July 1, 2002

Mr. Douglas E. Cooper
Site Vice President
Palisades Nuclear Plant
Nuclear Management Company, LLC
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES NUCLEAR PLANT
NRC INSPECTION REPORT 50-255/02-03(DRS)

Dear Mr. Cooper:

On May 17, 2002, the NRC completed an inspection at your Palisades Nuclear Plant. The enclosed report documents the inspection findings which were discussed on May 17, 2002, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on the design and performance capability of the service water and 125VDC electrical distribution systems to ensure they were capable of performing their required post-accident functions. Based on this inspection, an apparent violation whose safety significance has yet to be determined was identified.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

/RA by Hershell A. Walker Acting for/

Ronald N. Gardner, Chief
Electrical Engineering Branch
Division of Reactor Safety

Docket Nos. 50-255
License Nos. DPR-20

Enclosure: Inspection Report 50-255/02-03(DRS)

See Attached Distribution

Distribution

cc w/encl: R. Fenech, Senior Vice President, Nuclear
Fossil and Hydro Operations
L. Lahti, Manager, Licensing
R. Anderson, Chief Nuclear Officer, NMC
A. Udrys, Esquire, Consumers Energy Company
S. Wawro, Nuclear Asset Director, Consumers Energy Company
W. Rendell, Supervisor, Covert Township
Office of the Governor
Michigan Department of Environmental Quality
Department of Attorney General (MI)

Mr. Douglas E. Cooper
Site Vice President
Palisades Nuclear Plant
Nuclear Management Company, LLC
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES NUCLEAR PLANT
NRC INSPECTION REPORT 50-255/02-03(DRS)

Dear Mr. Cooper:

On May 17, 2002, the NRC completed an inspection at your Palisades Nuclear Plant. The enclosed report documents the inspection findings which were discussed on May 17, 2002, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on the design and performance capability of the service water and 125VDC electrical distribution systems to ensure they were capable of performing their required post-accident functions. Based on this inspection, an apparent violation whose safety significance has yet to be determined was identified.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

/RA by Hershell A. Walker Acting for/

Ronald N. Gardner, Chief
Electrical Engineering Branch
Division of Reactor Safety

Docket Nos. 50-255
License Nos. DPR-20

Enclosure: Inspection Report 50-255/02-03(DRS)

See Attached Distribution

DOCUMENT NAME: G:DRS\ML021820649.wpd
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RIII		RIII		RIII			
NAME	MFarber:sd		DPassehl		RGardner			
DATE	06/26/02		06/26/02		07/01/02			

OFFICIAL RECORD COPY

Distribution
cc w/encl: R. Fenech, Senior Vice President, Nuclear
Fossil and Hydro Operations
L. Lahti, Manager, Licensing
R. Anderson, Chief Nuclear Officer, NMC
A. Udrys, Esquire, Consumers Energy Company
S. Wawro, Nuclear Asset Director, Consumers Energy Company
W. Rendell, Supervisor, Covert Township
Office of the Governor
Michigan Department of Environmental Quality
Department of Attorney General (MI)

ADAMS Distribution
AJM
DFT
LWR
GEG
HBC
DRC1
C. Ariano (hard copy)
DRPIII
DRSIII
PLB1
JRK1

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-255
License No:	DPR-20
Report No:	50-255/02-03(DRS)
Licensee:	Nuclear Management Company, LLC
Facility:	Palisades Nuclear Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	April 29 through May 17, 2002
Inspectors:	M. Farber, Reactor Inspector A. Dunlop, Reactor Inspector G. O'Dwyer, Reactor Inspector R. Schin, Reactor Inspector S. Sheldon, Reactor Inspector O. Mazzoni, Consultant
Approved by:	Ronald N. Gardner, Chief Electrical Engineering Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000255-02-03(DRS), on 04/29 - 05/17/2002, Nuclear Management Company LLC, Palisades Nuclear Plant. Safety System Design and Performance Capability Inspection.

The report covers a baseline inspection by five regional inspectors and a consultant that focused on the design and performance capability of the service water and 125VDC electrical distribution systems to ensure they were capable of performing their required post-accident functions. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector Identified Findings

Cornerstone: Mitigating Systems

- To Be Determined (TBD). Inspectors identified an apparent violation of Technical Specification (TS) 5.4.1, which involved an inadequate emergency operating procedure (EOP). The EOP for supplying auxiliary feedwater (AFW) from alternate water sources could not be completed by operators in a timely manner to mitigate certain tornado events.

  This finding had a credible impact on safety, in that performing the EOP, as written, would have resulted in a lack of timely restoration of AFW and a loss of all core cooling during certain tornado events. The safety significance of this finding is unresolved pending NRC determination of the risk involved. Determination of the risk will involve analysis of: (1) the probability of a tornado striking the plant and causing a loss of the condensate storage tank (CST), safety injection and refueling water tank (SIRWT), and offsite power; and (2) the credit to be given for certain unproceduralized operator recovery actions (Section 1R21.b.1).

B. Licensee Identified Findings

No findings of significance were identified.

Report Details

Summary of Plant Status

The plant operated at 100 percent power throughout the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R21 Safety System Design and Performance Capability

Introduction

Inspection of safety system design and performance verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected system to perform its design basis functions. As plants age, their design bases may be lost, such that an important design feature may be altered or disabled. The plant risk assessment model is based on the capability of the as-built safety system to perform its intended safety function successfully. This inspectable area verifies aspects of the mitigating systems and barrier integrity cornerstones for which there are no indicators to measure performance.

The objective of this safety system design and performance capability inspection was to assess the adequacy of calculations, analyses, other engineering documents, and operational and testing practices that were used to support the performance of the service water (SWS) and 125VDC electrical distribution systems during normal, abnormal, and accident conditions. The inspection was performed by a team of inspectors that consisted of a team leader, four Region III inspectors, and a consultant.

The SWS and 125VDC systems were selected for this inspection, based upon:

- having a high probabilistic risk analysis ranking;
- having had recent significant modifications; and
- not having received recent NRC review.

The criteria used to determine the system's performance included:

- applicable technical specifications;
- applicable Updated Safety Analysis Report (USAR) sections;
- licensee responses and commitments to generic communications; and
- the system design documents.

a. Inspection Scope

The following system and component inspection attributes were reviewed in detail:

System Needs

Process Medium - water
Energy Source - electrical power
Control System - initiation, control, and shutdown actions
Operator Actions - initiation, monitoring, control, and shutdown

System Condition and Capability

Installed Configuration - elevation and flow path operation
Design - calculations and procedures
Testing - flowrate, pressure, temperature, voltage, and current

Components

Three components were chosen for detailed review: station battery ED-01, service water cross-tie valve CV-1359; and service water pump P7B. The following attributes were reviewed for the chosen components:

Component Degradation
Equipment/Environmental Qualification - temperature (pumps)
Vibration (pumps)
Equipment Protection - flood, missile and freezing (pumps)
Component Inputs and Outputs
Industry Operating Experience

b. Findings

.1 Inadequate Emergency Operating Procedure (EOP) for Supplying Auxiliary Feedwater (AFW) from Alternate Water Sources

a) Introduction

On May 17, 2002, inspectors identified an apparent violation of TS 5.4.1, which involved an inadequate EOP. The EOP for supplying AFW from alternate water sources was not adequate to mitigate certain tornado events. This finding had a credible impact on safety and was characterized as an unresolved item (URI) pending NRC determination of the risk involved.

b) Description

In the Palisades Systematic Evaluation Program (NUREG 0820), the NRC described a concern with the importance of the procedures for supplying alternate water sources to the AFW pumps. The NRC had noted a lack of tornado missile protection for the Condensate Storage Tank (CST) and the Safety Injection Refueling Water Tank (SIRWT), and the licensee's reliance on alternate water sources (from Lake Michigan) to the AFW pumps to mitigate a tornado that could disable the CST, SIRWT, and offsite power. In consideration of this potential event, the NRC had stated: "The plant procedures must be verified to be complete, clear, and unambiguous enough to ensure

that alternate water sources can be made available in a timely manner, giving specific consideration to equipment availability following any postulated initiating events and single failures."

The operator action to supply alternate water sources to the AFW pumps was identified in the Palisades Probabilistic Safety Assessment (PSA) as very important, with a risk achievement worth (RAW) of 9.6. The inspectors walked down EOP Supplement 31, "Supply AFW Pumps From Alternate Sources," Revision 5, with an experienced auxiliary operator and a qualified senior reactor operator. Supplement 31 had one section for supplying AFW pump P-8C from service water and another section for supplying AFW pumps P-8A or P-8B from fire water. In either case, the ultimate water source was Lake Michigan. The operators stated that service water to P-8C was preferred, and would be used to mitigate a total loss of feedwater to the steam generators that would result from a tornado that disabled the CST, SIRWT, and offsite power. The inspectors noted that both the procedure for supplying P-8C from service water and the procedure for supplying P-8A or P-8B from fire water required extensive venting of the AFW system. The inspectors observed that the venting steps for supplying P-8C from service water could be challenging for operators. They included removing pipe caps and opening manual valves on three different vents that were each located approximately 8 to 12 feet above the floor, in three different areas of the west engineering safeguards room, among pipes that were considered to be contaminated. The operators would have to obtain and place a portable ladder at each of the three locations, climb the ladder with a flashlight (during a loss of offsite power, the areas around the vents would not be well lighted) and a large pipe wrench, and in one case climb over other piping to reach the pipe cap. The operators would have to remove the pipe caps with the large pipe wrench and open the manual vent valves to vent any air from the system. The operators estimated, and the inspectors agreed, that it would take two auxiliary operators about one hour to accomplish the procedure to supply AFW pump P-8C from service water. In addition, it would take about 15 minutes from the start of a tornado event for control room operators to work through EOPs to the point where they directed auxiliary operators to begin aligning service water to pump P-8C. Overall, it would take approximately one hour and 15 minutes from the start of the tornado event for operators to supply service water to the steam generators.

Based on simulator experience, operators estimated that it would take approximately 30 to 35 minutes from the start of a tornado event that disabled the CST, SIRWT, and offsite power for the steam generators to reach low levels of minus 75 percent and minus 84 percent. At these low levels, EOPs respectively directed starting AFW with an alternate water source and starting primary feed and bleed from the SIRWT (in this event, the SIRWT is not available). Additionally, simulations of this event run on the Palisades training simulator and a heat removal model used by the PSA group indicated that effective primary coolant system (PCS) cooling would be lost at approximately 32 minutes into the event, when steam generator levels reached minus 84 percent. The PSA model also indicated that steam generator dryout would occur at 52 minutes from the event initiation, and that restoration and maintenance of natural circulation are possible down to dryout. Consequently, cooling of the PCS could be lost from 32 minutes into the event, when steam generator levels reached minus 84 percent, until 75 minutes into the event, when operators established AFW from an alternate water source. During the 43 minutes with no cooling, the PCS temperature and pressure

would increase, pressurizer safety valves would lift, discharging water from the PCS. Additionally, the RCS steam bubble would shift from the pressurizer to the reactor vessel and consequently the pressurizer safety valves would begin relieving water. The Palisades Individual Plant Examination (IPE) states that the plant is normally operated with the power operated relief valve (PORV) block valves closed and that the probability of a pressurizer safety valve sticking open during cycling increases from 0.1 for steam flow to 0.4 for water flow. The risk of a safety valve sticking open could limit the time available for operators to supply AFW from an alternate water source and to deal with any single failures that could occur. The inspectors concluded that the licensee's procedures were inadequate to ensure that AFW could be supplied from alternate water sources in a timely manner to mitigate certain tornado events.

In response to this issue, licensee personnel found that EOP Supplement 31, "Supply AFW Pumps From Alternate Sources," had been initially written in December 1996 and had included steps for venting. The licensee entered the issue into their corrective action program in Condition Report CPAL0201930, "Impact to Performance Time Limit Not Validated in Emergency Operating Procedure Revision," on May 15, 2002.

Licensee personnel stated that, if operators had found themselves in a tornado event where EOP-7.0, "Loss of All Feedwater Recovery," directed starting AFW pump P-8C with a suction from service water (aligned per EOP Supplement 31) when steam generator levels reached minus 75 percent, the operators would have departed from the EOP and would have started AFW pump P-8C without venting. The inspectors considered that, if the AFW pumps had started automatically after the loss of offsite power and had subsequently tripped on low suction pressure after the loss of the CST, there might well be air in the AFW pump suction piping from the CST. However, the licensee might be able to perform an engineering evaluation that could show that when supplied from the flowpath and the higher pressure from the service water pumps, AFW pump P-8C might be able to operate satisfactorily without venting. The inspectors reviewed the December 1996 EOP revision and found no technical discussion of why the venting steps had been included in Supplement 31. The inspectors noted that operators had a job performance measure (JPM) to align service water to AFW pump P-8C within 10 minutes. This JPM was not consistent with the EOP in that the JPM did not include venting. The inspectors considered that operators might start AFW pump P-8C without venting and that this might work, but this recovery action was not supported by procedures or by engineering analysis.

The inspectors noted that the licensee's PSA risk for the operator action to supply alternate water sources to the AFW pumps (RAW of 9.6) did not include a tornado event. The PSA included only events where the CST was not disabled, all of the CST water was used by AFW, and operators would have well over an hour to perform the action. All tornado events had been "screened out" and were not included in the Palisades PSA.

c) Analysis

This issue represented a licensee performance deficiency because it involved an inadequate EOP that caused an increase in risk; consequently, it was considered to be a finding. The finding was of more than minor safety significance because it was

associated with a cornerstone attribute, Mitigating Systems, and it affected a cornerstone objective, EOPs. This finding could not be processed by the Significance Determination Process (SDP) Phase 2, because the SDP Phase 2 Worksheets do not include external events such as tornados. During the tornado event of concern, all core cooling systems have been disabled by the tornado. The prevention of core damage in this scenario relied on the inadequate procedure and on unproceduralized operator recovery actions. Consequently, the safety significance of this finding remains unresolved pending NRC determination of the risk involved. Determination of the risk will involve analysis of: (1) the probability of a tornado striking the plant and causing a loss of the CST, SIRWT, and offsite power; and (2) the credit to be given for certain unproceduralized operator recovery actions as described above.

d) Enforcement

TS 5.4.1 requires that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33 recommends procedures for combating emergencies and other significant events, including acts of nature such as tornados. EOP Supplement 31, "Supply AFW Pumps From Alternate Sources," Revision 5, which would be relied upon to mitigate certain tornado events, was identified to be inadequate on May 17, 2002. EOP Supplement 31 was inadequate because it failed to ensure that alternate water sources could be made available in a timely manner to mitigate certain tornado events. The licensee entered the issue into their corrective action program in Condition Report CPAL0201930, "Impact to Performance Time Limit not Validated in Emergency Operating Procedure Revision." In addition, the licensee promptly initiated an Equipment and System Operations Guidance/Recommendation (ESOG/R) clarifying that venting may be delayed until after the AFW pump is started. The ESOG/R will be used for guidance until EOP Supplement 31 is revised. This issue does not present an immediate safety concern because of the licensee's compensatory measure of prompt interim guidance to operators. Because the safety significance of the finding has not yet been determined, the noncompliance is classified as an apparent violation. This issue is identified as URI 50-255/02-03-01, Inadequate Procedure for Tornado Mitigation.

.2 Potential 125VDC Single-Failure Impact on Containment Spray

a) Introduction

The inspectors identified a potential single-failure scenario whereby Containment Spray would be non-functional during a loss-of-coolant accident. The issue had a credible impact on safety because the plant may have been operated outside of the design basis and was characterized as unresolved pending an Office of Nuclear Reactor Regulation (NRR) licensing basis determination.

b) Description

The inspectors reviewed electrical and instrumentation aspects of design change EAR-2000-0302-01, "Installation of Permissives and Interlocks on Emergency Core Cooling System Valves CV-3001, CV-3002, CV-3070 and CV-3071," Revision 0, and

associated drawings and plant operating procedures. The review focused on high level design aspects such as the proper translation of logic into schematics, equipment failure modes, electrical power reliability, and operator procedure consistency with the design change.

The design change was implemented to resolve high pressure safety injection pumps (HPSI) P-66A and P-66B inadequate net positive suction head during the emergency core cooling system recirculation mode. Late in the design effort the licensee determined the failure of containment sump isolation valve CV-3030 to automatically open upon receipt of a Recirculation Actuation Signal (RAS) would result in runout of the only operable containment spray (CS) pump. Flow from the containment sump to CS pumps P-54B and P-54C is controlled by CV-3030; failure of the valve to open after a RAS would result in failure of these pumps. The only remaining CS pump, P-54A, would be required to supply subcooled water from the containment sump to both containment spray header valves, CV-3001 and CV-3002, and both HPSI pumps after a RAS. The resultant high flow could result in P-54A runout conditions; consequently, the design was modified so CV-3001 would shut if CV-3030 did not open after a RAS.

The inspectors noted a problem with this approach because if CV-3030 failed to open because of loss of DC power, containment spray valve CV-3001 would also fail to close from the same loss of DC power. The consequences of the failure would be that P-54A would still be the only functional CS pump feeding both spray headers and both HPSI pumps, resulting in pump runout. Common DC power failure points included failing open breaker No. 72-118, any upstream component (e.g., failure of DC isolating breakers, or fuses FUZ/D11-1), or loss of the entire “left” ED-01 battery.

The licensee stated these failures would be passive failures and, as noted in the original FSAR Appendix I, engineered safety features were required to accommodate active, not passive, failures. The original design protected against the failure of a single powered component with fuses for each circuit. In the modified design, CV-3030 and CV-3001 were on different circuits fed by the same power supply and a single active failure would result in the failure of both valves to operate.

The inspectors; however, considered the failure of circuit breakers or fuses as active failures based on:

- the licensing basis definition of an active device as one which changes either position or state to accomplish its designated function. Considering that the function of breakers or fuses is to provide an interrupting capability, that breakers move and fuses change state while performing this function, the determination is logically sound.
- 10 CFR 50.54.21.a(1)i (License renewal rule) which specifically identifies breakers as active components
- Industry guidance such as NEI 95-10 and the EPRI Electrical Handbook for License Renewal which specifically identify circuit breakers and fuses as active devices.

The licensee also stated that the plant’s original licensing basis considered failures of breakers and fuses as passive failures, but documentation to support this contention

could not be located. This issue was previously raised in January 2002, and the licensee received a verbal acknowledgment of their position from the Electrical Branch of NRR; however, this position was apparently not docketed.

c) Analysis

This issue is associated with the Mitigating Systems cornerstone and represents a potential condition where the plant may have been operated outside of the design basis, i.e., a single active failure could prevent an engineered safety feature from performing its accident mitigation function. Whether or not the issue represents a licensee performance deficiency is dependent upon the NRR licensing basis determination; the issue cannot be processed under the SDP until the existence of a performance deficiency has been decided.

d) Enforcement

The licensee has taken the position that the original design basis considered fuse and breaker failures as passive and believes that this position is supported by NRR. To resolve this issue, NRR will be requested, under a Task Interface Agreement, to review the Palisades licensing basis and determine whether the plant was licensed with breaker and fuse failures considered as passive. NRR will also be requested to determine, in the event that the original licensing basis did consider breaker and fuse failures as passive, whether or not a backfit to conform with present regulatory and industry guidance is appropriate. This issue does not represent an immediate safety concern because of the extremely low probability of a large break loss of coolant accident coincident with the occurrence of the proposed single active failure. This issue will be tracked as an Unresolved Item (50-255/02-03-02(DRS)) "Potential 125VDC Single-Failure Impact on Containment Spray."

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed condition reports, action tracking requests, and self-assessments (listed in supplemental information) associated with SWS and 125VDC design issues to verify that the licensee had an appropriate threshold for identifying design issues. The inspectors also evaluated the effectiveness of the corrective actions to the identified issues, including the engineering justification for operability, as applicable.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. D. Cooper and other members of licensee management and staff at the conclusion of the inspection on May 17, 2002. The licensee acknowledged the information presented. No proprietary information was identified.

Supplemental Information

KEY POINTS OF CONTACT

Licensee

M. Acker, Engineering
M. Carlson, Engineering
D. Cooper, Site Vice President
B. Dotson, Licensing
R. Gambrill, Engineering
G. Goralski, Engineering
P. Harden, Engineering
D. Malone, Licensing
S. Oakley, Nuclear Oversight
K. Osborne, Engineering
D. Riat, Engineering
T. Sweicicki, Engineering
R. White, Engineering

NRC

R. Caniano, Deputy Director

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

50-255/02-03-01 (DRS)	URI	Inadequate Procedure for Tornado Mitigation
50-255/02-03-02 (DRS)	URI	Potential 125VDC Single-Failure Impact on Containment Spray

LIST OF ACRONYMS USED

AFW	Auxiliary Feedwater
CS	Containment Spray
CST	Condensate Storage Tank
EOP	Emergency Operating Procedure
ESOG/R	Equipment and System Operations Guidance/Recommendation
HPSI	High Pressure Safety Injection
IPE	Individual Plant Examination
JPM	Job Performance Measure
PCS	Primary Coolant System
PORV	Power Operated Relief Valve
PSA	Probabilistic Safety Analysis
RAS	Recirculation Actuation Signal
RAW	Risk Achievement Worth
RCS	Reactor Coolant System
SDP	Significant Determination Process
SIRWT	Safety Injection and Refueling Water Tank
TBD	To Be Determined
TS	Technical Specification
URI	Unresolved Item

LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection, including documents prepared by others for the licensee. Inclusion on this list does not imply that NRC inspectors reviewed the documents in their entirety, but, rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion on this list does not imply NRC acceptance of the document, unless specifically stated in the inspection report.

1R21 Safety System Design and Performance Capability

Calculations

EA-A-PAL-88-068-01	SWs Backup for AFW Pump Suction	January 8, 1990
EA-AOVCAP-SWS-01	Actuator Capability Review for Air Operated Valves (AOV) with Scotch Yoke-Spring Return Actuators in the Service Water System (SWS)	Revision 0
EA-AOVCAP-SWS-03	Actuator Capability Review for Air Operated Valves (AOV) with Direct Acting-Rotary Diaphragm Actuators in the Service Water System (SWS)	Revision 0
EA-AOVSYS-SWS-01	System Level Design Basis Review for Air-Operated Valves (AOV) in the Service Water System (SWS)	Revision 4
EA-AOV/T-SWS-06	Evaluation of Stem Torque Requirements for Palisades AOV(s) CV-0884 and CV-0885 Using the EPRI MOV Butterfly Valve Performance Prediction Methodology	Revision 1
EA-AOV/T-SWS-07	Evaluation of Stem Torque Requirements for Palisades AOV(s) CV-0857, CV-1318, CV-1319 and CV-1359 Using the EPRI MOV Butterfly Valve Performance Prediction Methodology	Revision 1
EA-DBD-1.02-002	Electrical & Mechanical Failure Analysis for the Service Water System	Revision 1
EA-DDC-87-002	Justification of Service Water Operability	March 2, 1987
EA-E-PAL-86-076-02	Hydraulic Analysis of the Palisades Service Water System	September 2, 1986
EA-LOCA-2001-01	Containment Response to a LOCA Using CONTEMPT-LT/28	April 16, 2001
EA-QO14-01	Evaluation of Pump Differential Pressure Reference Values for P7A & P-7B	Revision 0

A-PAL-94-015	Analysis Limits On Steam Generator Pressure Not Documented In Revised E.A.	January 9, 1994
EA-C-PAL-94-0161	Seismic Evaluation of Service Water Pump Bay Sluice Gates, MV-SW219 & MV-SW220	September 2, 1994
EA-D-PAL-93-272F-02	Diesel Generator Lube Oil Cooler and Jacket Water Cooler Performance	May 4, 1994
A-PAL-94-095	Calculation of AFW Net Positive Suction Head (NPSH)	June 7, 1994
A-PAL-79-18	Fire Pump/Auxiliary Feedwater Analysis	August 2, 1979
A-PAL-88-068-01	Service Water as a Backup to Auxiliary Feedwater Pump P-8C	January 8, 1990
C-PAL-97-0478-01	Fire Pump Run-Out Potential When Cross-Tied To AFW	July 8, 1997
A-PAL-83-057	Palisades Plant Auxiliary Feedwater System Modifications, Service Water System Analysis	August 4, 1983
EA-E-ELEC-VOLT-1/92-1	ECCS Motors Acceleration Times at 70% and 100% Using the PSS/E Motor Models	Revision 0
EA-ELEC-AMP-008	2400V Cable Ampacity for Service Water Pump 7A	Revision 2
EA-ELEC-AMP-009	2400V Cable Ampacity for Service Water Pump P7B	Revision 1
EA-ELEC-AMP-010	2400V Cable Ampacity for Service Water Pump P7C	Revision 1
EA-ELEC-VOLT-033	Second Level Undervoltage Relay Setpoint	Revision 0
EA-ELEC-VOLT-034	Calculation of VT Burden and Ratio Correction Factor for 2400V Safety-Related Buses	Revision 0
EA-ELEC08-03	Instrument Uncertainty Calculation for Service Water System Installed Process Flow Instrumentation Channels	Revision 0
EA-DBD-SWS-001	Overload and Undervoltage of Service Water & Charging Pumps	Revision 0
EA-RJC-92-02	Justification for Exclusion of SV-0823A & B, SV-0826A & B, POS-0826, and POS-0823 from the Electrical	Revision 1

EA-SC-92-211-01	Setpoint Change for Service Water Pumps P-7B & C Basket Strainer Differential Pressure Switches DPS-1321 and DPS-1325 High Differential Pressure Alarms	Revision 0
EA-SC-94-052-02	SWS Basket Strainer High Differential Pressure Alarm Setpoint Change	Revision 1
EAR 97-0693	Station Battery Operability Conditions	August 4, 1998
EA-C-PAL-96-0329-01	Investigation of Circuit Breakers and Fuse Coordination for Safety Related 125V DC Distribution Panels	Revision 1
EA-ELEC-VOLT-001	Determination of Worst Case Low Voltage at Engineered Safeguards Solenoid Valves When Station Battery is at 105 VDC	Revision 1
EA-ELEC-FLT-005	Short Circuit for the Palisades Class 1E Station Batteries D01 and D02	Revision 1
EAR-1999-0035	“Evaluate 125 v Short Circuit Interrupting Rating of Fuses in Safe Shut down and 1E Circuits to Assure it Will Safely Interrupt Available Short Circuit Current (Calculated).	Revision 1
EA-ELEC-LDTAB-007	“Palisades Normal Loads for Preferred AC Bus Y10, Y20, Y30, Y40, and DC Bus D10 and D20 and DC Panels D21A, D21-1, D21-2	Revision 1
EA-D-PAL-90-46B-01	Calculation of Short Circuit Current at Maximum Ambient Room Temperature for Engineered Safeguard Station Batteries D01 and D02	Revision 0
EAR-97-0169	Revise Breaker Setting to Prevent Trip on Inrush Current	March 18, 1997
EAR-1998-0018	Revise Undervoltage Alarm Setpoints and Metering as Necessary to Reflect New Electrical Tech Specs for DC Bus Monitoring	August 4, 1998
EA-SC-98-011-02	Undervoltage Alarm Setpoints for EVI-27/D1 and EVI-27/D2	Revision 1
	DC Bus Short Circuit Protection	Revision 1
	DC Bus Short Circuit Protection Supplement	Revision 1
EA-ELEC-LDTAB-009	Battery Sizing for Palisades Class 1E Station Batteries ED-01 and ED-02	Revision 3

EA-ELEC-LDTAB-012	Palisades Station Batteries ED-01 and ED-02 Battery Sizing and Future Growth Availability for Battery Replacement 01, ED-02	Revision 0
EA-A-PAL-89-120-2	Safety-related 125 VDC System Load Profile - LOCA Conditions with Offsite Power Available	Revision 1
EA-PAL-E-46-SUPPL 1	Palisades Plant Station Batteries Load Profile Update and Other Applicable Analyses" 3 Volumes	Revision 0
EA-A-PAL-89-120-2	Safety Related 125 VDC System Load Profile LOCA Conditions with Offsite Power Available	Revision 1
EA-FES-95-206-02	Station Battery ED-01 Capacity - 59 New Cells	Revision 0
EA-FES-95-206-04	Station Battery ED-02 Capacity - 59 New Cells	Revision 0
EAR 99-0035	Assess Short Circuit Interrupting Rating for Fuses in Safe Shut Down and 1E, 125 VDC Circuits	Revision 0

Condition Reports Initiated as a Result of Inspection

CPAL0201722	Class 3 Boundary on PID —208-1A Does not Match EGAD-ISI-01	May 1, 2002
CPAL0201724	Incorrect Q-List Interpretation for Instrument Air Compressor Cooling Valves	May 1, 2002
CPAL0201725	Inservice Testing Data Base Does not Contain Class 3 Valves SV-0801 and SV-0803	May 1, 2002
CPAL0201744	DBD-1.02 Flow Rate Totals Incorrect in 2 Tables	May 1, 2002
CPAL0201834	Valves Listed inn Incorrect System in the IST Program (PV-PLUS)	May 8, 2002
CPAL0201921	Conflict Between IST Program and Q List Interpretation	May 15, 2002
CPAL0201928	Inspection Questions IST Testing for CV-1655 and CV-1656	May 15, 2002
CPAL0201732	Equipment Oil Level Monitoring Standard Lacks Detail	May 2, 2002
CPAL0201866	Condition Closed Before Deficiency Resolved	May 9, 2002

CPAL0201740	SSD&PC Inspection Identifies Bent Instrument Tubing Associated with BS-1318 Delta P Switch	May 1, 2002
CPAL0201814	SSD&PC Inspection Identifies Failure to Incorporate a Qualification Requirement into Breaker Maintenance Activity	May 7, 2002
CPAL0201871	SSD&PC Inspection Identified Inappropriate Closeout of Condition Report C-PAL-01-03635	May 10, 2002
CPAL0201886	SSD&PC Inspection Reveals Failure to Identify an Outdate Engineering Analysis as being Superseded	May 10, 2002
CPAL0201887	SSD&PC Inspection Revealed Discrepancy in Alarm Response Procedure ARP-7	May 10, 2002
CPAL0201903	SSD&PC Inspection Identifies Apparent Inadequate Documentation for Disposition of Vendor Recommendation	May 13, 2002
CPAL0201758	Inadequate Calculation Control	May 3, 2002
CPAL0201829	Inadequate Calculation Control	May 7, 2002
CPAL0201880	Inadequate Calculation Control	May 10, 2002
CPAL0201881	Inadequate Calculation Control	May 10, 2002
CPAL0201882	Calculation Which Could Be Superseded	May 10, 2002
CPAL0201899	Programmatic Weakness in Calculation Control	May 10, 2002
CPAL0200348.	Voltage Calculation Inconsistencies	May 16, 2002
CPAL0200349.	Voltage Calculation Inconsistencies	May 16, 2002
CPAL0200350.	DBD Enhancement	May 16, 2002
CPAL0200351.	Short Circuit Calculation Enhancement	May 16, 2002
CPAL0201927	Pages Omitted From Filming for System Protection Calc from 1994	May 15, 2002
CPAL0201930	Impact to Performance Time Limit Not Validated in Emergency Operating Procedure Revision	May 15, 2002
CPAL0201948	Lack of an Available Justification on Low Pressure Suction Pressure Trip Setpoint for Auxiliary Feedwater Pumps P-8A/B	May 17, 2002
CPAL0201738	Wrong Procedure Referenced in SOP-15	May 2, 2002

Condition Reports

CPAL9901955	CV-1359 Diagnostic Test Indicates Insufficient Seat Load Developed by Bettis Actuator	October 21, 1999
CPAL0002871	FSAR Section 9.1 Description of Warm Water Recirculation Pump P-5 Requires Clarification	September 21, 2000
CPAL0003056	Adverse Trend for SW Pump P-7A	October 9, 2000
CPAL0100090	Differential Pressure Adverse Trend for Service Water Pump P-7B	January 11, 2001
CPAL0100185	Back-up Specific Documentation Supporting Pump/Motor Operability to a Flood Level of 594'-8" Cannot be Located	January 18, 2001
CPAL0100545	Intake Bay Ice Results in Traveling Screen F-4C Failure and Entering of ONP 6.1 "Loss of Service Water"	February 17, 2001
CPAL0100614	Turbulent Lake Conditions Affecting Cooling of Plant Equipment	February 25, 2001
CPAL0100800	Excessive Sediment in Cooling Water Side of C-2C	March 12, 2001
CPAL0101104	Unexpected Quantity of Sand Found During Inspection of Intake Structure	April 3, 2001
CPAL0101597	AOV Calculation Error	April 22, 2001
CPAL0102086	CV-0869 Containment Air Cooler Inlet Valve Will Not Isolate Flow	June 7, 2001
CPAL0102747	Lack of Rigor in Documenting Operability For CPAL0102086	August 20, 2001
CPAL0102887	Compressor C-2C Water Jacket Found Full of Sand	September 6, 2001
CPAL0103204	Potential Degradation od Isolation Capability for SW to Control Room HVAC VC-11 and Emergency Diesel Generator D/G 1-1	October 6, 2001
CPAL0103801	EOP Manual Valve Evaluation	December 1, 2001
CPAL0103828	Unclear Procedure Direction for Bettis Actuator Type Valves	December 4, 2001
CPAL0200094	Control Valve Failed to Open When Handswitch Taken to Open	January 6, 2002

CPAL0200120	Service Water Pump (P-7C) Requires Frequent Packing Adjustments	January 8, 2002
CPAL0200466	Establishing Siphon Through Warm Water Recirc P-5 Flow Path Did Not Work as Expected	February 4, 2002
CPAL0200969	Component Problems Due to Turbulent Lake Conditions	March 10, 2002
CPAL0000789	Control Room Condensing Unit Condenser Drain Plug Severely Corroded By MIC	March 8, 2000
CPAL0001280	Significant Accumulation of Sand and Debris Discovered In Front of the Cooling Towers Screens	April 21, 2000
CPAL0001544	Outlet End Bell of Condenser Corroded on Divider Web, (Service Water Side)	May 16, 2000
CPAL0002018	Elevated Service Water Pump Basket Strainer DPS	June 29, 2000
CPAL0002857	Large Accumulation of Sand and Debris Discovered at Bottom of Cooling Tower Screens By Diver	September 20, 2000
CPAL0002871	FSAR Section 9.1 Description of Warm Water Recirculation Pump P-5 Requires Clarification	September 21, 2000
CPAL0100340	Service Water System Hydraulic Model Error for Contmnt Air Coolers	January 31, 2001
CPAL0101104	Unexpected Quantity of Sand Found During Inspection of Intake Structures	April 3, 2001
CPAL0101178	Service Water System Sand Issue Poses Potential Challenge to Entire System	April 6, 2001
CPAL0103351	No Basis Document for Technical Specification Test RO-216 “Service Water Flow Verification”	October 19, 2001
CPAL0101492	Service Water System Corrosion, Long Term Affects	April 18, 2001
CPAL0200047	Exceeding of Maint. Rule Screening Criteria for the SWS-UHS System, Ultimate Heat Sink	January 3, 2002
CPAL0200969	Component Problems Due to Turbulent Lake Conditions Suspected	March 10, 2002
CPAL0201199	Operability Recommendation for C-PAL-01-1178 Lacks Rigor	March 26, 2002
CPAL0201868	F-1005 Clogged During QO-14B	May 10, 2002

CPAL0201869	Frequent Fouling of EHC Coolers	May 10, 2002
C-PAL-94-0161	Indeterminate Seismic Qualification Status of S.W. Pump Bay Sluice Gates	May 22, 1994
CPAL0100025	Traveling Screen Hi DP Alarms	January 4, 2001
CPAL0100635	Inadequate Short Circuit Interrupting Rating (I/R), of Fuses in 1E, 125VDC Circuit	February 27, 2001
CPAL0101081	Battery ED-01 Failed to Complete 80% of Required Run Time	April 2, 2001
CPAL0101092	ED-01 Main Station Battery Connections Needed Additional Torquing	April 3, 2001
CPAL0101480	As Founds Out of Tolerance on Service Water Break Flow Transmitters	April 17, 2001
CPAL0101749	Service Water Break Detector FS-0885 Found Out of Tolerance During RI-27	April 30, 2001
CPAL0103623	Service Water to Containment FT-0883 Pegged “HI” Since October 31, 2001	November 13, 2001
CPAL0103635	Known Software Glitch Causes Temporary Excessive Load Condition on Battery	November 13, 2001
CPAL0103755	Inter-cell Connector Requires Replacement Due to Electrolyte Migration	November 27, 2001
C-PAL-96-0329-01	Circuit Breaker and Fuse Coordination for 125VDC Distribution Panels	Revision 1, 1/22/98
CPAL0100635	Inadequate Short Circuit Rating of Fuses in 1E, 125VDC circuit	February 27, 2001
CPAL0200263	FSAR Lacks Clarity with Respect to Identification of Active and Passive Components	01/16/2002
CPAL0200865	Ground on the DC System, Ground Self-cleared	March 2, 2002
CPAL0201664	Ground on the DC System, Ground Self-cleared	April 27, 2002
CPAL0201536	Ground on the DC System	April 18, 2002
CPAL0201032	Ground on the DC System	March 13, 2002
CPAL0104179	Ground on the DC System	December 27, 2001
CPAL0104196	Ground on the DC System	December 28, 2001
CPAL0104177	Ground on the DC System	December 27, 2001
CPAL0103794	Ground on the DC System	November 30, 2001

CPAL0103712	Ground on the DC System	November 24, 2001
CPAL0103299	Ground on the DC System	October 16, 2001
CPAL0101395	Breakers as Found Settings Were High	April 18, 2002
CPAL0100272	DC Input over Voltage Alarm Received While Placing Charger to Equalize	January 25, 2001
CPAL0201863	Implementation of Administrative Procedure 9.14, “Control of Computer Software,” is not Consistent Sitewide	April 9, 2002
CPAL0201751	The Probabilistic Safety Assessment (PSA) Does Not Include an Operator Action to Load Shed the Batteries During a Station Blackout Event	May 2, 2002
CPAL0201752	The Probabilistic Safety Assessment (PSA) Does Not Include an Operator Action to Reduce Service Water System Loads Following a Bus 1D Failure	May 2, 2002
CPAL0100635	Inadequate Short Circuit Interrupting Rating (I/R) of Fuses on 1E 125V DC Circuit	February 27, 2001
CPAL0101081	Battery ED-01 Failed to Complete 80% of Required Run Time	April 2, 2001
CPAL0101711	Sand in System Cause of Mechanical Seal Failure of SW Booster Pump	April 28, 2001
CPAL0100090	Differential Pressure Adverse Trend for Service Water Pump P-7B	January 11, 2001
CPAL0103755	Inter-Cell Connector Requires Replacement due to Electrolyte Migration	November 27, 2001
CPAL0100340	Service Water System Hydraulic Model Error for Containment Coolers	January 24, 2001
CPAL0100185	Backup Specific Documentation Supporting Pump/Motor Operability to a Flood Level of 595 ft., 8 in., Cannot be Located	January 18, 2001
CPAL0101492	Service Water System Corrosion, Long Term Effects	January 18, 2001
CPAL0101187	Service Water System Sand Issue Poses Potential Challenge to Entire System	April 6, 2001

CPAL0201146	Service Water System Corrosion Test Rack Not Secure	March 21, 2002
CPAL0201266	Operability Determination (for CPAL0201146) Does Not Provide Adequate Basis for Determination	March 29, 2002
CPAL0201281	Incomplete Corrective Actions for CPAL0001284 (for Testing SW Pumps Auto Start)	April 1, 2002
CPAL0201237	DBD 4.02, “125V DC System (Safety-Related),” in Need of Update	March 27, 2002
CPAL0201264	Add Documentation to DBD 1.02 Concerning the Ability of the Service Water System to Meet System Flow Requirements in Various system Conditions	March 29, 2002
CPAL0201253	Feeder Cable Not Incorporated Into EA-ELEC-VOLT-026	March 28, 2002
CPAL0201251	Failure to Leak Test Containment Air Cooler Inlet Service Water Valve CV-0847	March 28, 2002
CPAL0201245	DBD 7.08 Missed Cooling Tower Line Break in the Screenhouse	March 28, 2002
CPAL0201244	Lack of Documentation in DBD Concerning Critical Service Water System	March 28, 2002
CPAL0201145	Extremely Limited and Possibly Unsafe Access to Valve Located Behind Component Cooling Heat Exchangers	March 21, 2002
CPAL0201137	Inconsistent Use of Floor Drain Filter Socks in Cable Spreading Area	March 21, 2002
CPAL0201172	System Notebooks and Walk-downs Implementation not Consistent with EM-20	March 24, 2002
CPAL0101331	Leak in Underground Portion of Fire Main Line to Feedwater Purity Building	April 12, 2001
CPAL9800355	Seismic Adequacy of MV-SW501 Tubing	March 9, 1998
CPAL0100545	Intake Bay Ice Results in Traveling Screen F-4C Failure and Entering of ONOP-6.1, “Loss of Service Water”	February 17, 2001
CPAL0201231	Incomplete Operability Recommendation for CPAL-011492, “Service Water System Corrosion, Long-Term Effects”	March 27, 2002

CPAL0201220	NRC Commitment for Test of SW Crosstie to Engineered Safeguards Pumps Not Being Met	March 27, 2002
CPAL0201216	Inadequate Implementation of Corrective Action for CPAL0000394C Buried Piping & PM Plan	March 27, 2002
CPAL0201209	Deficient Corrective Actions for CPAL0101178, "Service Water Sand Issue Poses Potential Challenge to Entire System"	March 27, 2002
CPAL0201195	Flushing of Fire System and Service Water Cross Tie	March 26, 2002

Operability Recommendation

CPAL0101178	Service Water System Sand Issue Poses Potential Challenge to Entire System	April 8, 2001
CPAL0002018	Elevated Service Water Pump Basket Strainer DPS	June 29, 2000
CPAL0101492	Service Water System Corrosion, Long Term Affects	April 18, 2001
CPAL0101104	Unexpected Quantity of Sand Found During Inspection of Intake Structures	April 3, 2001
CPAL0002857	Large Accumulation of Sand and Debris Discovered at Bottom of Cooling Tower Screens By Diver	September 20, 2000
CPAL0000789	Control Room Condensing Unit Condenser Drain Plug Severely Corroded By MIC	March 8, 2000

Piping and Instrumentation Drawings (P&IDs)

M207, Sheet 2	Auxiliary Feedwater System	Revision 31
M208, Sheet A	Service Water System	Revision 18
M208, Sheet 1	Non-Critical Service Water System	Revision 72
M208, Sheet 1A	Service Water System	Revision 49
M209 Sh. 3	Piping & Instrumentation Diagram Component Cooling System	Revision 45
M208, Sheet 1B	Service Water System	Revision 28
M209, Sheet 2	Component Cooling System	Revision 30
M213	Service Water, Screen Structure and Chlorinator	Revision 76

M216, Sheet 2	Fire Protection System	Revision 55
M-653, Sh A	System Diagram Cooling Tower System	Revision 12
M653, Sheet 3	Cooling Tower System	Revision 43
Electrical Drawings		
E-1 Sh. 1	Single Line Meter & Relay Diagram - 480 Volt Motor Control Center - Warehouse	Revision BS
E-1 Sh. A	Single Line Meter & Relay Diagram	Revision 6
E-1 Sh. 2	Plant Single Line Diagram	Revision 25
E-2 Sh. 3	Single Line Meter & Relay Diagram Generator & 4160V System	Revision AD
E-3 Sh. 1	Single Line Meter & Relay Diagram - 2400 Volt System	Revision 48
E-8 Sh. 2	Single Line Meter & Relay Diagram 125V DC 120V Instrument & Preferred AC System	Revision 48
E-12 Sh. 1	Schematic Meter & Relay Diagram 2.4KV & 480V Systems	Revision 36
E-17 Sh. 5	Logic Diagram SIS Test and RAS	Revision 7
E-130 Sh. 1	Schematic Diagram Solenoid Operated Circuit Breaker	Revision 18
E-130 Sh. 1A	Schematic Diagram Solenoid Operated Circuit Breaker	Revision 2
E-130 Sh. 2	Schematic Diagram Solenoid Operated Circuit Breaker	Revision 4
E-154 Sh. 1	Schematic Diagram Service Water Pumps	Revision 20
E-154 Sh. 2	Schematic Diagram Service Water Pumps	Revision 13
E-154 Sh. 2A	Schematic Diagram Service Water Pumps	Revision 5
E-154 Sh. 3	Schematic Diagram Service Water Pumps	Revision 0
E-166 Sh. 1	Schematic Diagram Air Compressor	Revision 8
E-167 Sh. 1	Schematic Diagram Instrument Air Compressor (C-2A & C-2C) Control	Revision 16
E-207 Sh. 1	Schematic Diagram Containment High Pressure - High Radiation & SIRW Tank Low Level	Revision 27

E-209 Sh. 1	Schematic Diagram Safety Injection & Sequence Loading Circuits	Revision 31
E-209 Sh. 1A	Schematic Diagram Safety Injection & Sequence Loading Circuits	Revision 7
E-209 Sh. 2	Schematic Diagram Safety Injection & Sequence Loading Circuits	Revision 29
E-209 Sh. 2A	Schematic Diagram Safety Injection & Sequence Loading Circuits	Revision 2
E-209 Sh. 3	Schematic Diagram Safety Injection & Sequencer Loading Circuits	Revision 25
E-209 Sh. 3A	Schematic Diagram Safety Injection & Sequencer Loading Circuits	Revision 2
E-209 Sh. 4	Schematic Diagram Safety Injection & Sequence Loading Circuits	Revision 29
E-209 Sh. 5	Schematic Diagram Safety Injection & Sequence Loading Circuits	Revision 2
E-216 Sh. 1	Schematic Diagram Containment Cooler Recirc. Fans V-1A, V-2A, & V-3A	Revision 16
E-216 Sh. 1A	Schematic Diagram Containment Cooler Recirc. Fans V-1A, V-2A, & V-3A	Revision 8
E-217	Schematic Diagram Containment Cooler Recirculating Fan V-4A	Revision 17
E-219 Sh. 1	Schematic Diagram Service Water Valves	Revision 12
E-219 Sh. 2	Schematic Diagram Service Water Valves	Revision 12
E-219 Sh. 3	Schematic Diagram Service Water Valves	Revision 17
E-246 Sh. 1	Schematic Diagram SIRW Tank and Containment Sump Valves	Revision 20
E-246 Sh. 1A	Schematic Diagram SIRW Tank and Containment Sump Valves	Revision 0
E-246 Sh. 2	Schematic Diagram SIRW Tank and Containment Sump Valves	Revision 24
E-246 Sh. 2A	Schematic Diagram SIRW Tank and Containment Sump Valves	Revision 0
E-1, Sh. A,	Single Line Meter & Relay Diagram	Revision 6

E-8, Sh 1 (Sh. 21),	Single Line Meter & Relay Diagram 125VDC , 120V Instrument & Preferred AC system	Revision 54
E-8, Sh 2 (Sh. 21A),	Single Line Meter & Relay Diagram 125VDC , 120V Instrument & Preferred AC system	Revision 48
E-246, Sh 1,	Schematic Diagram SIRW Tank and Containment Sump Valves	Revision 20
E-8, Sh. 2K,	125VDC Distribution Panel No. 1, ED11-1 Bkr. Schematic Diagrams	Revision 1
E-8, Sh. 2M,	125VDC Distribution Panel No. 1, ED11-1 Bkr. Schematic Diagrams	Revision 0
E-8, Sh. 2P,	125VDC Distribution Panel No. 1, ED11-1 Bkr. Schematic Diagrams	Revision 1
Vendor Drawings		
Bechtel SK-C-109	30"x30" Sluice Gates	Revision B
61-201-004-401	Current Transformer Typical Curve	Revision 02
61-300-000-800 Sh. 1	MKS-1 C. T. Assy	Revision 11
61-800-000-406 Sh. 1F	Type MKS-1 Stacked Core	Revision 05
E-12B Sh. 2	C & D Charter Power Systems Installation & Operating Instructions for Standby Battery Vented Cell	
M31 Sh. 22	APEX and APEX Sentry Radar Gauges	April 8, 2002
SC-3521-77	Westinghouse Type MA Mark 75 Type HMA breaker time current curve	
10M1293GM/1,	C&D LCR and LCY Lead Calcium Battery data sheet	1/1/94
404 251 2008	Yokogawa Corp. of America Digital meters and counters	
Bulletin 700	AB Controls	
Sect 12-237-1	C&D LC and LCY Lead Calcium Battery and LA & LY Lead Antimony data sheet	
M233 Sh. 296	Fisher Controls Co Instruction Manual for Type 5190 and 5190S Temperature Controllers	February 18, 1992

Licensee Event Reports

81-01	Human Error in switching of battery breaker	

Safety Evaluations

FC-812	Facility Change to Modify the SIS Test Circuitry for CV-1359	May 24, 1988
FC-816	Facility Change to Modify CV-1359 Control Circuitry to Close CV-1359 for a Left Channel Relay Activation	November 27, 1989
FC-959	Service Water System Replace CV-0823/-0824/-0826 and Replace Non-Code Repairs	Revision 1
FSAR-2197	FSAR Change Request, 4/12/02, Single Failure Criteria	

Modifications

EA-SFC-82-139	Hardstop Modification for CV0823 and CV0826	July 21, 1982
EAR-2000-0289	Revision of Packing Material Sizes, Quantities, and Use of a Packing Spacer for Service Water System P-7 Pumps	Revision 0
EAR-2001-0107	Service Water Pump Shaft Sleeve	June 4, 2001
FES-96-068	Replacement Packing for Service Water Pump	April 18, 1998
SC-85-010	Service Water Pump Packing	Revision 0
FC-832	Critical Service Water System Instrumentation	
SC-96-033	Replacement of Safety Related Battery Chargers and Inverters	February 21, 2000
EAR-2000-0659	Bubbler Replacement	
EAR-2000-0302-01, Rev. 0,	Install CHP bypass for RB Spray valves CV-3001 & CV-3002 and RAS actuation of CV-3070 & 3071	January 21, 2002
FES95-206	“ED-01 and ED-02 Station Battery Replacement”	July 13, 1995
SC 98-061	Replacement of Float Current Measuring Relay and Indicator	February 4, 2000
SC-1989-110	DC Circuit Breaker change	November 3, 1989
SC-1989-022	DC Circuit Breaker change	May 18, 1989
FES-98-061,	Replacement of Float Current Measuring	May 4, 1999

FES-97-054	Revise 72-226 breaker settings	April 24, 1997
Procedures		
EM-09-02	Inservice Testing of Plant Valves	Revision 21
EOP Supplement 24	SW and CCW Hydraulic Shock Prevention	Revision 5
ONP-6.1	Loss of Service Water	Revision 10
QO-14	Inservice Test Procedure-Service Water Pumps	Revision 18
QO-14 Basis	Inservice Test Procedure-Service Water Pumps	Revision 12
SOP-5	Containment Air Cooling and Hydrogen Recombining System	Revision 20
SOP-12	Auxiliary Feedwater System	Revision 41
SOP-15	Service Water System	Revision 21
SOP-16	Component Cooling Water System	Revision 22
SOP-24	Ventilation and Air Conditioning System	Revision 34
RO-216	Service Water Flow Verification Performed on April 27, 2001	Revision 0
T-190	Special Test Procedure Service Water Supply to Auxiliary Feedwater Pump **P-SC Flow Verification Performed on February 1, 1986	Revision 0
EGAD-ELEC-08	Design and Maintenance Guide on Instrument Setpoint Methodology	Revision 0
FE-5A	Modified Performance Test - Battery No. ED-01	Revision 9
FE-5B	Modified Performance Test - Battery No. ED-02	Revision 8
ME-12	ED-01 and ED-02 Battery Checks - Monthly	Revision 33
MSE-E-23	Equalize Charge of ED-01 and ED-02	Revision 4
QE-35	ED-01 and ED-02 Battery Checks - Quarterly	Revision 5
RE-83A	Service Test - Battery No ED-01	Revision 12
RE-83B	Service Test - Battery No ED-02	Revision 12
RT-8C	Engineered Safeguards System - Left Channel	Revision 14
Procedure EPS-E-9,	Use of Portable DC Ground Fault Detection System	Revision 0
EOP 3.0	Station Black Out Recovery	

EOP 9.0	Functional Recovery - Maintenance of Vital DC Power Batteries	
EOP Supplements	Procedure Change Package for EOP Supplements Revision 1	December 13, 1996
EOP Supplement 31	Supply AFW Pumps From Alternate Water Source	Revision 5
EOP-1.0	Standard Post-Trip Actions	Revision 12
EOP-7.0	Loss of All Feedwater Recovery	Revision 12
EOP Supplement 8	Battery #2 Load Stripping	Revision 5
ONOP-6.1	Loss of Service Water	Revision 10
SOP-16, Section 7.6	Service Water Cooling to Engineered Safeguards Pumps	Revision 22
SOP-22, Attachment 5	Alternate Diesel Generator Fuel Oil Supply	Revision 31

Standards, Guides, and Codes

IEEE P1375, D2	Draft Standard for DC systems	
IEEE 450	Recommended Practice for Maintenance, Testing, and Replacement of Lead Acid Batteries for Stationary Applications	
IEEE 484	Recommended Practice for Installation Design and Installation of Lead Acid Batteries for Stationary Applications	
IEEE 485	Recommended Practice for Sizing of Lead Acid Batteries for Stationary Applications	
IEEE 946	Recommended Practice for the Design of DC Auxiliary Power Systems for Generating Stations	

Design Basis Document

DBD-1.02	Service Water System	Revision 5
DBD-1.08	Ultimate Heat Sink	Revision 2
DBD-4.01,	Palisades Nuclear Plant Design Basis Document, 125V DC System Batteries (Safety-Related)	Revision 5
DBD-4.02,	Palisades Nuclear Plant Design Basis Document, 125V DC System (Safety-Related)	Revision 5

Technical Specifications		
3.7.8	Service Water System (SWS)	Amendment 199
3.7.9	Ultimate Heat Sink (UHS)	Amendment 202
B 3.7.8	Service Water System (SWS)	August 1, 2001
B 3.7.9	Ultimate Heat Sink (UHS)	August 1, 2001
5.4	Procedures	
ORM 3.5	Operating Requirements Manual Specification 3.5, Auxiliary Feedwater Alternate Suction	Revision 7
Completed Surveillances		
MSM-M-57	Test Results for AOV CV-0884	August 5, 1998
MSM-M-57	Test Results for AOV CV-0885	August 20, 1998
MSM-M-57	Test Results for AOV CV-1359	October 29, 2001
QO-14	Inservice Test Procedure-Service Water Pumps	March 22, 2002, April 3, 2002, and April 19, 2002
X-OPS563	Manual Stroke of Fire Water and Service Water Supplies to Auxiliary Feedwater Pumps	September 29, 2001
T-218	Service Water Pumps P-7A, P-7B, and P-7C Performance Test by Flow to Containment	April 18, 2001
Updated Final Safety Analysis Report Sections		
9.7	Auxiliary Feedwater	
Chapter 1	Introduction and General Description of Plant	
9.1	Service Water System	
Miscellaneous		
	IST Hydraulic and Vibration Data for Service Water Pumps (4/00-4/02)	
NUREG 0820	NRC's Final Report for the "Integrated Plant Safety Assessment-Systematic Evaluation Program" for Palisades, Sections 4.6.1, 4.8, and 4.16	October 1982
Job No. 5628	Component Cooling Water Heat Exchanger Specification Sheet	November 9, 1990

A-PAL-02-0134	125-Volt DC System Service Water System Safety System Functional Assessment	March 20-29, 2002
	NRC letter dated Oct 14, 1981, from Dennis Crutchfield to David Hoffman (CPC), SEP Topic VI-7.C.1, Independence of Redundant Onsite Power Sources Safety Evaluation Report for Palisades	October 14, 1981
RKM 97*003	Internal Correspondence, “D10, D20, D11, D21 DC Breaker Short Circuit Interrupting Capabilities, Cutler-Hammer memo of 11-18-97, from T. Horner to R. Moceri (Consumers Energy) provided short circuit ratings	November 18, 1997
E13	Specification for DC Control and Distribution Centers	
System Health Assessment	Service Water System and Ultimate Heat Sink	1st/2nd Quarter 2001
Health and Status Report	Critical Service Water	April 26, 2002
Health and Status Report	Non-Critical Service Water	April 26, 2002
Health and Status Report	Ultimate Heat Sink	April 26, 2002
Safety System Functional Assessment (SSFA)	Service Water System	March 20-29, 2002