

CHRONOLOGICAL LICENSING EVENTS

<u>Date</u>	<u>Docket 50-255 CPOL Application</u>	<u>FSAR</u>	<u>Operating License</u>	<u>Other</u>
June 2, 1966	CP Co Files CPOL Application	PSAR Included With Application		
March 14, 1967	AEC Issues CPPR-25			
November 1, 1968	CP Co Files Amendment 9 to CPOL Application	FSAR, Rev 0, Included	Initial Operating License Application for Operation at 2,200 MWt Core	
October 9, 1970				CP Co File Construction Stage Environmental Report
March 24, 1971			NRC Issues IDPR-20 (1 MW)	
August 18, 1971				CP Co Files ER Supplement (Special Report 4)
November 20, 1971			Amendment 1 - Authorization for 20% Power (440 MW)	
March 10, 1972			Amendment 2 - Authorization for 60% power (1,320 MW)	
June 1972				NRC Issues Final Environmental Statement
July 1972				CP Co Files Operating Stage ER
September 1, 1972	NRC Issues OL DPR-20		Amendment 3 - Authorized 60% Power	
October 16, 1972			Amendment 4 - Authorized 100% Power (Limited to 60% Power)	
March 23, 1973			Authorization for 100% Power (Limited to 85% Power)	
January 22, 1974	CP Co Files Amendment 28 to CPOL	Full Revision to FSAR (Denoted as Amendment 28)	CP Co Application for Full-Term Operating License at 2,638 MWt Core	

CHRONOLOGICAL LICENSING EVENTS

<u>Date</u>	<u>Docket 50-255 CPOL Application</u>	<u>FSAR</u>	<u>Operating License</u>	<u>Other</u>
December 12, 1974				NPDES Permit Granted by Michigan DNR
August 2, 1976				Modified NPDES Permit Granted
August 12, 1977			CP Co Requests the OL Limit Be Increased to 2,530 MWt Core Power	
November 1, 1977			NRC Issues Amendment 31 to DPR-20 Granting Power Operation up to 2,530 MWt	
February 1978				NRC Initiated Systematic Evaluation Program (SEP)
October 1978				NRC Issues Final Addendum to the Final Environmental Statement
October 1982				SEP Integrated Plant Safety Assessment Final Report (NUREG 0820) issued
November, 1983				Supplement 1 to SEP Integrated Plant Safety Assessment Report issued.
June 28, 1984		Revision 0, Initial FSAR Update Pursuant to 10 CFR 50.71(e)		
October 22, 1990				NRC issues Environmental Assessment in support of POL to FTOL conversion
November 21, 1991				NRC issues SER (NUREG 1424) in support of POL to FTOL conversion
February 21, 1991			FTOL issued by NRC	

CHRONOLOGICAL LICENSING EVENTS

November 30, 1999			NRC approved conversion to Improved Technical Specifications Amendment 189 based on NUREG 1432, Standard Technical Specifications.	
October 24, 2000			Improved Technical Specifications implemented.	
December 14, 2000			Construction period recaptured with change of License expiration date to March 24, 2011. Amendment 192	
June 23, 2004			NRC issued Amendment 216 to Palisades Operating License to authorize operation of the facility at steady state reactor core power levels up to 2565.4 Megawatts thermal [FC-977].	
January 17, 2007			On January 17, 2007, the Renewed Facility Operating License was issued by the NRC, extending the license expiration date to March 24, 2031.	
April 11, 2007			On April 11, 2007, the NRC issued Amendment 224 to the Palisades Renewed Facility Operating License to reflect the transfer of ownership to Entergy Nuclear Palisades, LLC, and operating authority Entergy Nuclear Operations, Inc.	

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)Plant

Net Electrical Power Output @ 2,200 MWt	700 MWe
Net Electrical Power Output @ 2,565.4 MWt	750 MWe
Maximum Expected Gross Electrical Output @ 2,650 MWt	845 MWe

Nuclear Steam Supply System

Core Thermal Output	2,200 MWt Initial, 2,638 MWt Ultimate, 2,565.4 MWt Presently
Operating Pressure	2,100 psia Initial Rating, 2,250 psia for Ultimate Rating, 2060 present nominal rating
Design Pressure	2,500 psia
Primary Coolant Inlet Temperature	545°F Initial Rating, 537°F Presently
Primary Coolant Outlet Temperature	591°F Initial Rating, 583°F Presently
Pipe Size: Outlet (ID)	42"
(Wall Thickness)	4"
Inlet (ID)	30"
(Wall Thickness)	3"
Flow per Loop	62.5 x 10 ⁶ lb/h original 72.3 x 10 ⁶ lb/h present nominal
Number of Loops	2

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Number of Pumps	4
Type	Vertical, Centrifugal, Mechanical Seals
Design Flow/Pump	83,000 gpm
Design Head	260'

Core

Total Heat Output	2,565.4 MWt
Heat Generated in Fuel	97.4%
Design Thermal Overpower	15%
DNB Ratio at Nominal Conditions	2.00
Core Power Density	69.3 kW/Liter original 79.8 kW/Liter presently
Number of Fuel Bundles	204
Number of Fuel Rods/Bundle Initial Core Loading (A, B, C1 + Typical Reload Fuel)	212
Number of Fuel Rods/Bundle	216 typical
Fuel Rod Pitch	0.550"
Fuel Clad Material	Zircaloy-4 or M5 [®]
Number of Full-Length Control Rods	41
Number of Part-Length Control Rods	4
Control Rod Pitch	16.97"
Absorber Material	Silver-Indium-Cadmium
Control Rod Drive Type	Rack and Pinion
Equivalent Core Diameter	136.7"

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Reactor Vessel

Inside Diameter	172"
Overall Length	40'-3/4"
Wall Thickness Without Clad	8-1/2"
Wall Material	SA-302
Cladding Thickness	3/16"
Cladding Material	SS-308/309
Design Temperature	650°F
Design Pressure	2,500 psia
NDT Temperature (Initial)	40°F (This value does not apply to the vessel head. The vessel head RT-ndt is 72°F, Reference 14.)
Total Weight	426 Tons

Steam Generators

Number of Units	2
Type	Vertical "U" Tube
Outside Diameter	20'-10"
Length	59'-2"
Number of Tubes	8,219 Initial Design
Tube OD	3/4"
Tube Material	Inconel
Shell Material	SA-302B and SA-516, Gr 70

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Primary Side

Tube Side Design Pressure	2,500 psia
Tube Side Design Temperature	650°F
Tube Side Operating Pressure	2,060 psia
Coolant Inlet Temperature (nominal)	582.7°F
Coolant Outlet Temperature (nominal)	537.3°F
Bottom Head Clad Material	SS-304

Secondary Side

Shell Side Design Pressure	1,000 psia
Shell Side Design Temperature	550°F
Operating Pressure (Steam Generator Outlet at Plant Rating of 2,565.4 MWt Core)	760-770 psia presently
Operating Temperature	512°F
Quality	99.8%
Feedwater Inlet Temperature	440.7°F
Steam Flow/Steam Generator (10 ⁶ lb/h)	5.649

Turbine Cycle

Turbine Design	Tandem-Compound, 1 HP, 2 LP Turbines
Exhaust Pressure	1.8 inHg
Makeup	0.25%
Steam Atmospheric Dump (Rated Steam Flow)	35%
Steam Bypass to Condenser (Rated Steam Flow)	5%

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Feedwater Heater Stages	6
Condensate Pumps - Number	2 - Half Capacity
Design Flow	9,250 gpm
Design Head	1,000'
Feedwater Pumps - Number	2 - Half Capacity
Design Flow	13,500 gpm
Design Head	1,920'
Condenser Circulating Pumps - Number	2 - Half Capacity
Design Flow	205,000 gpm/Pump
Design Head	90'

Generator

Design Rating	955 MVA
Power Factor	0.85
Terminal Voltage	22,000

NSSS Auxiliary Systems

1. Chemical and Volume Control System

Normal Letdown Flow Rate	40 gpm
Maximum Letdown Flow Rate	133 gpm
Charging Pumps - Number	2 - Fixed Capacity 1 - Variable Capacity
Design Flow	40 gpm
Design Head	6,375'

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Metering Pumps - Number	1
Design Flow Range	0 to 35 gpm
Maximum Outlet Pressure	120 psig
Regenerative Heat Exchanger - Number	1 - Full Capacity
Design Heat Transfer	6.6 x 10 ⁶ Btu/h
Letdown Heat Exchanger - Number	1 - Full Capacity
Design Heat Transfer	19.1 x 10 ⁶ Btu/h
Demineralizers - Number	2 - Purification 1 - Deborating
Nominal Rating	40 gpm
Maximum Flow	160 gpm
Resin Type	H-OH
Resin Volume	32 ft ³
Filter - Number	2
Type	Cartridge
Design Rating	120 gpm
Filter Size	2 Microns
2. <u>Safety Injection System</u>	
Safety Injection Tanks - Number	4
Volume - Total	2,000 ft ³
Borated Water	1,000 ft ³
Nitrogen @ 200 psia	1,000 ft ³
Design Pressure	250 psia

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Design Temperature	200°F
High-Pressure Pumps - Number	2 - Full Capacity
Rating, Each	300 gpm
Head	2,500'
Low-Pressure Pumps - Number	2 - Full Capacity
Rating, Each	3,000 gpm
Head	350'
3. <u>Containment Air Cooling System</u>	
Air Coolers - Number	4 (3-safety related)
Rating, Each Safety Related Cooler (Btu/h) @ 283°F, 55 psig	87.2 x 10 ⁶ (DBA)
Cooling Water Flow, Each	Set per FSAR Sect 9.1.2.3 (DBA)
Airflow	30,000 ft ³ /min (DBA)
Rating (Safety Related Cooler)	1.98 x 10 ⁶ Btu/h (Normal)*
(Non-safety Related Cooler)	1.98 x 10 ⁶ Btu/h (Normal)*
Cooling Water Flow, Each	500 gpm (Normal)
Airflow	60,000 ft ³ /min (Normal)

*Cooler performance based on 115°F EAT & 81.5°F EWT

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

4.	<u>Containment Spray System</u>	
	Spray Pumps - Number	3 - Half Capacity
	Rating, Each	1,340 gpm
	Head	450'
	Heat Exchangers (Shutdown Cooling Heat Exchangers)	2
	Rating, Each (Btu/h)	83.5 x 10 ⁶ @ 283°F
5.	Deleted	
6.	<u>SIRW Tank</u>	
	Fluid Volume	285,000 Gallons
	Boron Concentration	1720-2500 ppm
7.	<u>Shutdown Cooling System</u>	
	Auxiliary Feedwater Pumps - Number	3 - Full Capacity
	Turbine Driven - Number	1
	Rating	415 gpm
	Head	2,730'
	Motor Driven - Number	2
	Approximate Rating	
	(Pump P8A)	415 gpm
	(Pump P8C)	330 gpm
	At Approximate Head	
	(Pump P8A)	2,730'
	(Pump P8C)	2,260'

Pumps - Use Low-Pressure Safety Injection Pumps

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Heat Exchangers - Number	2 - Half Capacity
Rating, Each	80.0 x 10 ⁶ Btu/h
8. <u>Component Cooling System</u>	
Component Cooling Pumps - Number	3 - Half Capacity
Rating, Each	6,000 gpm
Head	164'
Heat Exchangers - Number	2
Rating, Each	50.5 x 10 ⁶ Btu/h (Normal)
Rating, Each	85.0 x 10 ⁶ Btu/h (Post-DBA)
9. <u>Spent Fuel Cooling System</u>	
Spent Fuel Pool Capacity	4 Cores
Volume of Empty SFP Cavity	21,885 ft ³
Fuel Assemblies	892
Pumps - Number	2 - Half Capacity
Rating, Each	1,700 gpm
Head	64'
Heat Exchanger - Number	2
Combined Rating	23 x 10 ⁶ Btu/h
Filter - Number	1
Type	Cartridge
Rating	150 gpm
Size	25 Microns

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Demineralizer - Number	1
Resin Type	H-OH
Bed Size	68 ft ³
Nominal Flow	150 gpm
10. <u>Shield Cooling System</u>	
Pumps - Number	2 - Full Capacity
Rating, Each	154 gpm
Head	79'
Heat Exchanger - Number	1 - Full Capacity
Rating	2 x 10 ⁵ Btu/h
Sets of Cooling Coils - Number	2 - Full Capacity
 <u>Conventional Plant Auxiliary Systems</u>	
1. <u>Service Water System</u>	
Service Water Pumps - Number	3 - Half Capacity
Rating	8,000 gpm
Head	140'
2. <u>Compressed Air System</u>	
Compressors - Number	3
Rating	288 scfm
Discharge Pressure	100 psig

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

3. High-Pressure Air Systems

Compressors - Number	3
Rating, Each	22.3 scfm
Discharge Pressure	325 psig

Containment

Type	Reinforced Concrete, Prestressed, Post-Tensioned
Diameter	116'-0" ID (Inside)
Height	190'-6" (Inside)
Liner - Material	A442 Plate
Thickness	1/4"
Design Pressure	55 psig
Design Temperature	283°F
Free Volume	1.64 x 10 ⁶ ft ³
Leak Rate	0.1%/Day

Electrical Equipment

Main Transformer - Rating	875 MVA
Voltage	345 kV
Diesel Generators - Number	2 - Full Capacity
Rating	3,000 kVA
Fuel Oil Capacity	1 Week Following a DBA

PALISADES DESIGN CHARACTERISTICS
(NOMINAL VALUES)

Station Battery - Number	2
Type	Lead Calcium
Number of Cells	59
Rating	125 V, 1,800 Ah
Chargers - Number	4
Inverters - Number	4
AC/DC Voltage	120/125
Rating	6 kVA

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
II-1.A	Exclusion Area Authority and Control	4/N	(Evaluation acceptable.) Section 2.1.
II-1.B	Population Distribution	S	Section 2.1.2.
II-1.C	Potential Hazards or Changes in Potential Hazards Due to Transportation, Institutional, Industrial and Military Facilities	S	Sections 2.1.3 and 5.5.4.
II-2.A	Severe Weather Phenomena	S	Sections 8.7.1, 8.7.2 and 8.7.3.
II-2.C	Atmospheric Transport and Diffusion Characteristics for Accident Analysis	S	Section 2.5.
II-3.A	Hydrologic Description	S	Section 2.2.
II-3.B	Flooding Potential and Protection Requirements	3/C	(CP Co seiche evaluation established maximum flood level of 593.5 MSL accepted by staff October 7, 1982.) Sections 2.2.2 and 5.4.1.
II-3.B.1	Capability of Operating Plant To Cope With Design-Basis Flooding Conditions	3/C	(Same as II-3.B.) Section 5.4.1.
II-3.C	Safety-Related Water Supply (Ultimate Heat Sink (UHS))	3/C	(Same as II-3.B.) Sections 5.4.1 and 9.1.
II-4	Geology and Seismology	S	Sections 2.3 and 2.4.
II-4.A	Tectonic Province	S	Section 2.3.
II-4.B	Proximity of Capable Tectonic Structures in Plant Vicinity	S	Section 2.4.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
II-4.C	Historical Seismicity Within 200 Miles of Plant	S	Section 2.4.
II-4.D	Stability of Slopes	S	Section 2.4.
II-4.F	Settlement of Foundations and Buried Equipment	S	Section 2.3.5.
III-1	Classification of Structures, Components and Systems (Seismic and Quality)	3/C	(Additional information supplied on radiography fracture toughness, valves, pumps and storage tanks accepted by staff June 27, 1983.) Sections 5.1.5 and 11.2.1; and Tables 5.2-1, 5.2-2 and 5.2-3.
III-2	Wind and Tornado Loadings		
	- SIRW and Condensate Storage Tank	2/C	(New EOPs were issued in December 1986.) Sections 5.3.2 and 5.3.3.
	- Emergency Generators Supply and Exhaust Piping	4/N	(Loss of both diesel generators and offsite power could present safe shutdown problems, however, the probability of both generators being disabled, precludes any backfitting requirements.) Sections 5.3.2 and 5.3.3.
	- Spent Fuel Pool Enclosure	4/N	(The ability of the Plant to shut down is not affected by the inability of the steel enclosure to withstand tornado loadings, precluding any backfit requirements.) Sections 5.3.2 and 5.3.3.
III-3.A	Effects of High Water Level on Structures	S	(The NRC concluded that the design approach used for Palisades CP Co Design Class 1 structures was adequate for resisting a design basis flood.) Sections 5.4.1 and 5.9.1.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
III-3.C	Inservice Inspection of Water Control Structures		
	- Cooling Water System Structures Inspection	2/C	(Inspection began in 1982) Section 9.12.
	- Flood Protection Structures	4/N	(Inspection part of Preventative Maintenance Program.)
III-4.A Tornado	Missiles		
	- SIRW and Condensate Storage Tanks	2/C	(New EOPs were issued in December 1986.) Sections 5.3.3 and 5.5.1.
	- Emergency Diesel Supply and Exhaust Piping	4/N	(Same as III-2.) Sections 5.3.3 and 5.5.1.
	- Atmospheric Relief Stacks of Steam Relief Valves	4/N	(Same as III-2.) Sections 5.3.3 and 5.5.1.
	- Compressed Air System	4/N	(Same as III-2.) Sections 5.3.3, 5.5.1 and 9.5.2.1.
III-4.B	Turbine Missiles	S	Section 5.5.2.
III-4.C	Internally Generated Missiles	S	Section 5.5.3.
III-4.D	Site-Proximity Missiles (Including Aircraft)	S	Section 5.5.4.
III-5.A	Effects of Pipe Break on Structures, Systems and Components Inside Containment	2/C	(No modifications necessary. Reference CP Co letter of 5/31/85.) Section 5.6.
	- Operability of Leakage Detection System	2/C	(Technical Specifications change submitted by CP Co letter of 5/23/85.)
III-5.B	Pipe Break Outside Containment	S	Section 5.6.1.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
III-6 Seismic	Design Considerations		
	- Small Piping	3/C	Supplemental SER issued July 12, 1991 and CPCo Letter dated April 8, 1992
	- Electrical Components	3/C	Resolved under SQUG Outlier process (Sections 5.7.1.3 and 5.7.7)
III-7.A	Inservice Inspection, Including Prestressed Concrete Containments With Either Grouted or Ungouted Tendons		
	- Tendon Force Acceptance Criteria	3/C	(Acceptance criteria developed for each tendon that varies with time. Reference CP Co 11/7/83 submittal.) Sections 5.8.4.2 and 5.8.2.
	- Inspect Tendon-End Anchorages	3/C	(CP Co submitted Technical Specifications changes that specify when tendon-end anchorages will be inspected during ILRT. Reference 5/4/87 and 9/16/87 CP Co submittals.) Sections 5.8.4.2 and 5.8.2.
III-7.B	Design Codes, Design Criteria, Load Combinations and Reactor Cavity Design Criteria	3/C	(Issue resolved. Reference CP Co letters of 6/28/84, 5/3/85 and 8/7/91.) Sections 5.8.3, 5.9.1 and 5.10.2; and Table 5.2-2.
III-7.C	Delamination of Prestressed Concrete Containment Structures	3/C	(One-time delamination inspection of containment dome completed.) Section 5.8.8.
III-7.D	Containment Structural Integrity Tests	S	Section 5.8.8.4.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
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<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
III-8.A	Loose-Parts Monitoring and Core Barrel Vibration Monitoring	3/C	(A program of "Reactor Internals Vibration Monitoring" was instituted by Technical Specification 4.13 to monitor the adequacy of modifications to the core barrel clamping features made in 1974.) This Technical Specifications Program was discontinued in 1985 with NRC issuance of Technical Specifications Amendment No. 91 and SER dated 9/5/85. The SER dated 9/5/85 required an alternate non-Technical Specifications Monitoring Program as recommended by ASME Standard OM-05, 1981. CPCo committed to this program in a letter dated 3/29/85.
III-8.C	Irradiation Damage, Use of Sensitized Stainless Steel and Fatigue Resistance	S	-
III-10.A	Thermal-Overload Protection for Motors of Motor-Operated Valves	S	Chapter 8.
III-10.B	Pump Flywheel Integrity	S	Section 4.3.5.
IV-1.A	Operation With Less Than All Loops in Service	S	Section 7.2.3.3.
IV-2	Reactivity Control Systems Including Functional Design and Protection Against Single Failures	S	Section 7.4.1.
V-5	Reactor Coolant Pressure Boundary (RCPB) Leakage Detection	2/C	(Technical Specifications for operability of leakage detection systems completed December 15, 1983.) Section 4.7.
V-6	Reactor Vessel Integrity	S	Sections 4.3.3, 4.4.2 and 4.5.2.
V-7	Reactor Coolant Pump Overspeed	S	Section 4.3.5.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
V-10.A	Residual Heat Removal System Heat Exchanger Tube Failures	S	Section 6.1.
V-10.B	Residual Heat Removal System Reliability		
	- Overpressurization Protection (OPS)	2/C	(Technical Specifications Amendment submitted on July 29, 1982 which would place OPS in service before shutdown cooling.) Section 7.4.2.
	- Safety Grade Systems for Safe Shutdown	2/C	(New EOPs were issued in December 1986.)
V-11.A	Requirements for Isolation of High- and Low-Pressure Systems	2/C	(Technical Specifications Amendment submitted on July 29, 1982 which requires verification of LPSI check valve closure before criticality after use of system.) Sections 6.1.3 and 7.4.2.
V-11.B	Residual Heat Removal System Interlock Requirements	S	Chapters 6 and 7.
VI-1	Organic Materials and Post-Accident Chemistry	S	-
VI-2.D	Mass and Energy Release for Postulated Pipe Break Inside	1/C	(See PRA study submitted by CP Co letter of 5/23/85; NRC review dated 2/28/86.)
VI-3	Containment Pressure and Heat Removal Capability	1/C	(Same as VI-2.D. NRC review dated 2/28/86.)
VI-4	Containment Isolation System		
	- Manual Isolation Valve	1/C	(Manual isolation valve on Penetration 44 was replaced with CV-2099 by Facility Change FC-563.)
	- Threaded Pipe Connection	1/C	(Modification of Penetration 19 threaded pipe connection was corrected by SC-83-013 and SC-83-162.)
	- Containment Isolation Systems	1/C	(Modifications of Penetrations 13, 17, 17a, 21, 21a, 28, 29, 48 and 73 have been completed.)

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
VI-6	Containment Leak Testing	3/C	(Technical Specifications Amendment submitted March 3, 1982 for verification of airlock door seal integrity following opening. Approved by Amendment 126 dated June 1, 1989.)
VI-7.A.3	Emergency Core Cooling System Actuation System	S	Sections 7.3.2, 7.3.5 and 8.1.1; and Appendix 7A.
VI-7.B	Engineered Safety Feature Switchover From Injection to Recirculation Mode (Automatic Emergency Core Cooling System Realignment)	S	Section 6.1.2.2.
VI-7.C	Emergency Core Cooling System (ECCS) Single-Failure Criterion and Requirements for Locking Out Power to Valves, Including Independence of Interlocks on ECCS Valves	S	Section 7.3.
VI-7.C.1	Appendix K - Electrical Instrumentation and Control Re-reviews	S	Chapter 7, Sections 8.1.1 and 8.3.5.
VI-7.C.2	Failure Mode Analysis (Emergency Core Cooling System)	S	Section 7.2.3.10.
VI-7.D	Long-Term Cooling Passive Failures (eg, Flooding of Redundant Components)	S	Sections 5.4 and 9.1.3.
VI-7.F	Accumulator Isolation Valves Power and Control System Design	S	Chapters 7 and 8.
VI-10.A	Testing of Reactor Trip System and Engineered Safety Features, Including Response-Time Testing	3/C	(Requires response-time testing on a periodic basis.) Sections 7.3.2 and 7.3.5.
VII-1.A	Isolation of Reactor Protection System From Nonsafety Systems, Including Qualification of Isolation Devices	1/C	Section 7.2.9.
VII-1.B	Trip Uncertainty and Setpoint Analysis Review of Operating Data Base	S	-
VII-2	Engineered Safety Features System Control Logic and Design	S	Chapter 6 and Section 7.3.1.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
VII-3	Systems Required for Safe Shutdown	-	Sections 7.2.3, 7.2.7, 7.2.9, 7.3.1, 7.4.1, 7.4.2, 7.6.2, 8.1.1, 8.1.2, 8.1.3, 8.4.1, 8.4.2, and 9.6.3.
	- Removal of Nonessential Loads as an Alternative to 10 CFR 50, Appendix A, GDC 17	2/C	(Procedure to remove nonessential loads from battery if the immediate sources of offsite and onsite power are not available. Completed, see CP Co letter of 9/26/84.)
	- Component Cooling Water Surge Tank Level	1/C	(Installation of another level sensor to the component cooling water surge tank and control room indication completed.)
	- Boric Acid Heat Tracing	4/C	(The PRA study found that the boric acid system is a low contributor to risk and the impact of this issue on reactivity control is low, no backfit required.)
	- Pressure Sensor on CCW Pumps	4/C	(Because of redundancy in system failure indication, the PRA study concluded this issue has a small impact on availability, no backfit required.)
	- Adequate Seismic Category I Water Supply for AFW	2/C	(Same as III-2.)
VII-6	Frequency Decay	S	Section 14.7 and Chapter 8.
VIII-1.A	Potential Equipment Failures Associated With Degraded Grid Voltage	S	Sections 7.3.2.2 and 7.3.5.
VIII-2	Onsite Emergency Power Systems (Diesel Generator)	S	(Separate annunciator modification complete.) Section 8.4.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
VIII-3.A	Station Battery Capacity Test Requirements	2/C	(CP Co proposed an amendment to the Technical Specifications to conduct battery test pursuant to NRC guidelines, see CP Co letter dated 5/13/85.) Section 8.4.2.
VIII-3.B	DC Power System Bus Voltage Monitoring and Annunciation	S	(Installation of (1) 125 V dc tie breaker open (both buses), (2) public address system inverter loss of voltage and (3) battery undervoltage (both batteries) is complete.) Sections 8.3.5 and 8.4.2.
VIII-4	Electrical Penetrations of Reactor Containment	4/C	(Evaluation acceptable based on similar SEP plants, modification unnecessary.) Section 8.5.1.
IX-1	Fuel Storage	S	Sections 9.4 and 9.11.
IX-3	Station Service and Cooling Water Systems		
	- 2.7.1 Cooling of CCW Heat Exchanger	2/C	(Revision to EOP for FWS alignment acceptable and complete.)
	- 2.7.2 Flooding of Intake Safety Systems	2/C	Section 5.4.2.
IX-4	Boron Addition Systems (PWR)	S	Section 9.10.
IX-5 Ventilation	Systems		
	- AFW Pump Room	2/C	(AFW pumps qualified for 160°F service.) Section 9.8.
	- Cable Spreading, Switchgear and Battery Rooms	2/C	(Ventilation fans for additional cooling to inverter cabinets, charger cabinets and auxiliary feedwater junction boxes completed during 1983/84 outage.) Sections 8.7.2, 8.7.3 and 9.8.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
IX-6	Fire Protection	3/C	(11/7/83 NRC letter. FP will be reviewed generically outside the context of SEP.) Sections 7.4.1, 7.4.2, 7.6.2, 7.7.3, 7.7.4, 7.7.8, 8.3.5, 8.5.3, 8.7.2, 8.8, and 9.6.3.
XIII-2	Safeguards/Industrial Security	S	-
XV-1	Decrease in Feedwater Temperature, Increase in Feedwater Flow, Increase in Steam Flow and Inadvertent Opening of a Steam Generator Relief or Safety Valve	S	Section 14.9, 14.10.
XV-2	Spectrum of Steam System Piping Failures Inside and Outside Containment (PWR)	3/C	(See PRA study submitted by CP Co letter of 5/23/85, NRC review required. NRC review letter dated 2/28/86.) Section 14.14.
	- Failure of Main Feedwater Isolation	3/C	(No modifications necessary, pending NRC review. NRC review letter dated 2/28/86.)
XV-3	Loss of External Load, Turbine Trip, Loss of Condenser Vacuum, Closure of Main Steam Isolation Valve (BWR) and Steam Pressure Regulator Failure (Closed)	S	Section 14.12.
XV-4	Loss of Nonemergency AC Power to the Station Auxiliaries	S	Chapter 8.
XV-5	Loss of Normal Feedwater Flow	S	Section 14.13.
XV-6	Feedwater System Pipe Breaks Inside and Outside Containment (PWR)	S	Section 5.6.
XV-7	Reactor Coolant Pump Rotor Seizure and Reactor Coolant Pump Shaft Break	S	Section 14.17.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
XV-8	Control Rod Misoperation (System Malfunction or Operator Error)	S	Sections 14.2, 14.4, 14.6 and 14.16.
XV-9	Start-Up of an Inactive Loop or Recirculation Loop at an Incorrect Temperature, and Flow Controller Malfunction Causing an Increase in BWR Core Flow Rate	S	Section 14.8.
XV-10	Chemical and Volume Control System Malfunction That Results in a Decrease in Boron Concentration in the Reactor Coolant (PWR)	S	Section 14.3.
XV-12	Spectrum of Rod Ejection Accidents (PWR)	2/C	(The staff found that radiological consequences of a rod ejection accident are acceptable and do not require any departure from existing analysis.)
XV-14	Inadvertent Operation of Emergency Core Cooling System and Chemical and Volume Control System Malfunction That Increases Reactor Coolant Inventory	S	-
XV-15	Inadvertent Opening of a PWR Pressurizer Safety/Relief Valve or a BWR Safety/Relief Valve	S	-
XV-16	Radiological Consequences of Failure of Small Lines Carrying Primary Coolant Outside Containment	S	Section 14.23.
XV-17	Radiological Consequences of Steam Generator Tube Failure (PWR)	S	Section 14.15.

SYSTEMATIC EVALUATION PROGRAM (SEP) AND INTEGRATED ASSESSMENT PROGRAM (IAP)
PALISADES PLANT - NUREG-0820

<u>Topic</u>	<u>Title</u>	<u>Status(a)</u>	<u>IAP Disposition and Location Where Used in FSAR Update</u>
XV-19	Loss-of-Coolant Accidents Resulting From Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary	S	Section 14.17.
XV-20	Radiological Consequences of Fuel-Damaging Accidents (Inside and Outside Containment)	S	Sections 14.11 and 14.19.
XVII	Operational Quality Assurance Program	S	-

(a) Staff Position Code

Status Code

- S - Reviewed and accepted during SEP
- 1 - Evaluated during integrated assessment, modification required
- 2 - Evaluated during integrated assessment, procedure development or Technical Specifications Change required
- 3 - Evaluated during integrated assessment, refined engineering analysis or continuation of ongoing analysis required
- 4 - Evaluated during integrated assessment; no further work required

- (N) - No action required
- (C) - Action required complete and item resolved
- (b) - Action required in progress

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
I.A.1.1	Shift Technical Advisor	1. On duty	1	Additional training produced.
		2. Technical Specifications	1	Additional training produced.
		3. Trained per LL Cat B	1	Additional training produced.
		4. Describe long-term program	1	Additional training produced.
I.A.1.2	Shift Supervisor Responsibilities	Delegate nonsafety duties	1	Defined Shift Supervisor's responsibilities.
I.A.1.3	Shift Manning	1. Limit overtime	1	Reviewed and revised procedures for shift manning. To be addressed when final rule is issued.
		2. Min shift crew	1	
I.A.2.1	Immediate Upgrading of RO and SRO Training and Qualifications	1. SRO experience	1	Training and qualification procedures at Palisades Plant have been modified to meet NRC criteria.
		2. SROs be ROs in one year	1	Training and qualification procedures at Palisades Plant have been modified to meet NRC criteria.
		3. Three-month training on shift	1	Training and qualification procedures at Palisades Plant have been modified to meet NRC criteria.
		4. Modify training	1	Training and qualification procedures at Palisades Plant have been modified to meet NRC criteria.
		5. Facility certification	1	Training and qualification procedures at Palisades Plant have been modified to meet NRC criteria.
I.A.2.3	Administration of Training Programs	Instructors complete SRO exam	1	Assure trainers are qualified at SRO qualifications level.

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
I.A.3.1	Revise Scope and Criteria for Licensing Exams	1. Increase scope	1	Include simulator examinations with training.
		2. Increase passing grade	1	Include simulator examinations with training.
		3. Simulator exams	1	Include simulator examinations with training.
I.C.1	Short-Term Accident and Procedures Review	1. SB LOCA	1	Complete per EOP upgrade.
		2. Inadequate Core Cooling a. Reanalyze and propose guidelines b. Revise procedures	1	Complete per EOP upgrade.
		3. Transients and accidents a. Reanalyze and propose guidelines b. Revise procedures	1	Complete.
I.C.2	Shift and Relief Turnover Procedures checklist	Implement shift turnover	1	Revised procedure for shift turnover.
I.C.3	Shift Supervisor Responsibility and	Clearly define supervisor operator responsibilities	1	Defined Shift Supervisor's responsibilities.
I.C.4	Control Room Access	Establish authority; limit access	1	Access controlled by Shift Supervisor or No 1 Control Operator.
I.C.5	Feedback of Operating Experience	Licensee to implement procedures programs.	1	Assess operating experience and incorporate (if needed) into operating procedures, training and retraining

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
I.C.6	Verify Correct Performance of Operating Activities	Revise performance procedures	1	Evaluate procedures and revise when appropriate.
I.D.1	Control Room Design Reviews	1. Assessment and schedule for correcting deficiencies	1	Complete - SER issued 9/14/89. See Note 1.
		2. Implementation of corrective actions	1	Continuing.
I.D.2	Plant Safety Parameter Display Console	1. Description	1	Complete - SER issued 6/29/87.
		2. Installed	1	Complete - SER issued 6/29/87. - CPCo Certification letter 7/10/89 - NRC Closure letter 4/19/90
		3. Fully implemented	1	Complete - SER issued 6/29/87. - CPCo Certification letter 7/10/89 - NRC Closure letter 4/19/90
II.B.1	Reactor Coolant System Vents	1. Design vents	1	Modification of gas venting system and revised procedures accordingly.
		2. Install vents (LL Cat B)	1	Modification of gas venting system and revised procedures accordingly.
		3. Procedures	1	Modification of gas venting system and revised procedures accordingly.

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
II.B.2	Plant Shielding	1. Review designs	1	Modification completed of facility to provide access to vital areas under accident conditions.
		2. Plant modifications (LL Cat B)	1	Modification completed of facility to provide access to vital areas under accident conditions.
		3. Equipment qualification	1	Modification completed of facility to provide access to vital areas under accident conditions.
II.B.3 Deleted				
II.B.4	Training for Mitigating Core Damage	1. Develop training program	1	Complete training program.
		2. Implement program a. Initial b. Complete	1	Complete training program.
II.D.1	Relief and Safety Valve Test Requirements	1. Submit program	1	Complete.
		2. RV and SV testing (LL Cat B) a. Complete testing b. Plant specific report	1	Complete.
		3. Block valve testing	1	Block valve requirement analysis complete, new block valves and PORVs installed during 1989 maintenance outage.
II.D.3	Valve Position Indication	1. Install direct indications of valve position	1	Complete.
		2. Technical Specifications	1	Modification of valve indicators and Technical Specifications changes as required (reference Amendment 67, 10/8/81).

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
II.E.1.1	Auxiliary Feedwater System Evaluation	1. Short term	1	Auxiliary Feedwater Systems modified as required.
		2. Long term	1	Auxiliary Feedwater Systems modified as required.
II.E.1.2	Auxiliary Feedwater System Initiation and Flow	1. Initiation	1	Modification of instrumentation to level of safety grade complete.
		a. Control grade		
		b. Safety grade		
		2. Flow indication	1	Modification of instrumentation to level of safety grade complete.
		a. Control grade		
		b. LL A Technical Specifications		
II.E.3.1	Emergency Power for Pressurizer Heaters	1. Upgrade power supply	1	Modified system to provide emergency power.
		2. Technical Specifications	1	Modified system to provide emergency power.
II.E.4.1	Dedicated Hydrogen Penetrations	1. Design	1	Not required for Palisades Plant.
		2. Install	1	Not required for Palisades Plant.
II.E.4.2	Containment Isolation Dependability	1-4. Imp diverse isolation	1	Modified containment isolation circuitry.
		5. Containment pressure set point	1	Lower containment pressure set point to level compatible with normal operation.
		a. Specify pressure		
		b. Modifications		
		6. Containment purge valves	1	Consumers Power Company has committed to use valves only during outages.
		7. Radiation signal on purge valves	1	Isolate purge and vent valves on radiation signal.
		8. Technical Specifications	1	Isolate purge and vent valves on radiation signal.

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
II.F.1	Accident Monitoring	1. Noble gas monitor	1	Modifications made and included in Offsite Dose Calculation Manual (ODCM).
		2. Iodine/particulate sampling	1	Modifications made and included in Offsite Dose Calculation Manual (ODCM).
		3. Containment high-range monitor	1	Modifications made and included in Technical Specifications
		4. Containment pressure	1	Modifications made and included in Technical Specifications
		5. Containment water level	1	Modifications made and included in Technical Specifications
		6. Containment hydrogen	1	Existing equipment meets the NRC's criteria.
II.F.2	Instrumentation for Detection of Inadequate Core Cooling	1. Subcool meter	1	Instrumentation modified during 1988 refueling outage.
		2. Technical Specifications (LL Cat A)	1	Issued as Amendment 129.
		3. Install level instruments (LL Cat B)	1	Instrumentation modified during 1988 refueling outage.
II.G.1	Power Supplies for Pressurizer Relief Valves, Block Valves and Level Indicators	1. Upgrade to emergency sources	1	No action required.
		2. Technical Specifications	1	No action required.
II.K.1	IE Bulletins	79-05	1	See Bulletin for specific disposition, no further action required.
		79-06	1	See Bulletin for specific disposition, no further action required.
		79-08	1	See Bulletin for specific disposition, no further action required.

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
II.K.2	Orders on B&W Plants	13. Thermal mechanical report	1	Analysis shows that vessel integrity will be maintained for such an event.
		17. Voiding in RCS	1	Existing equipment meets NRC requirements.
		19. Bench mark analysis of seq AFW flow	1	Not applicable to Palisades Plant.
II.K.3	Final Recommendations, B&O Task Force	1. Auto PORV isolation a. Design b. Test/install	1	Not applicable to Palisades. Palisades operates with the PORVs isolated.
		2. Report on PORV failures	1	Complete.
		3. Reporting SV and RV failures and challenges	1	RVs are isolated - are not challenged. SVs have never been challenged. Complete per CE Reports CEN-213 and -227.
		5. Auto trip of RCPs a. Propose modifications b. Modify	1	Complete Trip 2/leave 2 incorporated in EOPs.
		17. Emergency Core Cooling System outages	1	No action required.
		25. Power on pump seals a. Propose modifications b. Modifications	1	Item not applicable to Palisades Plant.
		30. SB LOCA methods a. Schedule outline b. Model c. New analyses	1	CE-CEFLASH 4AS acceptable.
		31. Compliance with CFR 50.46	1	Not required.
		44. Evaluate transient with single failure	1	Item not applicable to Palisades Plant.

(a)Status Codes:

- 1 - Completed
- 2 - In Process

**POST-TMI REQUIREMENTS FOR CONSUMERS POWER COMPANY'S
PALISADES PLANT - NUREG-0737**

<u>Item Number</u>	<u>Title</u>	<u>Description</u>	<u>Status(a)</u>	<u>Disposition</u>
III.A.1.1	Emergency Preparedness, Short Term	Short-term improvements	1	Emergency Plan will be changed on an as-needed basis.
III.A.1.2	Upgrade Emergency Support Facilities	1. Interim TSC, OCS and EOF	1	Emergency support facilities have been constructed/modified to meet NRC criteria.
		2. Design	1	Emergency support facilities have been constructed/modified to meet NRC criteria.
		3. Modifications	1	Emergency support facilities have been constructed/modified to meet NRC criteria.
III.A.2	Emergency Preparedness	1. Upgrade emergency plans to Appendix E, 10 CFR 50	1	Complete. Emergency Plan has been upgraded to meet Appendix E.
		2. Meteorological data	1	Complete. Emergency Plan has been upgraded to meet Appendix E.
III.D.1.1	Primary Coolant Outside Containment	1. Leak reduction	1	Leakage reduction program has been implemented.
		2. Technical Specifications	1	Leakage reduction program has been implemented.
III.D.3.3	In-Plant Radiation Monitoring	1. Provide means to determine presence of radioiodine	1	Existing Plant equipment meets NRC requirements.
		2. Modifications to accurately measure	1	Existing Plant equipment meets NRC requirements.
III.D.3.4	Control Room Habitability	1. Review	1	Control room HVAC was modified to satisfy NRC criteria.
		2. Modification	1	Control room HVAC was modified to satisfy NRC criteria.

NOTE 1: See Supplement 1 to NUREG-0737 for details.

(a)Status Codes:

- 1 - Completed
- 2 - In Process

UNRESOLVED SAFETY ISSUES

<u>Task No</u>	<u>Title</u>	<u>FSAR</u>	<u>Reference Chapter(s)</u>
A-1	Water Hammer		4 and 9
A-2	Asymmetric Blowdown Loads on the Primary Coolant System		6
A-4	Pressurized Water Reactor Steam Generator Tube Integrity		4
A-9	Anticipated Transients Without Scram (ATWS)		7
A-11	Reactor Vessel Materials Toughness		4
A-12	Fracture Toughness of Steam Generators and Primary Coolant Pump Supports		-(a)
A-17	Systems Interactions in Nuclear Power Plants		-(a)
A-24	Environmental Qualification of Safety-Related Electrical Equipment (EEQ)		8
A-26	Reactor Vessel Pressure Transient Protection		4
A-31	Residual Heat Removal Requirements		7 and 9
A-36	Control of Heavy Loads Near Spent Fuel		9
A-40	Seismic Design Criteria Short-Term Program		5
A-43	Containment Emergency Sump Reliability		6
A-44	Station Blackout		8
A-45	Shutdown Decay Heat Removal Requirements		6 and 9
A-46	Seismic Qualification of Equipment in Operating Plants		5
A-47	Safety Implications of Control System		8
A-48	Hydrogen Control Measures and Effects of Hydrogen Burns on Safety Equipment		6
A-49	Pressurized Thermal Shock		3 and 4

(a) Not specifically addressed in FSAR.

ESTIMATED USE ON MARCH 24, 2031

RPV Material	Material Heat #	Cu (%)	Initial USE (ft-lbs)	1/4t Neutron Fluence (10 ¹⁹ n/cm ²)	USE (ft-lbs)
2-112A/C*	W5214	0.213	118	1.275	64.9
3-112A/C*	W5214	0.213	118	1.275	64.9
	34B009	0.192	111	1.275	56.6
9-112*	27204	0.203	84	2.024	49.6
D-3803-1*	C-1279	0.24	102	2.024	65.3
D-3803-2*	A-0313	0.24	87	2.024	53.1
D-3803-3*	C-1279	0.24	91	2.024	58.2
D-3804-1*	C-1308A	0.19	72	2.024	48.2
D-3804-2*	C-1308B	0.19	76	2.024	50.9
D-3804-3*	B-5294	0.12	73	2.024	54.8
D-3802-1**	C-1279	0.21	75	0.0902	62.3
D-3802-2**	C-1308	0.19	73	0.0902	61.3
D-3802-3**	C-1281	0.25	62.2***	0.0902	50.1
D-3802-3**	C-1281	0.25	59****	0.0902	47.5
1-112A/B/C**	W5214	0.213	118	0.0573	82.6
8-112**	34B009	0.192	111	0.0902	72.2

* Traditional beltline materials (Reference 106)

** Extended beltline materials (Reference 104)

*** CVGraph Method

**** 95% Shear Method

RT_{MAX-X} Values for Reactor Vessel at 42.1 Effective Full Power Years

	Lower and Intermediate Shell Region ($T_{wall} \leq 9.5$ inches) ⁽¹⁾		Upper Shell Region (10.5 inches $< T_{wall} \leq 11.5$ inches) ⁽¹⁾	
	Reactor Vessel	10 CFR 50.61a Screening Criteria	Reactor Vessel	10 CFR 50.61a Screening Criteria
Axial Weld - RT _{MAX-AW} (°F)	237.0	269	135.2	222
Plate - RT _{MAX-PL} (°F)	199.4	356	149.8	293
Axial Weld and Plate - RT _{MAX-AW} + RT _{MAX-PL} (°F)	436.4	538	285.0	445
Circumferential Weld - RT _{MAX-CW} (°F)	247.6	312	149.8	269
<p>Note: (1) T_{WALL} is the reactor vessel thickness including the cladding.</p>				

SUMMARY OF FATIGUE USAGE FACTORS AT NUREG/CR-6260
SAMPLE LOCATIONS APPLICABLE TO PALISADES

Location	Material	60 Year CUF	Fen	Environmental CUF
RPV Lower Head to Shell Juncture	SA-533 Grade B Class 1	0.004	2.50	0.009
RPV Inlet Nozzle	SA-302 Grade B	0.104	2.50	0.260
RPV Outlet Nozzle	SA-508 Class 2	0.181	2.50	0.454
Charging Nozzle	SB-166 Alloy 600 Stainless Steel	0.306 0.006	1.49 15.35	0.456 0.092
Surge Line Elbow	SA-376 Type 316	0.015	15.35	0.238
Safety Injection Nozzle	SA-516 Grade 70	0.036	1.76	0.064
Shutdown Cooling Line Inlet Transition	SA-516 Grade 70	0.0097	1.76	0.017

Values from Reference 96, Attachment 5.4

LONG-TERM COMMITMENTS FOR LICENSE RENEWAL OF PALISADES NUCLEAR PLANT

	Text of Commitment, Due Date, Source	Affected Program
1.	Each year, following the submittal of the Palisades License Renewal Application and at least three months before the scheduled completion of the NRC review, Entergy will submit an amendment to the application pursuant to 10 CFR 54.21 (b). This amendment will identify any changes to the Current Licensing Basis of the facility that materially affect the contents of the License Renewal Application, including the FSAR supplement, that have not already been submitted. (Reference 57)	NA
2.	Equivalent Margins Analysis - Entergy will submit an equivalent margins analysis, completed in accordance with 10 CFR 50 Appendix G Section IV.A.1, for NRC approval, at least three years before any reactor vessel beltline material upper shelf energy decreases to less than 50 ft-lb. (Reference 57)	Reactor Vessel Integrity Surveillance Program
3.	PTS Management - At the appropriate time, prior to exceeding the PTS screening criteria, Palisades will select the optimum alternative to manage PTS in accordance with NRC regulations and make relevant submittals to obtain NRC review and approval. (Reference 57)	Reactor Vessel Integrity Surveillance Program
4.	Charging Line Fatigue - Entergy will evaluate the effect the increase in variable speed charging pump out-of-service events may have on these lines (Charging Lines Inboard of the Regenerative Heat Exchanger), and will take actions necessary to ensure these lines meet licensing basis design criteria for the extended operating period. Entergy will complete this evaluation and will advise the NRC of the results, and of any necessary corrective actions, before the end of the current licensed operating period. (Reference 57)	Fatigue Monitoring Program
5.	Fatigue Monitoring of PZR TEs - Entergy will monitor the cumulative number of pressurizer temperature element nozzle fatigue cycles within the Fatigue Monitoring Program, and maintain a special action level to ensure that appropriate actions are taken if at any time the cycle count for any design basis event since 1993 reaches the number assumed by these analyses. (Reference 57)	Fatigue Monitoring Program

LONG-TERM COMMITMENTS FOR LICENSE RENEWAL OF PALISADES NUCLEAR PLANT

	Text of Commitment, Due Date, Source	Affected Program
6.	Update Alloy 600 Program - Entergy will revise the Alloy 600 Program to update the PWSCC corrosion rate assessments and inspection program consistent with the latest NRC requirements and industry commitments (e.g., EPRI Report 1010087 "Materials Reliability Program: Primary System Piping System Butt Weld Inspection and Evaluation Guidelines [MRP-139]," (August 2005)). (Reference 57)	Alloy 600 Inspection Program
7.	Commitment deleted (Reference 94).	Deleted.
8.	Incorporate AMP & TLAA into FSAR - In a periodic FSAR update following NRC issuance of the renewed operating license, in accordance with 10 CFR 50.71 (e), the summary descriptions of Aging Management Programs and Time Limited Aging Analyses, provided in Appendix A, will be incorporated into appropriate sections of the FSAR. (Reference 57)	NA
9.	Expand Quality Program to NSR SSC - The Quality Program implementation procedures will be expanded to apply the elements of corrective action, confirmation process, and administrative controls to both safety related and non-safety related systems, structures, and components that are subject to aging management review for license renewal. (Reference 57)	Quality
10.	Update Bolting Program Standards - Review and revise ASME ISI Master Plan, procedures that implement credited License Renewal Programs, and plant maintenance procedures to reflect and reference the applicable guidance provided in NUREG-1339 and EPRI TR-104213 for safety and non-safety related bolting. These revisions should also include instructions for selection of bolting material and use of lubricants and sealants, in accordance with the guidelines of EPRI NP-5769 and the additional recommendations of NUREG-1339 to prevent or mitigate degradation and failure of safety-related bolting. (Reference 57)	Bolting Integrity Program
11.	Define Insp Reqts High Strength Bolts - Evaluate the high strength bolting used for component supports for susceptibility to cracking as described in NUREG-1801, Section XI.M.18, "Parameters Monitored/Inspected," and implement appropriate inspection requirements to provide adequate age-management for these bolts (Reference 57).	Bolting Integrity Program

LONG-TERM COMMITMENTS FOR LICENSE RENEWAL OF PALISADES NUCLEAR PLANT

	Text of Commitment, Due Date, Source	Affected Program
12.	Define Boric Acid Insp Walkdown Criteria - Revise applicable plant procedures to include criteria for observing susceptible SSC, within the scope of license renewal, for boric acid leakage and degradation, during system walkdown inspections. (Reference 57)	Boric Acid Corrosion Program
13.	Boric Acid Insp Criteria - Revise applicable plant procedure(s) to include explicit acceptance criteria for boric acid inspections. (Reference 57)	Boric Acid Corrosion Program
14.	Boric Acid Insp of Struct & NonASME - Revise applicable plant procedures to include inspection of structural steel and non-ASME component supports for evidence of boric acid residue and boric acid wastage/corrosion on a periodic frequency. (Reference 57)	Boric Acid Corrosion Program
15.	Implement Buried Services Monitoring Program - A Buried Services Corrosion Monitoring Program will be developed and implemented. Features of the program will include development and implementation of procedures for inspection of selected buried SSCs for corrosion, pitting and MIC. The periodicity of these inspections will be based on opportunities for inspection such as scheduled excavation and maintenance work. (Reference 57)	Buried Services Corrosion Monitoring Program
16.	Periodic Clean Inspect FO Storage Tank - Develop and implement procedures for periodic draining and cleaning of diesel fuel oil storage tanks, Emergency Diesel Generator day tanks, and Diesel Fire Pump Day Tanks. These procedures shall include steps to perform a visual inspection of interior tank surfaces for signs of degradation or corrosion, with acceptance criteria, corrective actions, and documentation of inspection results. (Reference 57)	Diesel Fuel Monitoring and Storage Program
17.	Periodic Drain Water from Fuel Oil Tanks - Develop and implement procedures for periodic draining of water accumulated in the bottom of the fuel oil storage tanks and fuel oil day tanks for the Diesel Generators and Diesel Fire Pumps. (Reference 57)	Diesel Fuel Monitoring and Storage Program
18.	Fuel Oil Tank Bottom Thickness Measurements - Develop and implement procedures for periodic ultrasonic measurement of thickness of the bottom of Fuel Oil Storage Tanks, Emergency Diesel Generator Day Tanks, and Diesel Fire Pump Day Tanks. (Reference 57)	Diesel Fuel Monitoring and Storage Program

LONG-TERM COMMITMENTS FOR LICENSE RENEWAL OF PALISADES NUCLEAR PLANT

	Text of Commitment, Due Date, Source	Affected Program
19.	Structural Monitoring Program for Fire Barriers - The Structures Monitoring Program shall be revised to include specific inspection criteria and documentation requirements for verifying that walls, ceilings and floors that serve as Fire Protection Program fire barriers are verified to be free from aging related degradation that would impact the fire barrier's intended function. (Reference 57)	Structures Monitoring Program
20.	Fire Door Inspection - Plant procedures shall be revised to more specifically address aging related degradation and expectations for documentation of fire door condition. (Reference 57)	Fire Protection Program
21.	Fire Door Clearance Inspections - Develop and implement procedures to perform visual inspections for fire door clearances. (Reference 57)	Fire Protection Program
22.	Diesel Fire Pump Fuel Line Inspection - Revise diesel-driven fire pump performance test procedures to more specifically address requirement to inspect and monitor fuel oil supply line for aging related degradation, and to document inspection results.	Fire Protection Program
23.	Inspect Below Grade Fire Piping - Develop and implement procedures for inspection of below grade fire protection system piping. Inspections shall be implemented under the Buried Services Corrosion Monitoring Program. In addition, results of wall thickness inspections of above grade fire protection system piping shall be extrapolated to evaluate the wall thickness condition of below grade fire protection system piping. Procedures shall include acceptance criteria, and criteria for further corrective actions if acceptance criteria are not met. (Reference 94)	Fire Protection Program / Buried Services Program
24.	Fire Hydrant Inspection & Testing - Plant procedures shall be revised to more specifically address identification of aging related degradation and expectations for documentation of fire hydrant condition. Also, these revisions shall include provisions to perform flow testing for fire hydrants within the scope of License Renewal that are credited for fire suppression in the Palisades current licensing basis. (Reference 57)	Fire Protection Program

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	Text of Commitment, Due Date, Source	Affected Program
25.	Replace or Test Sprinkler Heads - Develop and implement procedures to replace all sprinkler heads prior to the end of the 50 year service life, or for testing of a representative sample of sprinkler heads prior to the end of the 50 year service life and at 10 year intervals thereafter, per requirements of NFPA 25, Section 5.3. (Reference 57)	Fire Protection Program
26.	Non-EQ Commodities Condition Monitoring - A Non-EQ Electrical Commodities Condition Monitoring Program will be developed and implemented. Features of the program will include development and implementation of procedures to conduct periodic inspection of insulated cables and connectors, test sensitive instrumentation circuits, test medium voltage cables, inspect manhole water levels, and inspect non-segregated phase bus and connections. (Reference 94)	Non-EQ Electrical Commodity Condition Monitoring Program
27.	One Time Inspection Program - A One Time Inspection Program will be developed and implemented. Features of the program are as described in the Enhancement section of LRA Section B2.1.13. (Reference 57)	One-Time Inspection Program
28.	Crane Inspection Requirements - Revise crane and fuel handling machine inspection procedures to specifically inspect for general corrosion on passive components making up the bridge, trolley, girders, etc., and to inspect rails of Bridge Cranes for wear. Revision should also include documentation of results of these inspections, acceptance criteria, and qualification requirements for inspectors and crane supervisors. (Reference 57)	Overhead Load Handling Systems Inspection Program
29.	Reactor Vessel PT/LTOP Curves - The Reactor Vessel Integrity Surveillance Program will ensure that pressure-temperature and LTOP curves are updated to reflect the additional neutron fluence accumulated during the extended operating period. (Reference 57)	Reactor Vessel Integrity Surveillance Program
30.	RV Surveillance Capsules - Document and establish requirement to save and store all pulled and tested reactor vessel surveillance capsules for future reconstitution use. (Reference 57)	Reactor Vessel Integrity Surveillance Program

LONG-TERM COMMITMENTS FOR LICENSE RENEWAL OF PALISADES NUCLEAR PLANT

	Text of Commitment, Due Date, Source	Affected Program
31.	Surv Capsule Withdrawal Schedule - Evaluate and revise as necessary, the surveillance capsule withdrawal and testing schedule of FSAR Table 4-20 such that at least one capsule remains in the reactor vessel and is tested during the period of extended operation to monitor the effects of long-term exposure to neutron irradiation. (Reference 57)	Reactor Vessel Integrity Surveillance Program
32.	Reactor Vessel Integrity Program - Develop a program level procedure to implement and control Technical Specification and FSAR activities associated with the Reactor Vessel Integrity Surveillance Program, including activities associated with surveillance capsules, pressure-temperature limit curves, LTOP setpoints, neutron embrittlement calculation methodology, neutron fluence calculations and control, and documentation requirements. Title of procedure should be, "Reactor Vessel Integrity Surveillance Program." (Reference 57)	Reactor Vessel Integrity Surveillance Program
33.	Reactor Vessel Internals Program Submittal - Entergy will participate in industry initiatives that will generate additional data on aging mechanisms relevant to reactor vessel internals (RVI), including void swelling, and develop appropriate inspection techniques to permit detection and characterization of features of interest. Recommendations for augmented inspections and techniques resulting from this effort will be incorporated into the Reactor Vessel Internals Program as applicable. (Reference 82)	Reactor Vessel Internals Inspection Program
34.	Withdrawn	
35.	Incorporate Members in Structural Monitoring Program - Incorporate into the Structural Monitoring Program all structural members listed in Tables 3.5.2-1 through 3.5.2-10 that will use the Structural Monitoring Program as an AMR. (Reference 57)	Structures Monitoring Program
36.	Enhance System Walkdown Procedures - Enhance system walkdown procedures to more specifically address the types of components to be inspected, and to specifically describe the relevant degradation mechanisms and effects of interest, and for use of the Corrective Action Program to document aging related degradation, identified during the inspections, that may affect the ability of the SSC to perform its intended function. (Reference 57)	System Monitoring Program

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	Text of Commitment, Due Date, Source	Affected Program
37.	Fatigue Monitoring Program - A Fatigue Monitoring Program will be developed and implemented. Features of the program will include monitoring and tracking selected cyclic loading transients (cycle counting) and their effects on critical reactor pressure boundary components and other selected components. (Reference 57)	Fatigue Monitoring Program
38.	Incorporate Commitments into FSAR - The final text and schedule of licensee commitments that are confirmed by NRC in the final SER for the Palisades Renewed Operating License will be incorporated into appropriate locations of the FSAR in the first regular FSAR update under 10 CFR 50.71 (e) following NRC issuance of the renewed operating license. (Reference 83)	NA
39.	Buried Piping Opportunistic Inspection - Visual inspections of a sample of buried carbon, low-alloy, and stainless steel components will be performed within ten years prior to entering, and within ten years after entering, the period of extended operation. Prior to the tenth year of each period, Entergy will perform an evaluation of available data to determine if sufficient opportunistic inspections have been performed within that period to assess the condition of the components. If insufficient data exists, focused inspection(s) will be performed as needed. (Reference 84)	Buried Services Corrosion Monitoring Program
40.	HVAC Flex Joint PM Enhancement - Entergy will enhance the preventive maintenance program to periodically inspect, and replace as necessary, the expansion joints/flexible connections in the portions of the Heating, Ventilation and Air Conditioning System that are in-scope for license renewal. (Reference 94)	NA
41.	Industry Standard Use for Tank Inspection - Entergy will identify specific methods of inspection for individual components as part of the System Monitoring Program implementation procedure development. Industry documents such as EPRI 1009743, EPRI GS-7086, and API 575 will be used as source documents to define tank testing and inspection requirements. (Reference 85)	System Monitoring Program

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	Text of Commitment, Due Date, Source	Affected Program
42.	FAC Acceptance Criterion NSR Pipe Wall - Entergy will revise the governing procedure for the Flow Accelerated Corrosion Program to include the value of 87.5% of nominal wall thickness for non safety related piping as a trigger point to initiate engineering analysis to confirm that remaining wall thickness is acceptable to support the intended function or to determine corrective action, as applicable. (Reference 82)	Flow Accelerated Corrosion Program
43.	Neutron Blackness Test of SFP Racks - Entergy will perform a neutron absorption ("blackness") test of selected cells in the NUS spent fuel racks to validate that there is no significant degradation of the neutron absorption capability. If degradation is identified, an evaluation of the condition will be performed under the Entergy Corrective Action Program. If applicable, this evaluation will determine the need for additional testing. (References 86 and 95)	NA
44.	Internal Inspections of Opportunity - Palisades procedures will be enhanced to inspect and document the internal condition of applicable components, in-scope for license renewal, when maintenance provides an opportunity. Applicable components are those that have an internal environment of water, are constructed of materials that are potentially susceptible to internal aging degradation in a wetted environment, but are not subject to another Aging Management Program (e.g., Water Chemistry, Open Cycle Cooling) that would manage the internal environment such that aging degradation of the internal surfaces would not be expected. (Reference 87)	Inspections of Opportunity for Internal Surfaces of Selected Components

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	Text of Commitment, Due Date, Source	Affected Program
45.	<p>Corrosion Under Insulation - To verify that Corrosion Under Insulation (CUI) is not causing excessive corrosion of insulated piping and components, inspections of opportunity will be performed to assess the external surface condition when insulation is removed for maintenance or surveillance. The piping and components of interest are those within the scope of the System Monitoring Program, constructed of carbon or low alloy steel, with low normal operating temperatures in an indoor or outdoor environment such that the piping could be wetted under its insulation (e.g., from condensation or rain water) for extended periods without being detected. The System Monitoring Program will be enhanced to require a periodic review of documented under-insulation inspection results to verify that there were a sufficient number of inspection opportunities to provide a representative indication of system condition, and to assess the need for further action. If there were insufficient opportunities for inspection, insulation will be removed from additional sample locations to assess system condition under insulation. (Reference 88)</p>	System Monitoring Program

LISTING OF NEWLY IDENTIFIED SYSTEMS, STRUCTURES, AND COMPONENTS
PER 10 CFR 54.37(b)

System	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program
ESS - Engineering Safeguards System ¹	Heat Exchanger / Cooler	Fluid Pressure Boundary Heat Transfer	Stainless Steel	Treated Water (internal)	Loss of Material Heat Transfer Degradation - Fouling	Closed Cycle Cooling Water Program
ESS - Engineering Safeguards System ¹	Heat Exchanger / Cooler	Fluid Pressure Boundary Heat Transfer	Stainless Steel	Oil (external)	Loss of Material Heat Transfer Degradation - Fouling	Oil Sampling and Analysis Program
FWS - Feedwater System ¹	Heat Exchanger / Cooler	Fluid Pressure Boundary Heat Transfer	Stainless Steel	Treated Water (internal)	Loss of Material Heat Transfer Degradation - Fouling	Water Chemistry Program
FWS - Feedwater System ¹	Heat Exchanger / Cooler	Fluid Pressure Boundary Heat Transfer	Stainless Steel	Oil (external)	Loss of Material Heat Transfer Degradation - Fouling	Oil Sampling and Analysis Program
FOS - Fuel Oil System ²	Accumulator	Fluid Pressure Boundary	Carbon Steel	Atmosphere/ Weather (external)	Loss of Material	System Monitoring Program

¹10 CFR 50.37(b) Determination Log No. 54.37-PLP-2011-004.

²10 CFR 50.37(b) Determination Log No. 54.37-PLP-2015-001.