Entergy

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Stephen J. Bethay
Director, Nuclear Assessment

August 30, 2006

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

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293 License No. DPR-35

License Renewal Application Amendment 7

REFERENCE: Entergy letter, License Renewal Application, dated January 25, 2006 (2.06.003)

LETTER NUMBER: 2.06.079

Dear Sir or Madam:

In the referenced letter, Entergy Nuclear Operations, Inc. applied for renewal of the Pilgrim Station operating license. NRC TAC NO. MC9669 was assigned to the application.

This License Renewal Application (LRA) amendment consists of five attachments. Attachment A contains the response to the RAIs on LRA Sections 2.2 (Plant Level Scoping Results) and 2.3 (Scoping and Screening Results: Mechanical) conveyed in NRC letter dated July 31, 2006. Attachment B contains the response to the RAIs on scoping and screening aspects of LRA Sections 2.3.1 (Reactor Coolant System), 2.3.2 (Engineered Safety Features), and 2.3.3 (Auxiliary Systems) conveyed in NRC letter dated July 31, 2006. Attachment C contains the response to the RAIs on time-limited aging analysis aspects of LRA Section 4.2.1 (Reactor Vessel Fluence) and LRA Appendix B (Aging Management Programs and Activities) Sections B.1.3 (Control Rod Drive Return Nozzle) and B.1.26 (Reactor Vessel Surveillance Program). Attachment D contains clarification of the response to RAIs on severe accident mitigation alternatives provided in LRA Amendment 4 dated July 5, 2006. Attachment E contains changes to the LRA (Section 2.3.3.12 Primary Containment Atmosphere Control).

This letter contains no new or revised commitments.

Please contact Mr. Bryan Ford, (508) 830-8403, if you have any questions regarding this subject.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 30, 2006.

Sincerely,

Stephen J. Bethay

Stephen J. Bethay
Director, Nuclear Safety Assessment

DWE/dm
Attachments: (as stated)
cc: see next page

A119

cc: with Attachments

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ATTACHMENT A to Letter 2.06.079
(34 pages)

Response to RAIs on LRA Sections 2.2 (Plant Level Scoping Results) and 2.3 (Scoping and Screening Results: Mechanical) conveyed in NRC letter dated July 31, 2006.

2.2: Plant Level Scoping Results

RAI-2.2-1

In licensing renewal application (LRA) Tables 2.2-1a and 2.2-2, the applicant identifies a listing of mechanical systems within the scope of license renewal and mechanical systems not within the scope of license renewal, respectively. The applicant identifies, in the first column of both tables, the system number, and in several cases, multiple system numbers for each corresponding system name. In LRA Section 2.2, third paragraph, the applicant states that the list of systems used in these tables and determination of system boundaries is based on maintenance rule scoping documents, the Q list, plant drawings, the [updated final safety analysis report] (UFSAR), and system design basis documents reviewed during scoping.

It is not clear whether all mechanical systems that are described in the UFSAR are included in the mechanical systems names contained in LRA Tables 2.2-1a and 2.2-2. In order to facilitate the staff's plant level scoping review, provide a complete cross reference list of mechanical systems names against system numbers and the specific source used for this cross reference.

RAI-2.2-1 Response

All mechanical systems that are described in the UFSAR are included in the mechanical systems names contained in LRA Tables 2.2-1a and 2.2-2.

As stated in LRA Section 2.2, the list of systems used in these tables and determination of system boundaries is based on maintenance rule scoping documents, the Q list, plant drawings, the UFSAR, and system design basis documents reviewed during scoping.
This is explained further in LRA Section 2.1.1.

> The list of systems used for scoping began with a list developed from maintenance rule scoping documents. This list was adjusted based on reviews of plant drawings, the Q list, the PNPS UFSAR, and other station documents reviewed during scoping.
>
> For mechanical system scoping, system boundaries were determined based on maintenance rule scoping documents, the Q list, plant drawings, and system design basis documents. Although system number codes are used at PNPS in some component identification numbers, the system number in the component identification does not always correspond to the actual system that contains the component. Therefore, PNPS system boundaries are not defined based solely on the system number assigned to components and a system may include components using more than one system code number. This is consistent with the approach used for defining system boundaries in PNPS documents, such as maintenance rule scoping documents and the Q list.
>
> Some system numbers have been used for multiple related systems (e.g., the reactor building and turbine building closed cooling water systems both use the number 30 on piping and instrument drawings (P&IDs)). To simplify administrative control of these systems, their numbers include a letter suffix (e.g., the reactor

building and turbine building closed cooling water systems are 30A and 30B, respectively). Although the letter suffix is not included as part of the component identification code, the number and letter combination is used in other system-level plant documentation, such as the Q list. Such systems may be evaluated [in the LRA] as a group (e.g., HVAC systems 24A-R) or separately (e.g., system 30A and 30B), based on system function.

The "system numbers" listed in LRA Tables 2.2-1a and 2.2-2 are historical designations and do not always align with current usage of system names. LRA system evaluation boundaries are based mainly on the P&IDs and on the system function supported by the components. These system numbers are used in some component identification numbers and are useful in reading the P&IDs, which is why the numbers used for components in the LRA-listed system are given in Tables 2.2-1a and 2.2-2.

A cross-reference list of mechanical systems names against system numbers would not be useful in determining whether all mechanical systems that are described in the UFSAR are included in the mechanical systems names contained in LRA Tables 2.2-1a and 2.2-2, since the names assigned to these "system numbers" do not correspond with UFSAR system names.

However, to facilitate the LRA review, the following table was developed to provide a matrix of UFSAR system names versus the LRA system that includes the UFSAR system.

PNPS UFSAR Systems vs. LRA Systems (RAI 2.2-1)

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
3.4.5	Control Rod Drive (CRD) System	Control Rod Drive
3.4.5.2	Rod Position Indicator System (RPIS)	part of Reactor Manual Control and CRD
3.4.5.3	Control Rod Drive Hydraulic System	part of Control Rod Drive
3.8	Standby Liquid Control System	Standby Liquid Control
3.9	Recirculation Pump Trip (RPT), Alternate Rod Insertion (ARI), Feedwater Pump Trip Systems	ATWS
4	Reactor Coolant System	Reactor Coolant System Main Steam
4.3	Reactor Recirculation System	part of Reactor Coolant System
4.4	Nuclear System Pressure Relief System (safety valves, relief valves, automatic depressurization)	part of Main Steam
4.7	Reactor Core Isolation Cooling (RCIC) System	Reactor Core Isolation Cooling

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
4.8	Residual Heat Removal (RHR) System shutdown cooling LPCI suppression pool cooling containment spray augmented fuel pool cooling	Residual Heat Removal
4.9	Reactor Water Cleanup System	Reactor Water Cleanup
4.10.3.3	Reactor Pressure Boundary Leak Detection System	part of Sampling
5.2	Primary Containment System	Primary Containment System
5.2.3.1	Low Leakage Pressure Suppression Containment System (consists of the drywell, the torus, connecting vent system, isolation valves, vacuum relief valves, and containment cooling systems)	Primary Containment System Containment cooling systems are included in Heating, Ventilation and Air Conditioning
5.2.3.3	Pressure Suppression Chamber and Vent System	Primary Containment System
5.2.3.6	Venting and Vacuum Relief System	Primary Containment System
5.2.3.7	Primary Containment Cooling and Ventilation System	part of Heating Ventilation and Air Conditioning

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
5.2.3.8	Primary Containment Atmospheric Control (PCAC) System	Primary Containment Atmospheric Control
5.2.8.2	Pipe Protection System	structural components
5.3	Secondary Containment System Reactor Building, the Reactor Building Isolation and Control System (RBICS), the Standby Gas Treatment System (SGTS), and the main stack.	Reactor Building Isolation and Control Standby Gas Treatment (Reactor Building and main stack are structural components.)
5.3.3.3; 7.18	Reactor Building Isolation and Control System	Reactor Building Isolation and Control
5.3.3.4	Standby Gas Treatment System (SGTS)	Standby Gas Treatment
5.4	Combustible Gas Control System	Primary Containment Atmospheric Control and Standby Gas Treatment
5.4.1	Containment Atmospheric Control System (CACS)	Primary Containment Atmospheric Control
5.4.3	Purge/Repressurization System	part of Primary Containment Atmospheric Control
5.4.5	Containment Combustible Gas Monitoring System (CCGMS)	H_2O_2 analyzers in Post-Accident Sampling
6.4.1	High Pressure Coolant Injection System	High Pressure Coolant Injection

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
6.4.2	Automatic Depressurization System	part of Main Steam
6.4.3	Core Spray System	Core Spray
6.4.4	Low Pressure Coolant Injection	Residual Heat Removal
7.1	<u>Safety systems</u>:	
	Reactor Protection System (RPS)	Reactor Protection
	Primary Containment Isolation System (PCIS)	Primary Containment Isolation
	Core Standby Cooling Systems Control and Instrumentation	Core Standby Cooling Systems Control and Instrumentation
	Neutron Monitoring System (specific portions)	Neutron Monitoring
	Main Steam Line Radiation Monitoring System Refueling Ventilation Exhaust Radiation Monitoring System	Process Radiation Monitor and Area Radiation Monitor (includes main steam lines, refueling vent exhaust)
	Reactor Building Isolation and Control (RBIC) System	Reactor Building Isolation and Control
	Containment Atmospheric Dilution System	Primary Containment Atmospheric Control

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
7.1	Process safety systems:	
	Neutron Monitoring System (specific portions)	Neutron Monitoring
	Refueling Interlocks	Refueling Interlocks
	Reactor Vessel Instrumentation	Nuclear Boiler Instrumentation
	Process Radiation Monitors (except Main Steam Line Radiation Monitoring System and Refueling Ventilation Exhaust Radiation Monitoring System)	Process Radiation Monitor and Area Radiation Monitor

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
7.1	Power generation systems:	
	Reactor Manual Control System	Reactor Manual Control and CRD
	Recirculation Flow Control System	Reactor Recirculation Control and Jet Pump Jet Pump Instrumentation Reactor Level Control
	Feedwater System Control and Instrumentation	Electrical and instrumentation portion of feedwater system
	Pressure Regulator and Turbine Generator Control	Electrical and instrumentation portion of turbine-generator and auxiliaries
	Area Radiation Monitors Site Environs Radiation Monitors Health Physics and Laboratory Analysis Radiation Monitors	Process Radiation Monitor and Area Radiation Monitor
	Process Computer System	Plant Computer Rod Worth Minimizer

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
8.2	Unit and Preferred AC Power Sources:	
	Station Main Generator	Excitation
		Generation
		Turbine Generator and Aux
	Transformers	Transformers – Main, Unit Auxiliary, Startup and Shutdown
	Isolation Phase Bus	Transmission and Switchyard
8.3	Secondary AC Power Source (Shutdown Transformer)	Transformers – Main, Unit Auxiliary, Startup and Shutdown
8.4	Auxiliary Power Distribution System:	
	4160 V Switchgear	Auxiliary Power Distribution System
	480 V load centers	Switchgear – 4 KV, 480 V, MCC
		Motor – 4 KV, 480 V
8.4.5.2	Cooling systems for 480V load center walk-in enclosures	Heating, Ventilation and Air Conditioning
8.5	Standby AC Power Source:	
	Diesel Generators	Emergency Diesel Generator
		Emergency Power System
	On-Site Fuel Oil Storage	Fuel Oil Storage and Transfer

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
8.6	125 and 240 Volt DC Power Systems	Station DC and Battery
8.7	24 Volt DC Power System	Station DC and Battery
8.8	120 Volt AC Power System	Instrument AC Power
8.10	Blackout AC Power Source:	
	Diesel generator	Station Blackout Diesel Generator
	Switchgear	Switchgear – 4KV, 480V, MCC
	Fuel Oil	Fuel Oil Storage and Transfer
9.2	Liquid Radwaste System	part of Radioactive Waste
9.3	Solid Radwaste System	part of Radioactive Waste
9.4	Gaseous Radwaste System	Offgas and Augmented Offgas Turbine Generator and Aux
10.2	New Fuel Storage	Reactor Building structure
10.3	Spent Fuel Storage	Pool and racks are Reactor Building structures.
10.4	Fuel Pool Cooling and Cleanup System	Fuel Pool Cooling and Demineralizer
10.5	Reactor Building Closed Cooling Water System	Reactor Building Closed Cooling Water
10.6	Turbine Building Closed Cooling Water System	Turbine Building Closed Cooling Water

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
10.7	Salt Service Water System	Salt Service Water
10.8	Fire Protection System	Fire Protection
10.9	Heating Ventilation and Air Conditioning System	Heating, Ventilation and Air Conditioning
10.10	Makeup Water Treatment System	Condensate Storage and Transfer
10.11	Instrument and Service Air Systems	Compressed Air
10.11.3.1	Backup Nitrogen System	Primary Containment Atmospheric Control
10.12	Potable and Sanitary Water System	Potable and Sanitary Water
10.13	Equipment and Floor Drainage Systems	Sanitary Soiled Waste and Vent, Plumbing and Drains Radioactive Waste
10.14	Process Sampling Systems	Sampling
10.15	Communications Systems	Communications
10.16	Station Lighting System	Station Lighting
10.17	Main Control Room Environmental Control System	Heating, Ventilation and Air Conditioning
10.18	Equipment Area Cooling System	Heating, Ventilation and Air Conditioning

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
10.19	PASS H_2/O_2 Subsystem	Post-Accident Sampling (includes the H_2O_2 monitors)
10.20	Crack Arrest Verification System	part of Sampling
10.21	Hydrogen Water Chemistry Extended Test System	part of Electrolytic Hydrogen Water Chemistry (not in scope) Hydrogen Gas Storage (not in scope)
10.22	Electrolytic Hydrogen Water Chemistry System	part of Electrolytic Hydrogen Water Chemistry (not in scope)
11.2	Turbine-generator	Turbine Generator and Aux Extraction Steam Turbine Generator Protection Excitation Generation
11.3	Main Condenser	Main Condenser
11.4.3.1	Main Condenser Gas Removal System (includes Steam Jet Air Ejectors (SJAEs)	part of Offgas and Augmented Offgas
11.4.3.2	Turbine Sealing System (provides gland sealing but does not include Gland Seal Holdup, which is described in Section 9.4.4.2)	part of Turbine Generator and Aux

UFSAR Section	UFSAR System ("system" used in heading, or otherwise indicating a system name)	LRA System (Tables 2.2-1a, 2.2-1b, and 2.2-2)
11.5	Turbine Bypass System	part of Turbine Generator and Aux
11.6	Circulating Water System	Circulating Water Screen Wash
11.7	Condensate Demineralizer System	Condensate Demineralizers
11.8	Condensate and Feedwater System	Condensate Feedwater Feedwater Heater Drains and Vents
11.9	Condensate Storage System	Condensate Storage and Transfer

RAI-2.2-2

In LRA Table 2.2-2, the applicant identifies the electrolytic hydrogen water chemistry system as a mechanical system not within the scope of license renewal, and identifies UFSAR Sections 10.21 and 10.22 as the reference for the system description.

In UFSAR Section 10.22.7.4, Limiting Transient Consequence, the applicant describes those hydrogen leaks that do not initiate automatic shutdown of the electrolytic hydrogen water chemistry system (EHWCS). The applicant states in the UFSAR that small leaks cannot lead to an accumulation of an explosive mixture of hydrogen and oxygen because the condenser bay and turbine buildings have sufficient forced ventilation to avoid combustible mixtures. The applicant, therefore, appears to be crediting the turbine building HVAC system to prevent an explosive mixture in the condenser bay and turbine buildings.

However, in LRA Section 2.3.3.11, the applicant does not identify this feature as an intended function for the turbine building HVAC system. Therefore, it is conceivable that an explosive mixture could accumulate, and potentially cause an explosion that could damage nearby equipment, some of which may be safety-related.

Justify the exclusion of the EHWCS from the scope of license renewal, or include the system in scope because of a 10 CFR 54.4(a)(2) effect, where a nonsafety related system such as EHWCS could detonate and prevent satisfactory accomplishment of safety-related structure, system and components which are relied upon to remain functional during and following design-basis events.

RAI-2.2-2 Response

Section 10.22 of the UFSAR describes the electrolytic hydrogen water chemistry system. This system has been abandoned and is being removed. The UFSAR has not yet been updated to reflect the removal. The system, however, was designed such that a postulated failure will not affect the operation of any safety-related systems. The piping and components of the system were placed sufficiently distant from any safety-related equipment such that a perturbation from a leak which could potentially lead to a detonation or fire would have no adverse effect on any safety-related equipment. Since this system cannot affect any safety-related equipment through adverse interaction including spatial interaction (leakage) or structural support it has no 10 CFR 54.4(a)(2) functions and is not in the scope of license renewal. This is conservative because 10 CFR 54.4(a)(2) involves interaction resulting in a loss of function; not simply damage to SR equipment.

2.3: Scoping and Screening Results: Mechanical Systems

2.3.3.2: Salt Service Water System

RAI-2.3.3.2-1

In LRA Section 2.1.2.1.3, the applicant states that the highlighting on the license renewal drawing indicates components subject to aging management review [(AMR)]. License Renewal drawing LR-M-212, sheet 1 shows the sluice gates (locations A-8 and A-3) and slide gate (location A-5) highlighted. However, they do not appear to be listed on LRA Table 2.3.3-2 as being subject to AMR. Clarify if these gates are listed on table 2.3.3-2 as being subject to AMR.

RAI-2.3.3.2-1 Response

The gates (component numbers X-367A, 367B, and 367C) are included in Table 2.3.3-2 for the salt service water system under the generic component type "valve body" since they act as valves by isolating flow. In addition, as shown in Table 3.3.2-2, these valve bodies are carbon steel with an internal and external environment of raw water. Aging effects are managed by the Service Water Integrity Program.

RAI-2.3.3.2-2

On page 10.7-2a of the FSAR, the applicant states, "to ensure that the safety design basis in Section 10.7.2 is achieved, flow condition is improved by the addition of baffle plates in the west side service water bay and a rear sluice gate allows maintenance and operational flexibility."

This statement implies that the baffle plates have an intended function in accordance with 10 CFR 54.4(a) and should therefore be within the scope of license renewal. Baffle plates are not shown on drawing LR-M-212-SH-01, nor do they appear to be listed on table 2.3.3-2. Clarify if the baffle plates are subject to AMR.

RAI-2.3.3.2-2 Response

These baffle plates were installed as an enhancement to improve flow conditions and reduce hydraulic forces on the pumps. The service water pumps and intake structure are capable of performing their intended function without these baffle plates. Therefore, the baffle plates are not subject to aging management review.

RAI-2.3.3.2-3

LRA Section 2.0, states that "the term 'piping' in component lists may include pipe, pipe fittings (such as elbows and reducers), flow elements, orifices, and thermowells." On drawing LR-M-212, sheet 1, air vents (locations B-8, 7, 6, 5 and 4), were found as being subject to AMR. The air vents downstream piping and a portion of the air vents will have a normal internal environment of air. It is assumed that air vents are included in LRA Table 2.3.3-2 under component type piping. However, when reviewing LRA Table 3.3.2-2, the staff noted that there is no listing for piping with an internal environment of air.

Clarify whether the air vents and their downstream piping are included in component type "piping" and are subject to AMR, or add them to LRA Tables 2.3.3-2 and 3.3.2-2.

RAI-2.3.3.2-3 Response

The air vents AV-38003, 38004, 38005, 38006, and 38007 are included in the salt service water system review. These vent valves and downstream vent piping are subject to aging management review and included in LRA Table 2.3.3-2 and 3.3.2-2 as "valve body" and "piping" with a conservative internal environment of "raw water". This environment was used due to the vent valve being exposed to raw water when the pumps are in operation.

2.3.3.3: Reactor Building Closed Cooling Water System

RAI 2.3.3.3-1

License renewal drawings for the reactor building closed cooling water (RBCCW) system show that flexible hoses are within the scope of license renewal in accordance with 10 CFR 54.4 (a), and subject to an AMR in accordance with 10 CFR 54.21 (a).

Flexible hoses that appear on license renewal drawing LRA-M-215-SH-01 provide an intended function of pressure boundary and connect MG set area cooling coils VAC-207A, -207B, -207C, and -207D to the RBCCW system. Flexible hoses that appear on license renewal drawing LRA-M-215-SH-02 provide an intended function of pressure boundary and connect Core Spray Pump Motor Thrust Bearing P-215B cooling coils, RHR Pump Area Cooling Coils VAC-204C/D, and HPCI Pump Area Cooling Coils VAC-201A/B to the RBCCW system. Flexible hoses that appear on license renewal drawing LRA-M-215-SH-04 provide an intended function of pressure boundary and connect RCIC Pump Area Cooling Coils VAC-202A/B, Control Rod Drive Pump Area Cooling Coils VAC-203A/B, Clean-Up Recirc Pump P-204A/B Cooling System, RHR Pump Area Cooling Coils VAC-204A/B, and Core Spray Pump Motor Thrust Bearing P-215A cooling coils to the RBCCW system.

LRA Section 2.1.2.1.3 states that flexible hoses that are periodically replaced (not long-lived) and therefore not subject to aging management, are indicated on the drawings. These components are not specifically identified on the drawings as "not a long-lived component" and there are no flexible hoses listed as a component type in LRA Table 2.3.3-3.

Justify the exclusion of flexible hoses as a component type from LRA Table 2.3.3-3. If not, include flexible hoses in LRA Table 2.3.3-3 and describe their aging management program (AMP) in LRA Table 3.3.2-3.

RAI 2.3.3.3-1 Response

Flexible hoses in the RBCCW system are replaced based on a specified time period and are therefore not subject to aging management review. Drawings LRA-M-264 sheets 1, 2, and 4 incorrectly show flexible connections as being subject to aging management review.

RAI 2.3.3.3-2

Flow elements FE-6265, FE-6267, FE-9014, FE-6263, and FE-6269 on license renewal drawings LRA-M-215-SH-01at location E-8, LRA-M-215-SH-02 at location G-5/6, LRA-M-215-SH-03 at location E-4, and LRA-M-215-SH-04 at location C-7/8 respectively, are shown as included within the scope of license renewal for the RBCCW system and subject to an AMR. The flow elements control flow to create a pressure differential signal that is interpreted by their associated flow transmitters to control the system's intended functions.

There are no orifices listed as a component type in LRA Table 2.3.3-3 with an intended function of flow control. LRA Table 2.0-1 identifies a component intended function for flow control (FC) that is applicable to the flow elements.

Justify the exclusion of flow control as an intended function for flow elements in LRA Table 2.3.3-3 as a component intended function requiring aging management.

RAI 2.3.3.3-2 Response

Flow control is an intended function when the orifice is credited with reducing the system flow rate. Flow elements in LRA Table 2.3.3-3 create a differential pressure to flow instrumentation that provides for indication only. They only provide a signal that indicates the flow rate but provide no controlling function. Therefore, the intended function of these flow elements is pressure boundary only.

RAI 2.3.3.3-3

Y-strainers-4074 and 4078 on license renewal drawings LRA-M-215-SH-01 at location B-5 and LRA-M-215-SH-02 at location C/D-4 respectively, are shown as included within the scope of license renewal for the RBCCW system and subject to an AMR. The y-strainers perform a filtration intended function (FLT) to remove particulates from the treated water.

There are no strainers listed as a component type in LRA Table 2.3.3-3 with an intended function of filtration. LRA Table 2.0-1 identifies a component intended function for filtration (FLT) that is applicable to the y-strainers.

Justify the exclusion of filtration as an intended function for the y-strainers in LRA Table 2.3.3-3 as a component intended function requiring aging management.

RAI 2.3.3.3-3 Response

Strainers 4074 and 4078 support sample chambers T-214A and T-214B. The ability to monitor liquid contained in the RBCCW system is not a RBCCW system license renewal intended function. Therefore, the filtration intended function for the strainers is not required. However, the strainer housings are required for pressure boundary and are subject to aging management review as listed in Table 2.3.3-3 and Table 3.3.2-3.

RAI 2.3.3.3-4

Restricting orifices RO-4019 and RO-4017 on license renewal drawings LRA-M-215-SH-01 at location B-5 and LRA-M-215-SH-02 at location C/D-4 respectively, are shown as included within the scope of license renewal for the RBCCW system and subject to an AMR. The restricting orifices perform a flow restriction intend function (FC) to ensure proper system operation.

There are no restricting orifices listed as a component type in LRA Table 2.3.3-3 with an intended function of flow restriction. LRA Table 2.0-1 identifies a component intended function for flow control (FC) that is applicable to restricting orifices.

Justify the exclusion of flow control as an intended function for the restricting orifices in LRA Table 2.3.3-3 as a component intended function requiring aging management.

RAI 2.3.3.3-4 Response

RO-4019 and RO-4017 are located in ¾ inch lines which provide flow to shielded sample chambers T-214A and T-214B. The ability to monitor liquid contained in the RBCCW system is not a RBCCW system license renewal intended function. Also, given the size of these lines relative to the main system components, the absence of flow restriction in this portion of the system will not prevent the RBCCW system from performing its intended function. Therefore, the flow control intended function for the orifices is not required.

2.3.3.4: Emergency Diesel Generator System

RAI 2.3.3.4-1

Section 10.9.3.9 of the Pilgrim UFSAR states that "engine freeze protection is provided by the jacket water cooling system heater..." This heater is not shown on the referenced license renewal drawings, nor is it listed in LRA Table 2.3.3-4 as a component subject to an AMR. This heater provides a pressure boundary for the jacket water cooling system, and therefore, should be within the scope of license renewal. Additionally, the pressure retaining portion of the heater is a passive, long-lived component, and therefore, should be subject to AMR. Justify the exclusion of this component from an AMR.

RAI 2.3.3.4-1 Response

This component is in scope and subject to AMR and is included in the LRA in Table 3.3.2-4 under the component type of heater housing with treated water as the environment.

RAI 2.3.3.4-2

License renewal drawing LRA-M-272-0 shows two aftercoolers at locations F/G-5 and B/C-5 as being within the scope of license renewal and subject to an AMR. The aftercoolers provide a pressure boundary and heat transfer intended function. However, aftercooler does not appear in LRA Table 2.3.3-4 as a component type subject to an AMR.

Confirm that aftercooler is a component type that is subject to an AMR, and is included within the component type of heat exchanger. If not, justify the exclusion of this component from an AMR.

RAI 2.3.3.4-2 Response

The aftercoolers are shell and tube type heat exchangers that are subject to AMR and included in LRA Table 2.3.3-4 and Table 3.3.2-4 under the component type of heat exchanger (shell) and heat exchanger (tubes) with intended functions of heat transfer and pressure boundary.

RAI 2.3.3.4-3

License renewal drawing LRA-M-272-0 shows two turbochargers at locations A-6 and E-6 as being within the scope of license renewal and subject to an AMR since it provides a pressure boundary. LRA Table 2.3.3-4 lists the turbocharger housing as a component subject to an AMR, and correspondingly, LRA Table 3.3.2-4 lists the turbocharger material and environment. LRA Section 2.3.3.4 and license renewal drawing LRA-M-272-0 indicate that the turbocharger is cooled by the jacket water cooling system.

However, LRA Tables 2.3.3-4 and 3.3.2-4 do not list "heat transfer" as an intended function, and treated water as an internal environment, respectively.

Explain why "heat transfer" is not listed as an intended function of the turbocharger. Also, explain why the cooling water of the jacket cooling water system is not listed as an internal environment for the turbocharger.

RAI 2.3.3.4-3 Response

The turbocharger interface with the jacket water cooling system was inadvertently omitted from the LRA. The intended function of heat transfer is added to Table 2.3.3-4 for component type turbocharger. Table 3.3.2-4 is also revised to add additional line items for component type turbocharger as follows.

Turbo-charger	Pressure boundary	Carbon steel	Treated water > 140°F (int)	Loss of material	Water chemistry control- closed cooling water	VII.H2-23 (A-25)	3.3.1-47	D
Turbo-charger	Heat transfer	Carbon steel	Treated water > 140°F (int)	Fouling	Water chemistry control- closed cooling water	VII.F1-13 (AP-77)	3.3.1-52	D

RAI 2.3.3.4-4

Flexible hose and flexible connections are shown on the following license renewal drawings at the given locations as being within the scope of license renewal and subject to an AMR.

a. License renewal drawing LRA-M-271-0 at locations C-5, C-6, F-5, and F-6.
b. License renewal drawing LRA-M-259-0 at locations F-1, F-2, F-5 and F-6.

LRA Section 2.1.2.1.3 states that flexible hoses that are periodically replaced (not long-lived) and therefore not subject to aging management, are indicated on the drawings. These components are not specifically identified on the drawings as "not a long-lived component." These flexible connections or hoses provide a pressure boundary in the turbo air assist system and lube oil system. LRA Table 2.3.3-4 lists expansion joint (exhaust flex joint) as a component type subject to an AMR; however, LRA Table 3.3.2-4 does not have indoor air or lube oil as an internal environments.

Confirm that the flexible connections and hoses in question are long-lived, and therefore subject to an AMR. If so, confirm that the material and environment are subject to the appropriate AMP.

RAI 2.3.3.4-4 Response

All flex hoses on the emergency diesel generators are replaced based on a specified time period and are therefore not subject to AMR. The hoses highlighted on drawings LRA-M-259 and LRA-M-271 should not have been highlighted.

RAI 2.3.3.4-5

License renewal drawing LRA-M-272-0 indicates that the emergency diesel generators (EDGs) are equipped with crankcase exhausters (see locations B-7 and F-7). Failure of this exhauster can adversely impact the function of the EDGs. The exhauster is not depicted on the drawing as a component that is subject to an AMR. Explain why the exhausters in question are not subject to an AMR.

RAI 2.3.3.4-5 Response

The crankcase exhauster is not shown on the drawing because it is physically attached to the diesel engine block and is considered part of the diesel engine. In accordance with NEI 95-10 revision 6 Appendix B, emergency diesel engines do not meet 10 CFR 54.21(a)(1)(i) because they are active and are therefore not subject to aging management review. The effects of aging on components that are part of the active diesel engine are managed under the Maintenance Rule 10 CFR 50.65.

RAI 2.3.3.4-6

License renewal drawing LRA-M-272-0 shows jacket water radiators at locations C-2 and G-2 as being within the scope of license renewal and subject to an AMR since they provide a pressure boundary. Pilgrim UFSAR Section 10.9.3.9 states that, "The EDG jacket water pump circulates the engine coolant through the radiator tubes where it transfers engine heat to the air. The engine driven fan draws suction through each of the parallel radiators and discharges the heated air through a cylindrical discharge duct which exits at the roof." LRA Tables 2.3.3-4 and 3.3.2-4 contain entries for heat exchanger bonnet, shell, and tubes. However, there does not appear to be an entry for the radiator fins.

State whether, or not, the jacket water radiators contain fins for heat transfer. If so, state whether the fins are subject to an AMR. If not, justify the exclusion of this component type from an AMR.

RAI 2.3.3.4-6 Response

The jacket water radiator tubes do have fins which are integral with the tubes and are the same material as the tubes and are subject to AMR. Since the material for the fins and tubes are the same, the fins are not listed as a separate component. They are included with the line item in Table 3.3.2-4 shown below for heat exchanger (tubes).

Heat exchanger (tubes)	Heat transfer	Copper alloy > 15% Zn	Air – outdoor (ext)	Fouling	Periodic surveillance and preventive maintenance	H

2.3.3.5: Station Blackout Diesel Generator System

RAI 2.3.3.5-1

On license renewal drawing LRA-M-264-0, the applicant shows the following components as being within the scope of license renewal and subject to an AMR. These components provide the intended function of pressure boundary.

a. starting rack booster housing at location F-6
b. jacking gear air interrupter at location G-6
c. deaerator housing at location H-3
d. air cleaner housing at location E-4
e. drain trap at location F-7

However, these components are not specifically listed in LRA Table 2.3.3-5 as components subject to an AMR. Confirm that these components are subject to an AMR. If not, justify the exclusion of the component(s) from an AMR.

RAI 2.3.3.5-1 Response

The components listed are subject to aging management review and included in LRA Table 2.3.3-5 as the following component types.

a. the starting rack booster housing is included as component type "piping"
b. the jacking gear air interrupter is included as component type "valve body"
c. the deaerator housing is included as component type "tank"
d. air cleaner housing is included as component type "filter housing"
e. the drain trap is included as component type "valve body"

RAI 2.3.3.5-2

On license renewal drawing LRA-M-264-0, the applicant shows a turbocharger at location H-3 as being within the scope of license renewal and subject to an AMR since it provides a pressure boundary. LRA Table 2.3.3-5 lists the turbocharger housing as a component subject to an AMR, and correspondingly, LRA Table 3.3.2-5 lists the turbocharger material and environment. LRA Section 2.3.3.5 and license renewal drawing LRA-M-264-0 indicate that the turbocharger is cooled by the jacket water cooling system. However, LRA Tables 2.3.3-5 and 3.3.2-5 do not list "heat transfer" as an intended function, and treated water as an internal environment, respectively.

Explain why heat transfer is not listed as an intended function of the turbocharger. Also, explain why the cooling water of the jacket cooling water system is not listed as an internal environment for the turbocharger.

RAI 2.3.3.5-2 Response

The turbocharger interface with the jacket water cooling system was inadvertently omitted from the LRA. The intended function of heat transfer is added to Table 2.3.3-5 for component turbocharger. Table 3.3.2-5 is revised to add line items for component type turbocharger as follows.

Turbo-charger	Pressure boundary	Carbon steel	Treated water > 140°F (int)	Loss of material	Water chemistry control- closed cooling water	VII.H2-23 (A-25)	3.3.1-47	D
Turbo-charger	Heat transfer	Carbon steel	Treated water > 140°F (int)	Fouling	Water chemistry control- closed cooling water	VII.F1-13 (AP-77)	3.3.1-52	D

RAI 2.3.3.5-3

Flexible connections are shown on license renewal drawing LRA-M-264-0 at locations E-3, F-3, G-3, F-5/6, H-5, and G-7 as being within the scope of license renewal and subject to an AMR. These components are not specifically identified on the drawing as "not a long-lived component."

In LRA Section 2.1.2.1.3, the applicant states that flexible hoses that are periodically replaced (not long-lived) and therefore not subject to aging management, are indicated on the drawings.

These flexible connections provide the intended function of pressure boundary. LRA Table 2.3.3-5 does not list flexible hose or connections as a component type subject to an AMR. Confirm that the flexible connections in question are long-lived, and therefore subject to an AMR. If not, justify the exclusion of these components from an AMR.

RAI 2.3.3.5-3 Response

Flexible hoses for the station blackout diesel generator are replaced based on a specified time period and are therefore not subject to aging management review. Drawing LRA-M-264-0 incorrectly shows flexible connections as being subject to aging management review.

RAI 2.3.3.5-4

On license renewal drawing LRA-M-264-0, the applicant shows jacket water immersion heaters at location G-2. The heaters are part of the jacket cooling water system which is a closed cooling water loop. Therefore, the heaters provide a pressure boundary. LRA Table 2.3.3-5 does not include the pressure retaining portion of the heaters as a component subject to an AMR. Justify the exclusion of this component from an AMR.

RAI 2.3.3.5-4 Response

The immersion heaters are included in the component type "heater housing" as listed in Table 2.3.3-5 and Table 3.3.2-5.

2.3.3.7: Fuel Oil System

RAI-2.3.3.7-1

In License Amendment 184 to the Pilgrim Facility Operating License, the licensing basis for the on-site fuel storage requirements for the EDG was modified. In addition, Technical Specification Bases were amended to reflect the new licensing basis. This change increased the amount of diesel fuel required to be stored on-site to assure sufficient supply of fuel oil to the EDGs from the EDG and Station Blackout Diesel Generator (SBODG) storage tanks. The Safety Evaluation Report to the License Amendment states that "the SBODG storage tanks are not connected to the EDG storage tanks and will require operator action to transfer fuel from the SBODG tanks to the EDG storage tank. The licensee's method of supplying fuel oil from the SBODG tanks to the EDG tanks requires the attachment of connections, hoses, and an air-powered pump to refill the EDGs from the SBODGs when needed. The required fittings and hardware accessories for refilling operations are prestaged and dedicated for the task."

This equipment provides functional support for the EDG which is safety-related equipment. Therefore, this transfer equipment should be within scope of license renewal and subject to an AMR. Verify that passive, long-lived components of this equipment are included in Table 2.3.3-7 and subject to AMR.

RAI-2.3.3.7-1 Response

The diesel fuel oil emergency transfer skid for emergency transfer of fuel oil from the SBODG storage tanks to the EDG storage tanks was inadvertently omitted from the aging management review.

The pre-staged equipment includes the following passive, long-lived components subject to aging management review: a pump casing, piping and fittings, bolting, valve bodies, tubing, a hose coupling, a strainer, and hoses.

Since Table 2.3.3-7 already includes most of the component types, and fittings are included in the piping line item, Table 2.3.3-7 is revised to include hose and hose coupling with a function of pressure boundary.

The following line items are added to Table 3.3.2-7, Fuel Oil System (FO) Summary of Aging Management Evaluation," for aging management review of the transfer equipment.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol.2 Item	Table 1 Item	Notes
Hose	Pressure boundary	Elastomer	Air-indoor (ext)	Cracking	Periodic Surveillance and Preventive Maintenance	V.B-4 (E-06)	3.2.1-11	E
Hose	Pressure boundary	Elastomer	Air-indoor (ext)	Change in material properties	Periodic Surveillance and Preventive Maintenance	V.B-4 (E-06)	3.2.1-11	E
Hose	Pressure boundary	Elastomer	Air-indoor (int)	Cracking	Periodic Surveillance and Preventive Maintenance	V.B-4 (E-06)	3.2.1-11	E
Hose	Pressure boundary	Elastomer	Air-indoor (int)	Change in material properties	Periodic Surveillance and Preventive Maintenance	V.B-4 (E-06)	3.2.1-11	E
Hose coupling	Pressure boundary	Copper alloy > 15% Zn	Air-indoor (int)	None	None	V.F-3 (EP-10)	3.2.1-53	C
Hose coupling	Pressure boundary	Copper alloy > 15% Zn	Air-indoor (ext)	None	None	V.F-3 (EP-10)	3.2.1-53	C
Piping	Pressure boundary	Carbon steel	Air - indoor (ext)	Loss of material	Periodic Surveillance and Preventive Maintenance	VII.I-8 (A-77)	3.3.1-58	E

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol.2 Item	Table 1 Item	Notes
Piping	Pressure boundary	Carbon steel	Air - indoor (int)	Loss of material	Periodic Surveillance and Preventive Maintenance	V.D2-16 (E-29)	3.2.1-32	E
Pump casing	Pressure boundary	Carbon steel	Air - indoor (ext)	Loss of material	Periodic Surveillance and Preventive Maintenance	VII.I-8 (A-77)	3.3.1-58	E
Pump casing	Pressure boundary	Carbon steel	Air - indoor (int)	Loss of material	Periodic Surveillance and Preventive Maintenance	V.D2-16 (E-29)	3.2.1-32	E
Strainer	Filtration	Carbon steel	Air - indoor (int)	Loss of material	Periodic Surveillance and Preventive Maintenance	V.D2-16 (E-29)	3.2.1-32	E
Strainer	Filtration	Carbon steel	Air-indoor (ext)	Loss of material	Periodic Surveillance and Preventive Maintenance	VII.I-8 (A-77)	3.3.1-58	E
Tubing[1]	Pressure boundary	Copper alloy < 15% Zn	Air - indoor (ext)	None	None	V.F-3 (EP-10)	3.2.1-53	C
Tubing	Pressure boundary	Copper alloy < 15% Zn	Air - indoor (int)	None	None	V.F-3 (EP-10)	3.2.1-53	C
Valve body	Pressure boundary	Carbon steel	Air - indoor (ext)	Loss of material	Periodic Surveillance and Preventive Maintenance	VII.I-8 (A-77)	3.3.1-58	E
Valve body	Pressure boundary	Carbon steel	Air - indoor (int)	Loss of material	Periodic Surveillance and Preventive Maintenance	V.D2-16 (E-29)	3.2.1-32	E

Item 1 under LRA Paragraph 3.3.2.2.5, "Hardening and Loss of Strength due to Elastomer Degradation," is revised as follows (bold wording added) to include the diesel fuel oil emergency transfer skid elastomer components.

[1] Line item already exists in LRA Table 3.3.2-7, but is duplicated here for complete aging management review of the diesel fuel oil emergency transfer skid.

1. Cracking and change in material properties due to elastomer degradation in elastomer duct flexible connections of the heating, ventilation and air conditioning systems **and hoses on the diesel fuel oil emergency transfer skid** exposed to air-indoor are aging effects requiring management at PNPS. These aging effects are managed by the Periodic Surveillance and Preventive Maintenance (PSPM) Program. The PSPM Program includes visual inspections and physical manipulation of the flexible connections to confirm that the components are not experiencing any aging that would affect accomplishing their intended functions.

Line item 3.3.1-58 in Table 3.3.1, "Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801," is revised as follows (bold wording added) to address the diesel fuel oil emergency transfer skid steel components.

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-58	Steel external surfaces exposed to air - indoor uncontrolled (external), air - outdoor (external), and condensation (external)	Loss of material due to general corrosion	External Surfaces Monitoring	No	Consistent with NUREG-1801 **for most components.** The System Walkdown Program manages loss of material for external surfaces of steel components. **The Periodic Surveillance and Preventive Maintenance Program manages loss of material for steel components on the diesel fuel oil emergency transfer skid.**

LRA Section A.2.1.26, "Periodic Surveillance and Preventive Maintenance Program," is revised to add the following bullet to the list of components for which periodic inspections using visual or other non-destructive examination techniques verify that the components are capable of performing their intended function.

- diesel fuel oil emergency transfer skid hoses, piping, pump casing, strainer, and valve bodies

The following activity is appended to the list in the Program Description of LRA Section B.1.24, "Periodic Surveillance and Preventive Maintenance."

fuel oil system	Use visual or other NDE techniques to inspect diesel fuel oil emergency transfer skid steel components to manage internal and external loss of material. Visually inspect and manually flex diesel fuel oil emergency transfer skid hoses to manage cracking and change in material properties.

RAI- 2.3.3.7-2

In UFSAR Section 8.5.2, the applicant describes a hydroturbine that drives backup diesel fuel transfer pump (P-181). This pump is a redundant diesel fuel oil transfer pump for the diesel fire pump P-140. In LRA Section 2.3.3.14 (page 2.3-65), the applicant states, "Unless specifically excluded, all non-safety-related components in a system determined to be in scope for 54.4(a)(2) for spatial interaction are subject to AMR. Components are excluded from review if their location is such that safety-related equipment cannot be impacted by component failure." Based on the above information, it appears that pump P-181 should be within the scope of license renewal for purposes of 10 CFR 54.4(a)(2). In LRA Tables 2.3.3-14-13 and 3.3.2-14-13, Fuel Oil Storage and Transfer System Nonsafety Related Components affecting Safety Related Systems Components Subject to an AMR, the applicant has an entry for component type pump casing, with appropriate material and environment combination that is subject to an AMR However, in LRA Tables 2.3.3-14-12 and 3.3.2-14-12, Fire Protection System Nonsafety Related Components affecting Safety Related Systems Components Subject to an AMR, the applicant does not include component type pump casing with appropriate material and environment combination that is subject to an AMR. Justify the exclusion of the hydroturbine portion of the diesel fire pump (P-181) from the scope of license renewal.

RAI-2.3.3.7-2 Response

The backup diesel fuel transfer pump (P-181) and its hydroturbine are located in the diesel fire pump day tank room in the intake structure. Therefore, the only components their failure might impact are fire protection system components.

10 CFR 54.4 (a)(2) requires inclusion of "All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1) (i), (ii), or (iii) of this section."

As stated in LRA Section 2.3.3.9, the fire protection system has no intended functions for 10 CFR 54.4(a)(1).

Therefore, failure of the backup diesel fuel transfer pump or its hydroturbine cannot prevent satisfactory accomplishment of any of the functions identified in paragraph (a)(1) and they are not within the scope of license renewal for 10 CFR 54.4(a)(2).

As stated in UFSAR Section 8.5.2, this redundant pump will allow extended operation of the diesel fire pump as a water source for the RHR system during extended station blackout and severe accident scenarios beyond design basis. Therefore, the backup diesel fuel transfer pump and its hydroturbine are not required for compliance with the Commission's regulations for fire protection (10 CFR 50.48) and are not within the scope of license renewal for 10 CFR 54.4(a)(3).

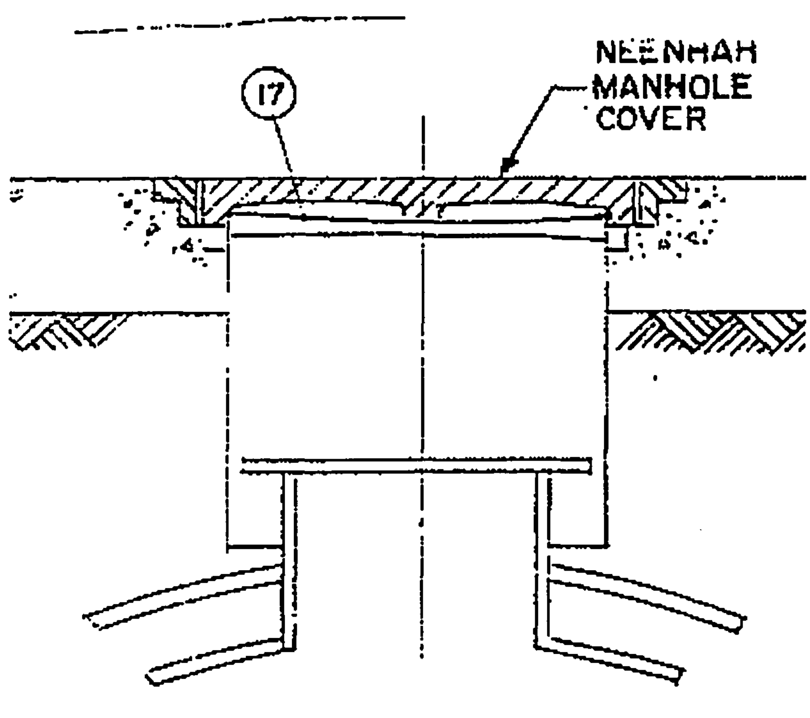
RAI 2.3.3.7-3

License renewal drawing LRA-M-264-0, Note 15 states that "there is a rain tight lid under manhole cover..." LRA Tables 2.3.3-7 and 3.3.2-7 contain entries for component type "tank." However, there does not appear to be an entry for the rain tight lid. State whether the rain tight lid is composed of a different material than indicated for the component type "tank." If so, state whether the lid is subject to an AMR. If not, justify the exclusion of this component type from an AMR.

RAI-2.3.3.7-3 Response

Note 15 on drawing LRA-M-264-0 refers to the rain tight lids under the manhole covers on the manholes to the SBO diesel fuel oil storage tanks. As can be seen in the sketch below, the manhole surrounds the fiberglass tank access port. Therefore, the manholes, manhole covers, and rain tight lids (item 17 on the sketch) are not part of the tank pressure boundary and are not subject to aging management review.

The access ports are considered part of the tanks and are, therefore, included in the "tank" line items in LRA Tables 2.3.3-7 and 3.3.2-7



RAI 2.3.3.7-4

License renewal drawing LRA-M-264-0 at locations A-6 and A-8 show ladders and check valves (38-CK-168A and 38-CK-168B) as components not subject to an AMR. Additionally, at locations A-6 and A-7, there are 4 inch "FRP" lines that are not shown as subject to an AMR.

State whether failure of these internal components could prevent the station blackout diesel fuel oil storage tanks from performing their intended function.

RAI-2.3.3.7-4 Response

The ladders, overfill prevention valves, and internal piping from the abandoned fill lines are not subject to aging management review. They do not form part of the tank pressure boundary and their failure would not prevent the tanks from performing their intended function.

2.3.3.8: Compressed Air (Instrument Air) System

RAI 2.3.3.8-1

In LRA section 2.3.3.8 for the Compressed Air (Instrument Air) System, the applicant states the following on page 2.3-41: "The instrument air system contains separate accumulators and tanks that store high pressure air or nitrogen for operation of safety-related equipment (main steam safety valves, nuclear system pressure relief valves, torus vacuum breakers, standby gas treatment system dampers, and EDG dampers)." License renewal drawings LRA-M-220-SH-03 and LRA-M-252-SH-01 have been reviewed and there are no instrument air components indicated within the scope of license renewal in accordance with 10 CFR 54.4 associated with main steam safety valves. However, on drawing LRA-M-252-SH-01 there are instrument air components indicated within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.21(a) associated with the four inboard and four outboard "main steam isolation valves."

Explain why "main steam safety valves" are listed in the above sentence from the LRA instead of inboard and outboard "main steam isolation valves." If instrument air components associated with the main steam safety valves are in the scope of license renewal and subject to AMR, provide a drawing they are shown on.

RAI-2.3.3.8-1 Response

Main steam safety valves were inadvertently listed instead of main steam isolation valves. LRA Section 2.3.3.8 for the Compressed Air (Instrument Air) System, Page 2.3-41 is revised to state the following.

"The instrument air system contains separate accumulators and tanks that store high pressure air or nitrogen for operation of safety-related equipment (main steam isolation valves, nuclear system pressure relief valves, torus vacuum breakers, standby gas treatment system dampers, and EDG dampers)."

RAI 2.3.3.8-2

In LRA section 2.3.3.8 for the Compressed Air (Instrument Air) System, the applicant states the following on page 2.3-42: "Additional details for the components subject to aging management review are provided in the following license renewal drawings." One of the license renewal drawings listed is LRA-M-250-SH-01 for the Control Rod Drive Hydraulic System. PCV's 302-89A (location A-5), 302-89B (location B-5), and 302-89C (location B-5), and SV's 302-26A (location G-6) and 302-26B (location F-6) on license renewal drawing LRA-M-250-SH-01 have a system intended function boundary flag at each end of the valve symbol pointing toward the valve. However, there are no instrument air system components color coded to indicate that they are subject to AMR.

Explain how these six valves alone by themselves perform an intended function in accordance with 10 CFR 54.4 and yet are not subject to an AMR in accordance with 10 CFR 54.21(a).

RAI-2.3.3.8-2 Response

Control rod drive (CRD) air header pressure control valves PCV-302-89A/B/C reduce instrument air pressure in the scram pilot valve air header, allowing reduced control rod insertion times. Pressure boundary integrity is not required for these valves since the associated CRD components achieve their desired position on a loss of header air pressure. Although these valves support a system intended function in accordance with 10 CFR 54.4, they perform that function <u>with</u> moving parts and a change in configuration. The valve bodies do not have a pressure boundary component intended function and therefore, do not require aging management review in accordance with 10 CFR 54.21(a).

The alternate rod insertion valves, SV-302-26A/B, and associated air dump valves function to open exhaust ports to depressurize the scram valve pilot air header to initiate a scram in order to mitigate the consequences of an ATWS event. Pressure boundary integrity is not required for these valves since the associated CRD components achieve their desired position on a loss of header air pressure. Although these valves support a system intended function in accordance with 10 CFR 54.4, they perform that function <u>with</u> moving parts and a change in configuration. The valve bodies do not have a pressure boundary component intended function and therefore, do not require aging management review in accordance with 10 CFR 54.21(a).

RAI 2.3.3.8-3

On license renewal drawing LRA-M-67-96 at location D-2, the applicant shows an instrument air system line color coded as within the scope of license renewal and subject to AMR. Also shown at this location, the applicant indicates the instrument air line continues onto license renewal drawing LRA-M-219 at location F-5. A review of drawing LRA-M-219 at location F-5 does not find a drawing reference continuation flag indicating drawing LRA-M-67-96 and location D-2.

Clarify the instrument air system license renewal boundary interface between license renewal drawing LRA-M-219 at location F-5 and license renewal drawing LRA-M-67-96 at location D-2.

RAI-2.3.3.8-3 Response

The instrument air system line on drawing LRA-M-219 at location F-5 continues on drawing LRA-M-220-SH-02 at location E-8 as indicated on the drawing. In addition this same line is continued on LRA-M-67-96 at location D-2 even though not specifically indicated on LRA-M220-SH-02. Similarly, the instrument air system line on drawing LRA-M-219 at location C-7 continues on LRA-M-220-Sh-02 at location E-2 and on LRA-M-67-96 at location D-2. The EDG dampers backup air supply components are shown on both LRA-M-220-SH-02 and LRA-M-67-96.

RAI 2.3.3.8-4

In FSAR Section 10.11, Instrument and Service Air Systems, on page 10.11-2, the applicant states the following: "A 3" back-up air supply system was added to the Instrument Air system, tying into the permanent plant hardpipe connection from the outside of the turbine building where it is connected to a diesel driven oil-free air compressor. This back-up source of instrument air is used for station black-out conditions and/or to provide additional air for times when the system is not available due to maintenance."

Justify the exclusion of the intended function for 10 CFR 54.4(a)(3) of supporting backup source of instrument that is credited in Station Blackout (SBO) regulations (10 CFR 50.63) from LRA Section 2.3.3.8, or include this system intended function. Identify and provide the drawing number where the SBO 3" back-up air supply system is depicted.

RAI-2.3.3.8-4 Response

As documented in the NRC SER for SBO, PNPS is an alternate AC plant and no detailed coping analysis is required [see 10 CFR 50.63(a)(2) and (c)(2)]. The equipment necessary to demonstrate compliance with the Commission's regulations for SBO are the AAC diesel generator and related electrical equipment. Based on NRC guidance concerning license renewal scoping for SBO, switchyard equipment needed to restore offsite power is also considered in the scope of license renewal. Mechanical systems other than the AAC diesel and its support systems are not within the scope of license renewal based on the Commission's regulations for station blackout. The backup source of instrument air does not perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63). This back up source of instrument air is shown on drawing M220 sheet 1. This drawing is not an LRA drawing because it does not depict components in the scope of license renewal and subject to aging management review.

2.3.3.13: Fuel Pool Cooling and Fuel Handling and Storage Systems

RAI 2.3.3.13-1

On license renewal drawing LR-M-241-SH-01 for the Fuel Pool Cooling and Fuel Handling and Storage system, the applicant shows that spectacle flange RO-1001-75 is installed to utilize augmented fuel pool cooling (AFPC). In FSAR Sections 4.8.5 and 10.4, the applicant describes the operation of the AFPC modes from the safety related RHR system. The sections describe the system inter-tie and the consequences of a postulated pipe break on the RHR system. When placed in service, restricting orifice RO-1001-75 limits flow from the RHR system in the event of a break in the FPC piping. The mitigation of the subsequent drain down of the reactor basin requires operator action. The time to accomplish the actions is based on the flow from the FPC pipe break.

Based on the FSAR information, the staff believes that RO-1001-75 supports RHR system intended functions by providing flow control. Therefore RO-1001-75 when placed in service meets criteria 10 CFR 54.4 (a)(2) for functional support to a safety related system, with a component intended function of flow control.

Neither LRA Table 2.3.3-13 nor 2.3.3-14-14 include a component type of orifice with an intended function of flow control.

Explain the exclusion of flow control as an intended function requiring aging management for the component type orifice.

RAI 2.3.3.13-1 Response

This line shown on LRA-M241 sheet 1 from the residual heat removal (RHR) system to the spent fuel pool is subject to aging management review due to its function as a source of spent fuel pool makeup. This line provides water to makeup for inventory lost due to boiling if the normal spent fuel pool cooling system is out of service. Restriction orifice RO-1001-75 does not have a required function of flow control during this emergency makeup function.

The RHR to SFP line has an alternate function of supporting the nonsafety-related fuel pool cooling system using the RHR pump to recirculate and cool the reactor basin (augmented fuel pool cooling). For augmented fuel pool cooling, this orifice in conjunction with downstream butterfly valve 19-HO-166 limits the flow to the desired flowrate. SAR Section 4.8.5.6 states the response time to a break in this nonsafety-related piping is based on a maximum flowrate of 5000 GPM which does *not* credit a reduction of flow by this restriction orifice.

Orifice RO-1001-75 is the stainless steel orifice listed in Table 3.3.2-13 of the LRA with the intended function of pressure boundary. Although the orifice has no license renewal intended function of flow control, the Water Chemistry Control-BWR Program manages the effects of aging on the pressure boundary function through the period of extended operation.

RAI 2.3.3.13-2

On license renewal drawing LR-M-231-SH 1 for the Fuel Pool Cooling and Fuel Handling and Storage system, the applicant shows that removable screens attached to lines 4"-HE-19 and 3"-HE-19 for the dryer and separator pool and fuel pool gate drains respectively are excluded from AMR. The actual lines are highlighted indicating that they are subject to AMR.

Explain whether the entire screen assembly including the pressure retaining portion is subject to AMR in accordance with 10 CFR 54.4(a), or justify its exclusion.

RAI 2.3.3.13-2 Response

The rectangles shown on the LRA drawing LRA-M231 Sheet 1 represent continuations of the pool liner and concrete. The removable screens over the entrances to the pool function only to remove debris during normal draining operations and do not support a safety function. The screens have no pressure boundary intended function.

2.3.4.4: Main Condenser System

RAI 2.3.4.4-1

In FSAR Section 11.3.3, the applicant describes a sight glass level indicator as being located on the outlet of each water box to aid in evaluation of the scavenging system and/or condenser performance. A sight glass level indicator and associated tubing provide the intended function of pressure boundary integrity for the main condenser. Component type sight glass indicator, or "LG" on P&ID Legend drawing M-200-SH 1, does not appear on LRA Table 2.3.4-2.

Justify the exclusion of component type sight glass indicator from being included within the scope of license renewal and subject to an AMR or include it on the LRA Table 2.3.4-2 and 3.4.2-2 with an appropriate AMP.

RAI 2.3.4.4-1 Response

The sight glass level indicator and associated tubing do not support the intended function of pressure boundary for the main condenser. The sight glass level indicators and associated tubing are located on the water boxes and are part of the circulating water system. The circulating water system is in the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The sight glass indicators and tubing are shown with other circulating water system components on Tables 2.3.3-14-1 and 3.3.2-14-1.

RAI 2.3.4.4-2

On license renewal drawings LRA-M-203-SH-1 at location C-5, and LRA-M-226-SH 1 at location F-8, the highlighted license renewal boundary ends at normally open valves. Failure of downstream piping can impact the intended function of the system (e.g., pressure boundary).

Justify ending the boundary as highlighted or describe the license renewal boundary on drawings for components downstream that are in the scope of license renewal in accordance with 10 CFR 54.4(a)(2) .

RAI 2.3.4.4-2 Response

When required during an MSIV leakage event, valve 1-HO-107 on drawing LRA-M-203-SH-01-0 at location C-5 and downstream valve MO-S-1 on drawing LRA-M-226-SH-01-0 at location F-8 are closed to direct MSIV leakage flow to the condenser. Therefore, components downstream of these valves are not part of the MSIV leakage pathway and are not subject to aging management review for 10 CFR 54.4(a)(1).

Components downstream of valve MO-S-1 are part of the steam sealing system, which is a subpart of the turbine-generators and auxiliaries system. As described in LRA section 2.3.4.3 and Table 2.3.3.14-35, these components are in the scope of license renewal in accordance with 10 CFR 54.4 (a)(2).

Components downstream of valve 1-HO-107 are part of the offgas and augmented offgas system. As described in LRA section 2.3.3.14 and Table 2.3.3.14-19 these components are in the scope of license renewal in accordance with 10 CFR 54.4 (a)(2).

As described in LRA section 2.1.2.1.3, LRA drawings indicate by highlight the portions of systems that support system intended functions within the scope of license renewal with the exception of those systems or portions of systems in scope for 10CFR54.4(a)(2) for physical interaction.

RAI 2.3.4.4-3

In LRA Section 2.0, the applicant states that if components have unique tag numbers or the specific component has a function other than pressure boundary, then flow elements, orifices and thermowells are identified as a separate component type.

On license renewal drawing LRA-M-203-SH-1 at location C-7, the applicant shows a restricting orifice RO-3058, that is highlighted meaning that it is subject to an AMR in accordance with 10 CFR 54.21(a). Although an orifice is listed as a component type in LRA Table 2.3.4-2 with an intended function of pressure boundary, restricting orifices also have a flow control intended function.

Justify excluding the flow control component intended function for the restricting orifice from being subject to AMR, or include it in LRA Tables 2.3.4-2 and 3.4.2-2.

RAI 2.3.4.4-3 Response

The components in the MSIV leakage pathway to the condenser only have a pressure boundary function since they provide the path to get the leakage to the condenser. Orifices in the pathway do not have a flow control intended function for license renewal since regulating flow in this line is not required to ensure that dose as a result of MSIV leakage during accident conditions is controlled

ATTACHMENT B to Letter 2.06.079
(4 pages)

Response to the RAIs on LRA Sections 2.3.1 (Reactor Coolant System), 2.3.2 (Engineered Safety Features), and 2.3.3 (Auxiliary Systems) conveyed in NRC letter dated July 31, 2006.

2.3.1.1 Reactor Vessel

RAI 2.3.1.1-1

In Table 2.3.1-1 of the license renewal application (LRA), the reactor vessel leakage monitoring piping was not identified as a component within scope requiring an aging management review (AMR). The staff requests the applicant to identify the subject components within scope, because it is considered as part of the pressure boundary, and accordingly, it should be within the scope of license renewal and subject to AMR. If, however, the applicant believes that the components do not require an AMR, then they should provide plant-specific justification based on the description of the subject components, or any other relevant information, as to why the components need not be subjected to an AMR.

RAI 2.3.1.1-1 Response

This response assumes that the subject components are those associated with reactor vessel head seal leakage detection. The subject components are not part of the reactor vessel and therefore are not included in Table 2.3.1-1, but are treated as part of the reactor coolant pressure boundary. As shown on LRA drawing LRA-M-252-SH-02-0, "P&ID Nuclear Boiler," at coordinate H5, the head seal leakage detection line is subject to aging management review. The associated components are included as Piping and fittings < 4" NPS, Orifices (instrumentation), and Valve bodies < 4" NPS in LRA Table 2.3.1-3, "Reactor Coolant Pressure Boundary Components Subject to Aging Management Review." Item 3.1.1-19 of Table 3.1.1 specifically addresses the head seal leak detection line.

RAI 2.3.1.1-2

The staff believes that the scram discharge piping and volume should be in scope requiring aging management. However, it appears that the subject component was not identified in Table 2.3.1-1 of the LRA. Please justify.

RAI 2.3.1.1-2 Response

As shown on LRA drawing LRA-M-250-SH-02-0, "Control Rod Drive Hydraulic System," the scram discharge piping and discharge volume are in scope and subject to aging management review. The scram discharge volume is a section of piping which is used to contain reactor vessel water from the drives during a scram. Since this piping and associated valves constitute part of the reactor coolant pressure boundary, the components are included in line items 'Piping and fittings < 4"NPS', 'Piping and fittings ≥ 4"NPS', and 'Valve bodies < 4"NPS' in LRA Table 2.3.1-3, "Reactor Coolant Pressure Boundary Components Subject to Aging Management Review." The CRD scram discharge piping and discharge volume are not in Table 2.3.1-1 because they are not part of the reactor vessel.

RAI 2.3.1.1-3

The staff understands that the CRD Housing Supports (CRDHS) limit the travel of a control rod in the event that a control rod housing is ruptured. The supports prevent a nuclear excursion as a result of a housing failure, thus protecting the fuel barrier, and limiting radioactive releases. In addition, following a postulated failure of the drive housing at the attachment weld at the same time the control rod is withdrawn, and if the collet were to stay unlatched, the housing would separate from the vessel, and the drive and housing would be blown downward against the CRDHS. If credit is taken for the CRDHS; and since, the CRDHS are passive and long-lived, the staff believes that the subject components should be within the scope of license renewal requiring aging management. It appears, however, that the subject components and their intended function of limiting travel of the control rod following control rod housing rupture have not been identified in Table 2.3.1-1 of the LRA. Therefore, the staff requests the applicant to provide an explanation.

RAI 2.3.1.1-3 Response

Control rod drive housing supports are structural elements that are in scope and subject to aging management review. Since they are structural components, they are included in the line item for "Component and piping supports ASME Class 1, 2, 3 and MC" in Table 2.4-6, "Bulk Commodities Components Subject to Aging Management Review." Control rod drive housing supports are not included in Table 2.3.1-1 because they are not part of the reactor vessel.

2.3.1.2 Reactor Vessel Internals (RVI)

RAI 2.3.1.2-1

In Section 2.3.1.2, "Reactor Vessel Internals," it was stated that RVI include local power range monitors. The staff understands that the neutron monitoring system (NMS) includes additional neutron monitors, such as, intermediate range monitors, rod block monitors, etc.; and these monitoring circuits, along with their electrical cables should be within scope of license renewal requiring aging management. The staff also noted that in Table 2.2-1b of the LRA, it was indicated that a bounding approach was used for the NMS. The staff requests the applicant to clarify which neutron monitors and the related cables are considered within scope based on the bounding approach.

RAI 2.3.1.2-1 Response

The purpose of PNPS LRA Section 2.3 "Scoping and Screening Results: Mechanical Systems," subsection 2.3.1.2 "Reactor Vessel Internals" is to provide a brief list of the reactor vessel internals. Inside each LPRM assembly there are multiple detectors and a calibration tube. The calibration tube, also called a TIP tube, is the path through which the transversing incore probes (TIPs) move. Thus, the LPRM assembly calibration tubes function as part of the reactor coolant pressure boundary. The other neutron monitoring circuits do not form part of the reactor coolant pressure boundary as they do not have calibration tubes. Due to their mechanical pressure boundary function, the LPRMs are listed in this section. However, this section of the LRA is not intended to provide a description of electrical portions of the system such as the intermediate range monitors, rod block monitors, and associated electrical cables.

As stated in LRA Section 2.2, "Plant Level Scoping Results," all electrical and I&C commodities contained in electrical and mechanical systems are in scope by default. Therefore, the neutron monitoring components and related cables described in PNPS UFSAR Section 7.5 are in the scope of license renewal.

2.3.2.1 Residual Heat Removal System

RAI 2.3.2.1-1

The low pressure coolant injection coupling was identified in the Boiling Water Reactor Vessel and Internals Project (BWRVIP)-06 report as a safety-related component. It appears, however, that the component was not identified in Table 2.3.2-1 of the LRA requiring an AMR. If the component exists at Pilgrim Nuclear Power Station, then the staff requests the applicant to justify its exclusion from aging management; otherwise, submit an AMR for the subject component.

RAI 2.3.2.1-1 Response

As noted in LRA Section B.1.8, PNPS does not have a low pressure coolant injection coupling.

RAI 2.3.2.1-2

Please clarify whether the passive components, namely, vortex breakers used in pump suction lines, which could be located inside the emergency core cooling system tanks or in the sump, and whose intended functions are to protect the pumps from cavitation, are subject to an AMR. If so, identify which of these tanks are equipped with such passive components, and where in the LRA are the AMRs for these components, or provide justifications for exclusion of these components from AMRs.

RAI 2.3.2.1-2 Response

A review of PNPS site documentation for all in-scope mechanical systems, including licensing basis and design basis documents as well as site drawings, determined that no vortex breakers were required to support system intended functions in the scope of license renewal per 10 CFR 54.4(a)(1), (a)(2) or (a)(3). Therefore vortex breakers are not included in the PNPS license renewal application.

2.3.2.4 & 2.3.2.5 High Pressure Coolant Injection (HPCI) & Reactor Core Isolation Cooling (RCIC)

RAI 2.3.2.4-1

The steam supply and return lines for HPCI and RCIC perform safety functions, and therefore, should be in scope of license renewal in accordance with 10 CFR 50.4(a)(1). The staff requests the applicant to clarify whether the subject components are in scope requiring an AMR.

RAI 2.3.2.4-1 Response

As shown on LRA drawings LRA-M-243-0 and LRA-M-244-SH-01-0, "P&ID HPCI System," the steam supply and return lines for the high pressure coolant injection (HPCI) system are in scope and subject to aging management review. These lines support the intended functions of the HPCI system and are therefore subject to aging management review in accordance with 10 CFR 54.4(a)(1). Components in these lines are included in LRA Table 2.3.2-4, "High Pressure Coolant Injection System Components Subject to Aging Management Review."

As shown on LRA drawings LRA-M-245-0 and LRA-M-246-SH-01-0, "P&ID RCIC System," the steam supply and return lines for the reactor core isolation cooling (RCIC) system are in scope and subject to aging management review. These lines support the intended functions of the RCIC system and are therefore subject to aging management review in accordance with 10 CFR 54.4(a)(1). Components in these lines are included in LRA Table 2.3.2-5, "Reactor Core Isolation Cooling Components Subject to Aging Management Review."

ATTACHMENT C to Letter 2.06.079
(3 pages)

Response to RAIs on LRA Section 4.2.1 (Reactor Vessel Fluence) and
LRA Appendix B (Aging Management Programs and Activities)
Sections B.1.3 (Control Rod Drive Return Nozzle)
and B.1.26 (Reactor Vessel Surveillance Program).

4.2.1 Reactor Vessel Fluence

RAI 4.2.1-1

Section 4.2.1 of the submittal indicates that PNPS used the radiation analysis modeling application code for the calculation of the 54 effective full-power year (EFPY) vessel fluence values. Section 4.2.2 states that recent calculations done per Regulatory Guide 1.190 confirm that the fluence for 54 EFPY is less than the fluence used to calculate the pressure and temperature limits in Reference 4.2-5, "Pilgrim Nuclear Power Station - Issuance of Amendment Re: Pressure-Temperature Limit Curves (TAC NO. MB0561)," letter dated April 13, 2001, Wang, A., to M. Bellamy.

Please provide information to substantiate this statement, preferably in the form of a contractor's report that documented these fluence calculations.

RAI 4.2.1-1 Response

The pressure and temperature limits in the technical specifications were calculated for 48 EFPY based on a projected maximum ¼T neutron fluence of 1.48×10^{18} n/cm^2 (E > 1 mev). The projection of maximum ¼T fluence for 54 EFPY is only 8.4×10^{17} n/cm^2 (E > 1 mev), as presented in Section 4.2.1 of the LRA. This value was obtained from a TransWare proprietary fluence calculation. Fluence values were calculated using the RAMA fluence methodology. The RAMA fluence methodology was developed for the Electric Power Research Institute, Inc. and the boiling water reactor vessel and internals project (BWRVIP) for the purpose of calculating neutron fluence in boiling water reactor components. This methodology has been approved by the NRC[2] for application in accordance with Regulatory Guide 1.190.

The projected 54 EFPY fluence, calculated in accordance with Regulatory Guide 1.190, is less than the fluence used to generate the 48 EFPY curves because of excess conservatism used in the previous fluence model. Removing this conservatism, the current P-T limits remain valid for 54 EFPY.

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[2] Bateman, W. H. (NRC), to Eaton, W. (BWRVIP), "Safety Evaluation of Proprietary EPRI Reports BWRVIP-114, -115, -117, and -121 and TWE-PSE-001-R-001," letter dated May 13, 2005.

B.1.3-1 Control Rod Drive (CRD) Return Nozzle

RAI B.1.3-1

Provide information regarding the type of inspection and the inspection frequency of the capped CRD return line nozzle weld overlay during the extended period of operation.

RAI B.1.3-1 Response

The CRD Return Line Nozzle N-10 weld overlay repair will continue to be inspected under the PNPS Inservice Inspection Program as a Category E weld in accordance with BWRVIP-75-A "Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules" during the period of extended operation.

RAI B.1.3-2

The applicant states that it will take the following exception to the inspection requirements for the CRD return line nozzle weld as mandated by the American Society of Mechanical Engineers (ASME) Code, Section XI.

PNPS proposes to examine ½" of the volume on either side of the widest part of the N10 nozzle-to-vessel weld in lieu of ½ the vessel wall thickness as required by the ASME Code, Section XI, 1998 Edition, 2000 Addenda, Figure IAB-2500-7(b).

The staff requests that the applicant provide information regarding the state of stress that is present in the volume of the subject weld that will not be included in the future examinations. Clarify whether the highly stressed volume of the weld, where cracks can initiate, will be examined effectively with the proposed alternative. The staff believes that the applicant should obtain prior approval from the staff for implementing the proposed alternative examination under the provisions of 10 CFR 50.55a before entering into the extended period of operation. Provide information whether the proposed alternative examination of the CRD return line nozzle weld has previously been submitted to the staff for review and approval for the current ISI interval.

RAI B.1.3-2 Response

PNPS has taken an exception to NUREG-1801, not to the ASME code. For the third ISI interval, the NRC has granted relief from the code requirement. The relief is in accordance with Code Case N-613-1.

The reduced examination volume for the CRD return line nozzle to vessel weld is described in LRA Appendix B.1.3. This reduction of the inspection volume for the adjacent base metal is in accordance with ASME Code Case N-613-1, which the NRC has determined to be an acceptable Section XI code case per Table 1 of Regulatory Guide 1.147 Rev. 14, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1".

As this code case has been found acceptable by Regulatory Guide 1.147, PNPS will not submit relief requests to use these alternative examinations during the ISI ten-year intervals through the period of extended operation at PNPS.

PNPS has not compared the stress levels in the section of this nozzle being examined to the areas not being examined. Code Case N-613-1 as approved by the NRC applies to all Category B-D welds with no restrictions based on stress levels. However; as can be seen by the sketches in Code Case N-613-1, the entire weld and most of the heat affected zone is being examined. In addition, the CRD return nozzle, by virtue of being capped, has no flow and hence relatively low stresses compared to other nozzles in the reactor vessel. The Code Case N-613-1 examination will adequately inspect the weld.

RAI B.1.26-1

The applicant in the updated final safety analysis report (UFSAR) supplement A.2.1.28, "Reactor Vessel Surveillance Program," and in the aging management program (AMP) B.1.26, "Reactor Vessel Surveillance," states that it will implement the Boiling Water Reactor Vessel and Internals Project (BWRVIP) integrated surveillance program (ISP) at the Pilgrim Nuclear Power Station (PNPS) as specified in BWRVIP-116, "BWR Vessel Internals Project Integrated Surveillance Program Implementation for License Renewal." By letter dated March 1, 2006, the staff has issued the final safety evaluation (SE) for the BWRVIP-116 report and therefore, the staff requests that the applicant include the following statement in UFSAR supplement Section A.2.1.28 and in AMP B.1.26 of the license renewal application (LRA).

> "The BWRVIP-116 report which was approved by the staff will be implemented at PNPS with the conditions documented in Sections 3 and 4 of the staff's final SE dated March 1, 2006, for the BWRVIP-116 report."

RAI B.1.26-1 Response

With the expectation that the BWR Owners Group (BWROG) will implement the conditions documented in the Staff's SER for BWRVIP-116 into the BWRVIP Integrated Surveillance Program, PNPS will also implement the approved BWRVIP-116. This commitment will need to be re-evaluated should the BWROG take exception to the conditions documented in the Staff's SER for BWRVIP-116.

LRA Sections A.2.1.28, "Reactor Vessel Surveillance Program," and B.1.26, "Reactor Vessel Surveillance," are revised to add the following.

"The BWRVIP-116 report which was approved by the Staff will be implemented at PNPS with the conditions documented in Sections 3 and 4 of the Staff's final SE dated March 1, 2006, for the BWRVIP-116 report."

RAI B.1.26-2

Title 10 of the Code Federal Regulations Part 50 (10 CFR Part 50), Appendix H requires that an ISP used as a basis for a licensee implemented reactor vessel surveillance program be reviewed and approved by the NRC staff. The ISP to be used by the applicant is a program that was developed by the BWRVIP. The applicant will apply the BWRVIP ISP as the method by which the PNPS unit will comply with the requirements of 10 CFR Part 50, Appendix H. The BWRVIP ISP identifies capsules that must be tested to monitor neutron radiation embrittlement for all licensees participating in the ISP and identifies capsules that need not to be tested (standby capsules). Table 3-3 of the BWRVIP-116 report indicates that the standby capsule from PNPS unit is not to be tested. This untested capsule was originally part of the applicant's plant-specific surveillance program and has received significant amounts of neutron radiation.

The staff requests that the applicant include the following statement in the UFSAR supplement Section A.2.1.28 of the LRA.

"If the PNPS standby capsule is removed from the reactor vessel without the intent to test it, the capsule will be stored in a manner which maintains it in a condition which would permit its future use, including during the period of extended operation, if necessary."

RAI B.1.26-2 Response

LRA Section A.2.1.28, "Reactor Vessel Surveillance Program," is revised to add the following.

"If the PNPS standby capsule is removed from the reactor vessel without the intent to test it, the capsule will be stored in a manner which would permit its future use if necessary."

ATTACHMENT D to Letter 2.06.079
(14 pages)

Clarification of the Response to RAIs on Severe Accident Mitigation Alternatives
Provided in LRA Amendment 4 dated July 5, 2006

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Tables

Background

On January 25, 2006, Entergy Nuclear Operations, Inc. requested the renewal of the operating license for the Pilgrim Nuclear Power Station (PNPS), to extend the terms of their operating license an additional 20 years beyond the current expiration date. Appendix E of the License Renewal Application (LRA) consisted of the Applicant's Environmental Report – Operating License Renewal Stage (i.e., the ER). Attachment E of the ER contained the evaluation of Severe Accident Mitigation Alternatives (SAMAs). By letter dated May 22, 2006, the NRC provided a request for additional information (RAI) concerning the analysis of SAMAs performed in support of the PNPS LRA. By letter dated July 5, 2006 PNPS provided the additional information requested. By email dated August 7, 2006, the NRC provided a request for clarification of Entergy's responses to some of the SAMA RAIs for telecon discussions. The response to this clarification request follows.

NRC Request for Clarification to RAI 1.e

With regard to the independent team of consultants that reviewed the PRA revision, identify the criteria and scope of the review.

Response to Request for Clarification to RAI 1.e

The independent team of consultants was comprised of three prominent outside experts from Scientech:

- Mr. Robert Bertucio

Mr. Bertucio reviewed the entire plant model, including the accident sequence event trees; the system fault tree models and their associated system notebooks.

- Mr. Jeff Julius

Mr. Julius reviewed the Human Reliability Analysis. His review included both the human reliability analysis approach and results.

- Mr. P. J. Fulford

Mr. Fulford reviewed the Level II Containment Performance Analysis, including the following.

  - Bins and Plant Damage States
  - Containment Failure Characterization
  - Containment Event Tree
  - Radionuclide Release Characterization
  - Containment Event Tree Quantification.

The review concentrated on the technical adequacy and accuracy of the PNPS PSA model. The review criteria are the criteria embodied in the Owners Group certification and NEI peer review processes.

NRC Request for Clarification to RAI 2.b

From the response, it is not clear for what the CET release categories (see Table RAI.2-4) are used. It appears that they have no function. Please discuss.

Response to Request for Clarification to RAI 2.b

The CET release categories have no direct function in determining the final collapsed accident progression bins used in the MACCS2 evaluation. The CET release categories presented in Table RAI.2-4 are used as a method to present the Level 2 results.

NRC Request for Clarification to RAI 2.c

1. Please describe the terms in source term algorithm equation in more detail. For example, how do the in-vessel releases get to the environment, what if there is no core concrete interaction, and what about revaporization/resuspension from containment surfaces? Please discuss.

2. The CAPB definitions appear to combine in one CAPB sequences which are the same except that the fission product releases are either mitigated in the drywell, mitigated in the reactor building or are not mitigated. The three, presumably significantly different release fractions, are then frequency weighted to produce a release fraction for the CAPB. The validity of this process is not clear. The usual purpose of having several source term categories is to do separate consequence analysis for groups with different release characteristics. Please discuss.

3. The last portion of the response to 2b discussed release timings for the CAPBs while the last portion of 2c, part ii of the response indicates that release times were frequency weighted. Please clarify. What is considered a late release as far as the CAPBs are concerned?

Response to Request for Clarification to RAI 2.c.1

All sources of release are considered, including in-vessel releases, ex-vessel releases due to core-concrete interaction (CCI), and in-vessel revolatilization releases from the primary coolant system after vessel breach.

The magnitude of the source term release resulting from an accident progression was estimated using a source term algorithm. This algorithm is a set of algebraic expressions that calculate release of each radionuclide group to the environment based on the release from fuel debris and removal mechanisms active in the severe accident progression.

Several terms must be defined to understand the algorithm.

R (Release to Environment). The release of fission products to the environment that is attributable to a distinct source. These sources are:

- In-vessel releases (R_{IV}). Releases to the environment due to core melt in-vessel.
- Ex-vessel releases due to core-concrete interaction (CCI) inside containment (R_{CCI})
- In-vessel revolatilization releases from the primary coolant system after vessel breach (I, CS and TE only) (R_{REV}).

RF (Release Fraction). Release fraction is the fraction of material in a given fission product group that evolves from the core debris and becomes available for release to the environment. Deposition mechanisms act on this material to limit its ultimate release to the environment. Release fractions were defined for each source:

$RF_{IV\,(i)}$	In-vessel release fraction for each fission product (I).
$RF_{CCI\,(i)}$	Core-concrete interaction release fraction.
$RF_{REV\,(i)}$	Revolatilization release fraction.

DF (Decontamination Factor). The decontamination factor accounts for the reduction in airborne mass of fission products by the deposition mechanism. Mathematically, the DF is the ratio of fission product mass entering (or initially present in) a volume to the mass leaving. The inverse of the decontamination factor is the transmission factor.

Decontamination factors were defined for each product group for primary coolant system and vessel deposition, torus scrubbing and drywell sprays decontamination:

DF_{VSL}	Primary coolant system and vessel decontamination factor.
DF_{ESPY}	Drywell sprays decontamination factor for in-vessel releases.
DF_{ECONT}	Containment natural deposition decontamination factor for in-vessel releases.
DF_{CCI}	Core-concrete interactions overlying pool scrubbing decontamination factor.
DF_{LCONT}	Containment natural deposition decontamination factor for ex-vessel and revolatilization releases.
DF_{LSPY}	Drywell sprays decontamination factor for ex-vessel and revolatilization releases.
DF_{TORUS}	Decontamination factor for aerosol species flowing from the vessel to the torus.
$DF_{DW\text{-}TORUS}$	Decontamination factor for aerosol species flowing from the drywell to the torus.
DF_{RB}	Decontamination factor for aerosol species from the reactor building to the environment.

Making use of these terms, we can calculate the total release to the environment as:

$$R_{env(i)} = R_{IV(i)} + R_{CCI(i)} + R_{REV(i)}$$

Where the release terms are defined as follows:

In-vessel releases:

$$R_{IV(i)} = \frac{RF_{IV(i)}}{DF_{IV}}$$

Ex-vessel releases:

$$R_{CCI(i)} = \left[1 - RF_{IV(i)}\right] * \frac{RF_{CCI(i)}}{DF_{CCI}}$$

In-vessel revolatilization release:

$$R_{REV(i)} = \left[RF_{IV(i)} * \left(1 - \frac{1}{DF_{VSL}} \right) \right] * \frac{RF_{REV(i)}}{DF_{REV}}$$

Where:

DF_{IV} = decontamination factor for in-vessel releases

$$DF_{IV} = DF_{ECONT} * DF_{ESPY} * DF_{TORUS} * DF_{RB}$$

DF_{CCI} = decontamination factor for core-concrete interaction releases

$$DF_{CCI} = DF_{LCONT} * DF_{LSPY} * DF_{POOL} * DF_{DW-TORUS} * DF_{RB}$$

DF_{REV} = decontamination factor for revolatilization releases

$$DF_{REV} = DF_{LCONT} * DF_{LSPY} * DF_{RB}$$

Release fractions (RFs) and decontamination factors (DFs) are calculated in a manner consistent with their definitions. RFs are calculated by dividing the release by the initial mass; DFs are calculated by dividing the mass entering a volume by the mass leaving that volume (e.g., DFVSL is the ratio of released mass in-vessel to the mass in the containment at vessel failure). This method for calculating RFs and DFs from the MAAP output data is illustrated below for a few source term algorithm parameters.

In-vessel Release Fraction (RF_{IV})

$$RF_{IV} = \frac{Inv\ Rel_f}{Initial_f}$$

Where,

$Inv\ Rel_f$ = the final isotope mass in-vessel release,
$Initial_f$ = the initial isotope.

Decontamination Factor for the RPV (DF_{VSL})

$$DF_{VSL} = \frac{Inv\ Rel_v}{Cont_v}$$

Where,

$Inv\ Rel_v$ = the isotope mass in-vessel release at vessel failure,
$Cont_v$ = the isotope mass in the containment at vessel failure.

Ex-vessel Release Fraction (RF_{CCI})

$$RF_{CCI} = \frac{Exv\ Rel_f}{Initial_f - Inv\ Rel_v}$$

Where,

$Exv\ Rel_f$ = the final isotope mass ex-vessel release.

Revolatilization Release Fraction (RF_{IV})

$$RF_{REV} = \frac{Ps_v - Ps_f}{Ps_v}$$

Where,

Ps_f = the final isotope mass in the primary system,
Ps_v = the isotope mass in the primary system at vessel failure

The remaining decontamination factors are present in Table RAI.2-5.

The above equations were transported into an EXCEL spreadsheet and calculations were performed for all releases to the environment for the release endstates represented in the CET.

Response to Request for Clarification to RAI 2.c.2

The CAPBs used in the consequence analysis are distinct source terms groups with different source term characteristics. The initial process of generating specific source terms was accomplished by grouping releases into release categories that represent all postulated accident scenarios that produce a similar fission product source term. The criteria used to characterize the release are the estimated magnitude of total release and the timing of the first significant release of radionuclides. This process resulted in the generation of hundreds of source terms. Since it was not feasible to perform a calculation with the MACCS2 consequence model for each of the source terms, another interface was developed between the source term analysis and the consequence analysis. This interface involved grouping the large number of source terms into a much smaller number of source terms.

These source term groups were defined in terms of similar accident progressions properties and were frequency weighted for each group. The properties are: the occurrence of core damage, the occurrence of vessel breach, primary system pressure at vessel breach, the location of containment failure, the timing of containment failure and the occurrence of core-concrete interactions.

The source terms used in the consequence analysis were determined as follows:

1. The appropriate source terms based on the source term algorithm (described in Response to RAI 2.c.1) were selected and assigned to a particular CET accident progression endstate.
2. Based on the source terms from Step 1, the source term for each plant damage state CET accident progression endstate was determined.
3. The mean frequency of each release category was determined by summing the individual plant damage state CET accident progression endstates contained in the particular release category (i.e., no containment failure, early high release, etc.).
4. The release category individual fractional contributions for each CET accident progression were determined by dividing the result from Step 3 by the individual PDS frequency.
5. Each PDS accident progression CET endpoint source term, release timing, release energy and release elevation was multiplied by the value determined in Step 4.
6. The individual results of Step 5 were summed to arrive at the final values used in the MACCS2 analysis.

The validity of this binning process was examined by calculating the population dose risk (PDR) and offsite economic cost risk (OECR) for each the of the eleven CET accident progressions bins that are binned into CAPB-14. The results, presented in Table RAI.2-6, show only minor variation in the PDR and OECR values for the two approaches. Therefore, the binning process is reasonable.

Response to Request for Clarification to RAI 2.c.3

The release timings for the CAPBs used in the MACCS2 analysis are based on frequency weighted values. The initial values of the CAPB release timings (prior to performing the frequency weighted calculations) are described in the response to RAI 2b.

CAPB releases timings greater than 7.5 hours are considered a late release.

Table RAI.2-5 Remaining Pilgrim Decontamination Factors

Decontamination Factors	NG	I	Cs	Te	Sr	Ru	La	Ce	Ba	Reference
Drywell sprays decontamination factor for in-vessel releases (DF_{ESPY})	1	11	11	11	11	11	11	11	11	NUREG/CR-4551, Vol.4, Rev.1, Part 2, page B.2.3
Containment Decontamination Factor for In-vessel Releases (early rupture failure-saturated pool) (DF_{ECONT})	1	1.32	1.32	1.35	1.35	1.35	1.35	1.35	1.35	Table 5.1 page 5.5-10 NUREG/CR-4551 Vol. 2 Part 4 Rev.1
Containment Decontamination Factor for Ex-vessel Releases (early rupture failure-saturated pool) (DF_{ECONT})	1	1.32	1.32	1.41	141	1.41	1.41	1.41	1.41	Table 5.1 page 5.5 -22 NUREG/CR-4551 Vol. 2 Part 4 Rev.1
Containment Decontamination Factor for Ex-vessel Releases (late rupture failure-saturated pool) (DF_{LCONT})	1	14.93	14.93	10.53	10.53	10.5 3	11.77	11.77	11.7 7	Table 5.1 page 5.5-26 NUREG/cr-4551 Vol. 2 Part 4 Rev.1
Drywell sprays decontamination factor for ex-vessel and revolatilization releases (DF_{LSPY})	1	11	11	11	11	11	11	11	11	NUREG/CR-4551, Vol.4, Rev.1, Part 2, page B.2.3
Decontamination factor for aerosol species flowing from the vessel to the torus (DF_{TORUS})	1	81	81	81	81	81	81	81	81	NUREG/CR-4551, Vol.4, Rev.1, Part 2, page B.2.3
Decontamination factor for aerosol species flowing from the drywell to the torus ($DF_{DW-TORUS}$)	1	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	NUREG/CR-4551, Vol.4, Rev.1, Part 2, page B.2.3
Decontamination Factor for the Overlying Pool (DF_{Pool})	1	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	NUREG/CR-4551, Vol.4, Rev.1, Part 2, page B.2.4
Decontamination factor for aerosol species from the reactor building to the environment (DF_{RB})	1	2.49	2.49	2.59	2.59	2.59	2.59	2.59	2.59	NUREG/CR-4551, Vol.4, Rev.1, Part 2, page B.2.3 (these values represents the average values)

Table RAI.2-6 Comparison of PDR and OECR for each APB Release Mode for CAPB-14

Release Mode	Frequency (/yr)	Population Dose Risk (PDR) (person-rem/yr)	Off-site Economic Cost Risk (OECR) ($/yr)
APB-3	5.73E-07	1.89E-01	9.34E+01
APB-4	3.04E-08	1.00E-02	4.96E+00
APB-7	3.18E-08	6.91E-02	2.42E+02
APB-8	2.37E-08	8.07E-02	2.98E+02
APB-9	2.37E-08	1.32E-01	5.05E+02
APB-31	2.88E-08	4.93E-02	1.69E+02
APB-32	2.37E-08	7.67E-02	2.91E+02
APB-33	2.37E-08	1.29E-01	4.91E+02
APB-55	1.44E-06	2.46E+00	8.45E+03
APB-56	2.71E-08	8.78E-02	3.33E+02
APB-57	4.73E-08	2.57E-01	9.80E+02
APB Totals	**2.27E-06**	**3.54E+00**	**1.19E+04**
CAPB-14 Totals	**2.26E-06**	**3.82E+00**	**1.12E+04**

NRC Request for Clarification to RAI 3.c

The response to this RAI includes a revision to the analysis of SAMAs 2 and 19. The basis for this revision is described in Note 1 to Table RAI.3-2.

1. Note 1 indicates that successful venting PDSs result in CAPBs 12, 13, 14 and 15. Two of these CAPBs (14 and 15) are stated in Table E.1-9 to involve drywell failure due to core-concrete interaction. It is not clear how, with successful venting the drywell would fail due to CCI or with drywell failure the filtered vent would impact the releases. Please clarify the assignment of containment venting to accident progression bins (CET end states) and CAPBs.

2. Note 1 provides the change in release fractions for the 4 CAPBs for the assumed factor of 2 reduction in source term due to the filtered vent. While several source terms are not reduced at all or are reduced by only a few percent, the Cs and I release fractions are reduced by approximately 50% (i.e. a factor of 2) and the Te source term is reduced by more than a factor of 10. Please discuss these source term reductions.

Response to Request for Clarification to RAI 3.c.1

The CET classifies containment venting from either the drywell or torus as containment failure, hence, a CET sequence that involves 'successful venting' with core damage occurring post vent, and the occurrence of core concrete interactions (CCI) is valid. The occurrence of CCI in the CAPB description does not necessarily imply drywell failure due to CCI-induced over-pressure failure. Containment failure in CAPBs 12, 13, 14 and 15 could result from any of the severe accident phenomena (i.e., high temperatures drywell seal failure, containment overpressurization due to CCI, etc.). The occurrence of CCI is used an accident progression characteristic that influences the release.

Response to Request for Clarification to RAI 3.c.2

Note 1 to Table RAI.3-2 compares the base case CAPB source terms and the revised CAPB source terms associated with 'TW' plant damage states.

As stated in Note 1, the assumed factor of reduction of 2 in source terms due to the filtered vent was applied to the source terms associated with core damage accident sequences that are binned into plant damages states 1, 5, 12, 18, 40 and 43. These plant damages represent successful venting with core damage occurring after containment venting. The source term reduction of these plant damage states influences the final source terms for CAPBs 12, 13, 14, 15 as presented in Note 1 of RAI response 3.c.

NRC Request for Clarification to RAI 5.a

While, as stated in the response, relocation of equipment to eliminate or reduce the correlated failure of the vulnerable equipment would be cost prohibitive, relocation is not the only way of reducing the risk due to the identified pieces of equipment. Simple, inexpensive fixes might be possible depending on the failure mode. For example, if the mode of failure of the electrical panels is a simple structural failure such as tipping due to lack of a top support or failure of an anchor bolt, then a fix might be cost effective. Please discuss the individual failure modes in assessing the potential for cost effective SAMAs.

Response to Request for Clarification to RAI 5.a

IPEEE Table 3-15 lists the important seismic faults that dominate seismic risk.

The seismically correlated events were developed to account for failure of *like-equipment* located on the same elevation. *Like equipment* is defined as equipment of the same manufacturer, same model, and same anchorage capacity. Major groups of identical components located on the same elevation were represented by a seismic "*Common Cause*" event that fails all components in that group. The conditional failure probability for a single component was assigned to the common cause event (i.e., complete correlation).

However, the individual equipment which make up the correlated failure combinations have high seismic capacity and do not show up as important seismic faults that dominate seismic risk. The correlated events are relatively important because they fail all components in the group. Thus, simple inexpensive fixes that would reduce the conditional failure probability for a single component would not significantly reduce the relative importance of the correlated event. Therefore, only reorientation and relocation, not individual failure modes, were considered in assessing the potential for cost effective SAMAs.

NRC Request for Clarification to RAI 5.e

Apparently, the modifications included in SAMA 27 were revised along with the evaluation of the benefit from these modifications. That is, the benefit was increased by including the reduction in initiator frequency but the cost went up by including a new DC power source in the modification. Would the original modifications considered impact the initiating event frequency and if so what would be the benefit?

Response to Request for Clarification to RAI 5.e

The original modification considered in SAMA 27 would impact the initiating event frequency. However, a more refined cost estimate was performed on this original modification. The revised cost estimate for this SAMA to mitigate the loss of DC-bus initiator by improving DC bus reliability is $1,953,682 and its revised baseline benefit with uncertainty is $1,341,800. Therefore, this SAMA is not cost effective for PNPS.

NRC Request for Clarification to RAI 5.q

The cost of a redundant diesel fire pump is given as over $5.5 Million. This seems excessive. Please justify.

Response to Request for Clarification to RAI 5.q

Cost estimates for SAMA consideration followed Entergy's standard process for development of project estimates. The process is applied to establish conceptual (+/- 25% to 50% accuracy), preliminary (+/- 15% to 30% accuracy), and definitive (+/- 10% to 20% accuracy) estimates during the study, design, and implementation phases of a design project. This procedure replaced and enhanced the completeness and accuracy of estimates previously developed.

The SAMA cost estimates capture all anticipated expenses by identifying all parts of the organization that must support the proposed SAMA modification from the conceptual perspective. Typical expenses associated with project cost estimating include calculations, drawing updates, specification updates, bid evaluations, contract issuance, design package preparation, walkdowns, planning and scheduling, estimating, procurement, configuration management, ALARA, QC/QA, training, simulator, IT, design basis update, construction, multi-discipline and independent review of design concepts and calculations, 50.59 review, FSAR update, cost control, contingency, security, procedures, post work testing, and project management and close-out. In addition, the project cost estimates include corporate indirect charges.

In summary, the cost estimates for the subject SAMAs followed Entergy's standard process for development of project estimates. Therefore, these cost estimates are reasonable conceptual level estimates.

NRC Request for Clarification to RAI 5.h

The cost of changing two valves to fail open on loss of air or power is given as $3.2 million. This seems excessive. Please justify.

Response to Request for Clarification to RAI 5.h

See response to NRC Request for Clarification to RAI 5.g.

NRC Request for Clarification to RAI 6.a

1. For SAMAs 6 and 20, it appears that flooding internal to the drywell was evaluated. It would appear that flooding (or sprays) on the outside might serve the same purpose and avoid the necessity for the relocation of the drywell vent. Please discuss.

2. For SAMAs 7 and 21, it would appear that use of existing fire water sprays might be effective in mitigating releases. Please discuss.

3. SAMA 22 is understood to be simply providing a means of flooding the floor of the drywell rather than providing a core retention device (the latter is considered in SAMA 5). Please clarify.

Response to Request for Clarification to RAI 6.a.1

SAMAs 6 and 20 evaluated flooding internal to the drywell to ensure the drywell head seal does not fail due to high temperature. Flooding or sprays on the outside might serve the same purpose, but would still cost more than the estimated benefit for these SAMAs ($0 in Table RAI.3-2).

Response to Request for Clarification to RAI 6.a.2

There are only a few fire protection automatic suppression systems within the reactor building (23' and 51' elevations). As such, they have limited capability in providing fission product scrubbing. The proposed design modification would upgrade the fire protection system to a sufficient capacity to handle postulated loads from severe accidents. The revised baseline with uncertainty value of $94,714 is less than the estimated implementation cost of greater than $2.5 million. Therefore, this SAMA is not considered to be cost effective.

Response to Request for Clarification to RAI 6.a.3

To clarify, SAMA 22 would allow debris to be cooled by providing a means of flooding the floor of the drywell rather than providing a core retention device. In SAMA 5, the proposed design modification involves a core retention device inside the reactor pedestal area.

NRC Request for Clarification to RAI 6.d

The appropriateness of a factor of 3 reduction in operator failure to vent for SAMA 53 is not clear. The benefit of the controlled venting occurs for sequences involving successful venting which are not significantly affected by reducing the operator error to vent. In addition, the evaluation for SAMA 53 leads to only a 3.6% reduction in CDF while the provision of a passive vent considered in response to RAI 5.h (which presumably eliminates all failure to vent sequences) led to a 14.5% reduction. Please provide further support for the evaluation.

Response to Request for Clarification to RAI 6.d

SAMA 53 (Control containment venting within a narrow band of pressure), would establish a narrow pressure control band to prevent rapid containment depressurization when venting is implemented thus avoiding adverse impact on the low pressure ECCS injection systems (LPCI and core spray) taking suction from the torus.

The original response to RAI 6.d used a factor of 3 reduction in the operator failure to vent probability based on the following:

- Current PSA does not model control venting to allow LPCI and Core Spray operation,
- Modeling of control venting requires impact on net positive suction head (NPSH) requirements for LPCI and Core Spray when opening the torus vent path, and
- Examination of the feasibility of re-closing the torus vent valves AO-5042B and AO-5025 against high containment pressures is not available.

In response to this request for clarification, the following alternative means of evaluating the benefits for SAMA 53 is provided.

This evaluation was performed by crediting continued vessel injection from LPCI or Core Spray for those sequences in which torus venting is successful and alternative injection systems fail after torus venting. Specifically, an additional event (LPCI-CS) was added to the PSA results (cutsets) that involve successful torus venting.

Currently there is no detailed engineering analysis that examines the impact of opening the torus vent path on NPSH requirements for LPCI and Core Spray and no examination of the feasibility of re-closing the torus vent valves AO-5042B and AO-5025 against high containment pressure. However, MAAP computer runs for Vermont Yankee Nuclear Power Station (VYNPS) predict that the available NPSH will be below the required NPSH following opening of the torus vent path. Since PNPS and VYNPS have Mark I containments and similar vent size opening (8-inches), the same NPSH difficulties are expected for PNPS. Since the available NPSH is likely to be less that the required NPSH with the vent path open, a failure probability of 0.9 was assigned to event LPCI-CS.

This PSA model change resulted in a 2.54 percent reduction in CDF and a revised baseline benefit of approximately $387,096.

As described in the response to RAI 6.a, the cost of performing an engineering analysis, procedure changes, simulator changes, and training is estimated to be $300,000. Therefore, this SAMA is potentially cost effective for PNPS provided the existing torus vent path, valves, and controls do not require hardware modification.

ATTACHMENT E to Letter 2.06.079

(1 page)

License Renewal Application Changes
LRA Section 2.3.3.12 "Primary Containment Atmosphere Control"

The following system description was omitted from LRA Section 2.3.3.12, Primary Containment Atmosphere Control (PCAC), due to an administrative oversight. The primary containment system was included in the PCAC aging management review and the appropriate LRA tables.

The primary containment system as described in UFSAR Section 5.2 encompasses the mechanical and electrical systems as well as the structures that establish and maintain primary containment during normal and accident conditions and limit the release of fission products in the event of a postulated design basis accident. Primary containment penetrations are addressed in Section 2.3.2.7.

The purpose of the mechanical portion of the primary containment system (excluding penetrations) is to limit the negative pressure within the drywell and suppression chamber so that the structural integrity of the containment is maintained. This function is performed by the venting and vacuum relief system of primary containment. The vacuum relief system from the pressure suppression chamber to reactor building consists of two redundant vacuum relief breakers (secondary containment vacuum breakers). Ten drywell vacuum relief valves limit the pressure differential between the suppression chamber and drywell post-accident.

The mechanical portion of the primary containment system has the following intended functions for 10 CFR 54.4(a)(1).

- Limit the negative pressure within the primary containment so that its structural integrity is maintained.
- Support primary containment isolation.

The mechanical portion of the primary containment system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).