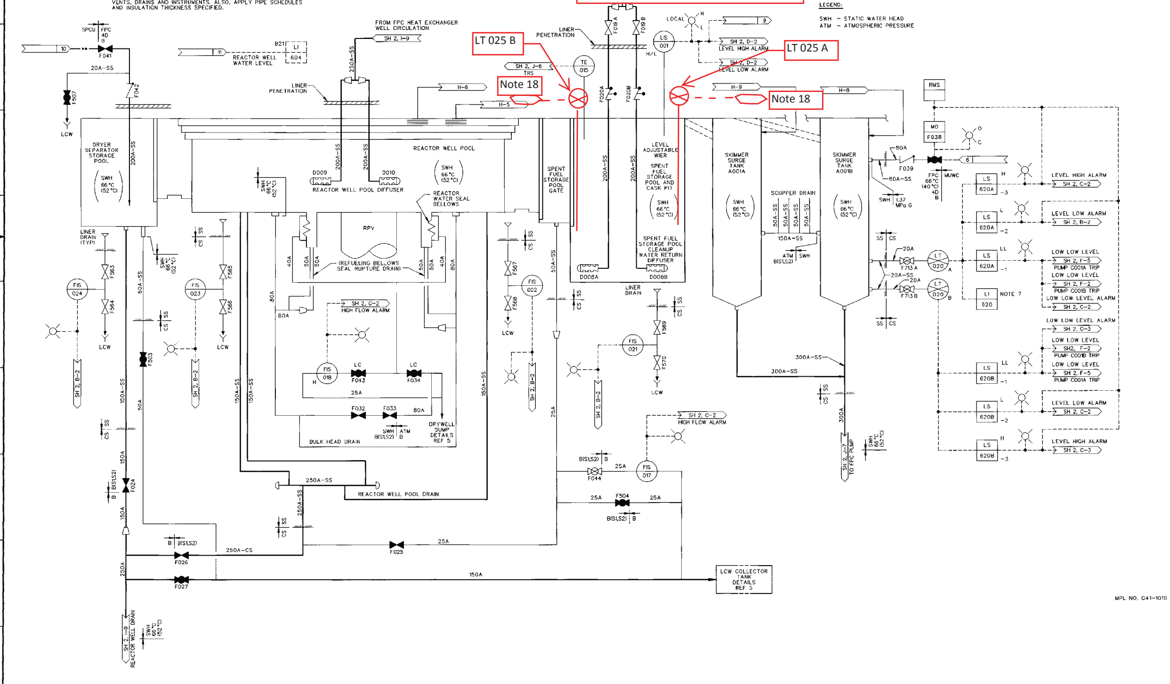

FIGURE 9.1-1 FUEL POOL COOLING AND CLEANUP SYSTEM P&ID (Sheet 1 of 3)

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