NMC
Committed to Nuclear Excellence

Palisades Nuclear Plant
Operated by Nuclear Management Company, LLC

July 26, 2004 10 CFR 50.54(f)

U. S. Nuclear Regulatory Commission
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Rockville, Maryland 20852

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

60-Day Response to Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials Used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors"

On May 28, 2004, the Nuclear Regulatory Commission (NRC) transmitted Bulletin (BL) 2004-01. Enclosure 1 of this letter contains the Nuclear Management Company, LLC (NMC) 60-day response to BL 2004-01 for the Palisades Nuclear Plant.

Summary of Commitments

This letter contains four new commitments and no revisions to existing commitments:

- NMC will perform a bare metal visual inspection of 100 percent of all pressurizer heater sleeve locations, in a manner that visual access to the bare metal 360 degrees around each sleeve can be attained each refueling outage at the Palisades Nuclear Plant.
- NMC will perform non-destructive examination (NDE) capable of characterizing crack orientation of all sleeves for which visual inspection shows evidence of leakage at Palisades Nuclear Plant. The NDE will be performed prior to any repairs.
- NMC will notify the NRC immediately if the NDE defines the flaw as potential circumferential primary water stress corrosion cracking (PWSCC) in either the pressure boundary or non-pressure boundary portions of any locations covered under the scope of Bulletin 2004-01 for the Palisades Nuclear Plant. An appropriate inspection plan will be developed, which will define additional sleeves to be inspected by NDE, sufficient to determine the extent of condition commensurate with the characterization of the flaw.

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- NMC will perform bare metal visual inspections of all Alloy 82/182/600 primary system pressure boundary locations normally operated at greater than or equal to 350°F within the next two refueling outages for the Palisades Nuclear Plant.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 26, 2004.

Daniel J. Malone
Site Vice President, Palisades Nuclear Plant
Nuclear Management Company, LLC

Enclosure with Attachment (1)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ENCLOSURE 1
BULLETIN 2004-01
PALISADES NUCLEAR PLANT 60-DAY RESPONSE

Introduction

Palisades Nuclear Plant has 251, Alloy 600 penetrations all of which are contained within the primary coolant system (PCS). The PCS includes two identical heat transfer loops connected in parallel to the reactor vessel. Each loop contains one steam generator, two circulating pumps, flow and temperature instrumentation and connecting piping. A pressurizer is connected to one of the reactor vessel outlets by means of a surge line.

A project was initiated in 1993 to identify and rank all Alloy 600 penetrations contained within the PCS, as a result of Alloy 600 cracking issues associated with the pressurizer power operated relief valve (PORV) nozzle. This project ranked all 251 Alloy 600 penetrations based on four main criteria: primary water stress corrosion cracking (PWSCC) susceptibility, failure consequence, leakage detection margin and radiation dose rates. A brief explanation of these criteria is provided below.

> Susceptibility: All Alloy 600 PWSCC susceptibility contributors are fairly well understood from considerable worldwide studies and field experiences. The susceptibility ranking considers material heat treatment temperatures, carbon content, fabrication process, material yield strength, weld configuration, post weld heat treatment and service temperature as main susceptibility variables. The method yields results comparable to those of other ranking schemes.
>
> Consequence: Postulated PWSCC induced failures in Alloy 600 are bounded by existing large and small break loss-of-coolant accidents. PWSCC induced control rod ejection is bounded by analysis. Failure consequences range from permanent plant shutdown to simple repair during an unforced outage. Contributing factors include core damage potential, plant conditions required for repair, axial or circumferential cracking, component location, difficulty of post-event cleanup prior to restart, and public and regulatory perception.
>
> Detectability: A simplified ranking criteria based on component leak detection margin using the leak-before-break concept was developed for potential circumferential cracking in Alloy 600 girth butt-welded components. Leakage through axial cracks at J-groove welded penetrations can be effectively detected by the Inservice Inspection (ISI) Program well before the cracks become critical.
>
> ALARA: Radiation exposure to personnel is generally lower for inspection than repair. However, in-depth inspection of components with low PWSCC susceptibility and low consequence profiles can incur unnecessary exposure in high dose areas.

The following table summarizes the inspection prioritization results. The components are ranked from high to low priority for inspection. On a relative scale, Group I represents the most susceptibility, Group II represents average susceptibility and Group III represents the least susceptibility to PWSCC of all Alloy 600 components at the Palisades Nuclear Plant.

PWSCC INSPECTION PRIORITIZATION SUMMARY FOR PALISADES	
GROUP	COMPONENT DESCRIPTION
I	Pressurizer PORV Nozzle Safe-End
	Pressurizer and Hot Leg Surge Nozzle Safe-Ends
	Pressurizer Temperature Element (TE) Nozzles
	Primary Relief Valve Mounting Flanges (Safety Valve Flanges)
	Pressurizer Heater (HE) Sleeves with 44° < Setup Angles < 58°
	Pressurizer Heater (HE) Sleeves with Setup Angles < 44°
	Hot Leg Shutdown Cooling (SDC) Outlet Nozzle Safe-End
	Pressurizer Level Indicator (LT) Tap Nozzles
II	Pressurizer Spray Safe-End
	Reactor Head Control Rod Drive Mechanism (CRDM) Nozzles with Setup Angles > 45°
	Reactor Head Incore Instrument (ICI) Nozzles
	Cold Leg Safety Injection/SDC Inlet Nozzle Safe-Ends
	Hot Leg Pressure (DPT) and Sampling (SX) Tap Penetrations
	Reactor Head CRDM Nozzles with 22.5° < Setup Angle < 45°
	Reactor Head Gas Vent Nozzle
III	Hot Leg Drain Penetration
	Hot Leg RTD Nozzles
	Reactor Head CRDM Nozzles with Setup Angles < 22.5°
	Cold Leg RTD Nozzles
	Cold Leg Drain, Charging, Letdown and Spray Penetrations
	Cold Leg Pressure (DPT) and Sampling (SX) Tap Penetrations
	Reactor Flange Leak Detector Taps

In 1995, an Alloy 600 Program was developed at the Palisades Nuclear Plant. The Nuclear Regulatory Commission (NRC) issued the safety evaluation for the Palisades Alloy 600 Program on June 27,1995.

NRC Requested Information

(1) *All subject PWR licensees are requested to provide the following information within 60-days of the date of this bulletin.*

(a) *A description of the pressurizer penetrations and steam space piping connections at your plant. At a minimum, this description should include materials of construction (e.g., stainless steel piping and/or weld metal, Alloy 600 piping/sleeves, Alloy 82/182 weld metal or buttering, etc.), joint design (e.g., partial penetration welds, full penetration welds, bolted connections, etc.), and, in the case of welded joints, whether or not the weld was stress-relieved prior to being put into service. Additional information relevant with respect to determining the susceptibility of your plant's pressurizer penetrations and steam space piping connections to PWSCC should also be included.*

Nuclear Management Company (NMC), LLC Response

(a) The pressurizer maintains PCS operating pressure and compensates for changes in coolant volume during load changes. The pressurizer is constructed of ASTM A 533, Grade B, Class 1 steel plate. The interior surface of the cylindrical shell and upper head is clad with type 304 stainless steel. The lower head is clad with a Ni-Cr-Fe (Alloy 600) material to facilitate welding of the Alloy 600 heater sleeves to the shell.

The Palisades pressurizer contains 136 Alloy 600 penetrations, which are described as follows:

(1) 3-inch inside diameter (ID) X 6-inch outer diameter (OD) PORV nozzle

<u>Materials of construction</u>

The PORV nozzle was originally fabricated of ASTM-A-508-64 CL.2 forged steel with type 304 stainless steel cladding and fitted with a schedule 120, Alloy 600 safe-end. In 1995, the PORV safe-end was replaced with a new type 316 stainless steel safe-end/spool piece. Alloy 690 was used for the attachment weld to eliminate PCS contact with Alloy 600 from the pressurizer PORV nozzle.

<u>Joint Design/Stress Relief (Original Design)</u>

An Alloy 600 safe-end was butt-welded to the carbon steel nozzle (carbon steel nozzle is clad with stainless steel). The nozzle was then stress relieved, per the ASME Code, Section III, prior to being shipped to Palisades. Upon installation of the pressurizer, stainless steel piping was field-welded to the Alloy 600 safe-end.

Joint Design/Stress Relief (Current Design)

Due to PWSCC cracking of the Alloy 600 safe-end, it was replaced with a new stainless steel safe-end. Per the ASME Code, Section III, no stress relief was required to be performed.

Palisades Susceptibility Group

The PORV nozzle safe end was originally classified in Group 1 for susceptibility. Since its replacement with a stainless steel nozzle and Alloy 690 weld material, it is considered less susceptible to PWSCC, however, it is still included in the program.

(1) 4-inch spray line nozzle assembly

Materials of construction

The spray line nozzle assembly is fabricated of ASTM-A-508-64 CL.2 forged alloy steel with type 304 stainless steel cladding and fitted with an Alloy 600 safe-end.

Joint Design/Stress Relief

An Alloy 600 safe-end was butt-welded to the carbon steel nozzle (carbon steel nozzle is clad with stainless steel). The nozzle was then stress relieved, per the ASME Code, Section III, prior to being shipped to Palisades. Upon installation of the pressurizer, stainless steel piping was field-welded to the Alloy 600 safe-end.

Palisades Susceptibility Group

Palisades operates the pressurizer with the heaters in full-time service. This operational practice results in a steady stream of spray flow to balance the heater input. The spray flow, which is at the cold leg temperature, maintains the spray nozzle at a lower temperature than that of other pressurizer components. The spray safe-end is classified as Group II (moderate).

(1) 12-inch surge line nozzle

Materials of Construction

The surge line is fabricated of ASTM-A-508-64 CL.2 forged alloy steel with type 304 stainless steel cladding and fitted with a schedule 140, Alloy 600 safe-end.

Joint Design/Stress Relief

An Alloy 600 safe-end was butt-welded to the carbon steel nozzle (carbon steel nozzle is clad with stainless steel). The nozzle was then stress relieved, per the ASME Code, Section III, prior to being shipped to Palisades. Upon installation of the pressurizer, stainless steel piping was field-welded to the Alloy 600 safe-end.

Palisades Susceptibility Group

The mechanical stress improvement process (MSIP) was applied to this weld in 1995. MSIP changes the residual stress patterns at these locations from tensile to compressive by plastically deforming the piping near the welds. The compressive residual stress mitigates PWSCC. The surge line safe-end is classified as a Group I (high).

(3) 3-inch ID X 6-inch OD safety nozzles

Materials of Construction

The safety nozzles are fabricated of ASTM-A-508-64 CL.2 forged alloy steel with type 304 stainless steel cladding and fitted with Alloy 600 nozzle flanges to provide a 3-inch, 2500# flange connection to the safety valves.

Joint Design/Stress Relief

An Alloy 600 flange was butt welded to the carbon steel nozzle (carbon steel nozzle is clad with stainless steel). The nozzle was then stress relieved, per the ASME Code, Section III, prior to being shipped to Palisades.

Palisades Susceptibility Group

The safety valve mounting flanges are classified as Group I (high).

(8) 1-inch level nozzles, four upper and four lower

Materials of Construction

The level nozzles are fabricated of ASTM-A-508-64 CL.2 alloy steel forgings, clad and fitted with Alloy 600 ends. The alloy end serves to facilitate welding the stainless steel socket weld safe-ends for connection of the water level instrumentation piping.

Joint Design/Stress Relief

An Alloy 600 end was butt welded to the carbon steel nozzle (carbon steel nozzle is clad with stainless steel). The nozzle was then stress relieved, per the ASME Code, Section III, prior to being shipped to Palisades. Upon installation of the pressurizer, stainless steel piping was field-welded to the Alloy 600 safe-end.

Palisades Susceptibility Group

The level indicator alloy 600 ends are classified as Group 1 (high).

(2) 1-inch temperature element nozzle penetrations

Materials of Construction

The temperature element nozzle penetrations are fabricated of Alloy 600 with SA-182 (F316) stainless steel socket weld safe-ends.

Joint Design/Stress Relief

The original joint design was a J-groove weld between the ID of the pressurizer shell and temperature nozzle. This pressure boundary weld design was replaced in 1993 by a weld build-up pad at the OD of the shell for both the upper and lower temperature nozzles. The pad weld build-up was installed using the ASME Code approved self-tempering weld process.

Palisades Susceptibility Group

The temperature penetrations are classified as a Group I (high).

(120) Pressurizer heater penetrations

Materials of Construction

The bottom head of the pressurizer is made of A-533 Gr.B CL.1 alloy steel with Alloy 600 cladding. The Alloy 600 heaters are J-groove welded to the internal cladding of the vessel lower head.

Joint Design/Stress Relieved

The heater penetrations are J-groove welded to the internal cladding of the vessel lower head. These welds were not stress relieved.

Palisades Susceptibility Group

Palisades operates with heaters in full-time service. This operating practice minimizes the thermal cycling effects on both the heaters and heater sleeves. The heater sleeves penetrations are classified as a Group I (high).

NRC Requested Information

(b) A description of the inspection program for Alloy 82/182/600 pressurizer penetrations and steam space piping connections that has been implemented at your plant. The description should include when the inspections were performed; the areas, penetrations and steam space piping connections inspected; the extent (percentage) of coverage achieved for each location which was inspected; the inspection methods used; the process used to resolve any inspection findings; the quality of the documentation of the inspections (e.g., written report, video record, photographs); and, the basis for concluding that your plant satisfies applicable regulatory requirements related to the integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections were found, indicate what followup NDE was performed to characterize flaws in the leaking penetrations.

NMC Response

(b) As described previously, in 1995, an Alloy 600 Program was developed and approved at the Palisades Nuclear Plant.

Prior to implementing the project plan for the 1995 refueling outage, Babcock and Wilcox Nuclear Technologies (BWNT) developed procedures and techniques for the detection and sizing of PWSCC in Alloy 600 components. In order to develop and qualify the ultrasonic examination procedures and techniques, non-destructive examination (NDE) mockups were designed and fabricated. The objective of the mockups was to demonstrate the capabilities of the NDE techniques, procedures and equipment. Successful demonstration of the NDE capabilities provided a high confidence level that PWSCC type flaws would be detected and accurately sized during the examinations.

Each of the Alloy 600 components that were scheduled to be ultrasonically examined at Palisades were evaluated to determine the extent of NDE mockups required to effectively demonstrate the examination technique capabilities. Mockup design included considerations for component geometry, examination limitations, component size (diameter and thickness) and flaw size. The shop welds had the weld crowns machined flush and the field welds were left in the as-welded condition to represent the field conditions to be encountered in the plant. A total of four mockups containing seven welds with 22 implanted thermal fatigue cracks, were used to demonstrate the automated examination technique capabilities. These mockups covered the more complex and difficult geometries to be examined.

Attachment 1 provides a table that shows when the inspections were performed, the areas inspected, the penetrations inspected, the extent of coverage, the inspection method used, and the quality of the documentation.

The following section describes the inspections performed to date of the 136 Alloy 600 pressurizer penetrations.

(1) One 3-inch ID X 6-inch OD PORV nozzle

Inspection History: In 1993, the safe-end developed a through-wall crack. The safe-end was repaired by removing the cracked weld and heat affected zone, rewelding the stainless steel PORV line to the safe-end, and performing code required examinations of the repair. In 1995, the PORV safe-end was replaced with a new type 316 stainless steel safe-end/spool piece. Alloy 690 was used for the attachment weld to eliminate PCS contact with Alloy 600 from the pressurizer PORV nozzle. Baseline examinations of the repair welds were performed in 1995 using ultrasonic (UT) and liquid penetrant (PT) methods with acceptable results. The safe-end welds are UT/PT examined once each ISI interval.

(1) 4-inch spray line nozzle

Inspection History: In 1993, the safe-end welds were inspected by PT and radiography (RT) with acceptable results. These welds were examined again in 1995 by UT/PT methods with acceptable results. The welds associated with the pressurizer spray line safe-end are UT examined every other refueling outage as required by a previous commitment to the NRC. These welds were examined in 1995, 1998 and 2001 with acceptable results.

(1) 12-inch surge line nozzle

Inspection History: In 1993, the safe-end welds were examined by UT-inter-granular stress corrosion cracking (IGSCC) techniques with acceptable results. These welds were examined again in 1995 by UT/PT methods with acceptable results. The safe-end welds associated with the pressurizer surge line safe-end are UT examined every other refueling outage as required by a previous commitment to the NRC. These welds were examined in 1996, 1999 and 2003 with acceptable results. In 2003, these welds were examined with performance demonstration initiative (PDI) qualified examiners and procedures.

(3) 3-inch ID X 6-inch OD safety nozzles

Inspection History: In 1993, Electric Power Research Institute (EPRI) qualified examiners inspected all three flanges by PT (internal and external), RT and UT. Two of the three pressurizer relief valve nozzle to flange welds were examined in 1995 by PT and UT techniques with acceptable results.

(8) 1-inch level nozzles, four upper and four lower

Inspection History: During the 1993 refueling outage, the upper level tap safe-ends were radiographed in addition to the external surface being examined by PT. No indications were found. The upper four level tap safe-ends received a bare metal visual examination in 1995 with acceptable results.

(2) 1-inch temperature element nozzle penetrations, one in the upper head and one in the lower shell

Inspection History: In 1993, the upper and lower nozzles were found to be leaking. Eddy current testing (ECT) was performed by Combustion Engineering to characterize the flaws on the upper temperature nozzle. The flaws in the upper nozzle were determined to be four axial crack indications emanating from inside the pressurizer with a length of approximately one-half inch. Axial PWSCC, in the heat-affected zone of the Alloy 600 nozzle, was found to be the root cause of this leakage in the upper temperature nozzle. The flaws in the lower temperature nozzle were not characterized due to the location of the nozzle. A pad weld repair was performed in both nozzle locations. The original pressure boundary, at the temperature nozzles, has been replaced by the weld pad configurations. A bare metal visual exam was performed in 1995 with acceptable results. A visual (VT-2) examination of the upper nozzle is performed each refueling outage, as required by a previous commitment to the NRC.

(120) Pressurizer heater penetrations

Inspection History: In 1993, a partial bare metal visual examination of the heater penetrations was performed, with the insulation removed from the surge line below the pressurizer allowing direct visual inspection of the center heater sleeve penetrations, with acceptable results.

The pressurizer is contained within the required inspection boundary for the ASME Section XI system leakage test required each refueling outage. This visual inspection is performed without the removal of insulation.

The process used to resolve inspection findings is in accordance with the Palisades' corrective action program. Any indications exceeding code acceptance criteria that cannot be resolved as non-relevant (e.g., UT geometric reflectors) are documented on an action request (AR).

The basis for concluding that the Palisades Nuclear Plant satisfies the applicable regulatory requirements related to the integrity of the pressurizer penetrations and steam space piping connections is based on the Palisades Nuclear Plant meeting all applicable requirements of the ASME Section XI Code. Additionally, by letter dated June 7, 1995, Palisades committed to augmented inspection requirements for NDE of the surge line, spray line and the temperature elements.

NRC Requested Information

(c) A description of the Alloy 82/182/600 pressurizer penetration and steam space piping connection inspection program that will be implemented at your plant during the next and subsequent refueling outages. The description should include the areas, penetrations and steam space piping connections to be inspected; the extent (percentage) of coverage to be achieved for each location; inspection methods to be used; qualification standards for the inspection methods and personnel; the process used to resolve any inspection indications; the inspection documentation to be generated; and the basis for concluding that your plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections are found, indicate what followup NDE will be performed to characterize flaws in the leaking penetrations. Provide your plans for expansion of the scope of NDE to be performed if circumferential flaws are found in any portion of the leaking pressurizer penetrations or steam space piping connections.

NMC Response

(c) In the next refueling outage and subsequent refueling outages, NMC will continue to implement the Alloy 600 Program as described in the response to question 1 (b), with the following additional requirements to the program:

NMC will perform inspections capable of detecting through-wall leakage from any pressurizer penetration or steam space piping connection for the Palisades Nuclear Plant. These examinations will be performed as follows:
A bare metal visual examination of 100 percent of all pressurizer heater sleeve locations will be performed in a manner that visual access to the bare metal 360 degrees around each sleeve can be attained. This examination will be conducted each refueling outage.

Non-destructive examination (NDE), capable of characterizing crack orientation of all sleeves for which visual inspection shows evidence of leakage, will be performed prior to any repair.

A bare metal visual inspection of all Alloy 82/182/600 primary system pressure boundary location normally operated at greater than or equal to 350 degrees Fahrenheit will be performed within the next two refueling outages. This is in accordance with the recommendations as outlined in MRP 2004-05, "Needed Action for Visual Inspection of Alloy 82/182 Butt Welds and Good Practice Recommendations for Weld Joint Configuration."

The personnel qualification standards for examination of Alloy 600 pressure boundary material and dissimilar metal weld connections at Palisades Nuclear Plant are described below:

Examination Method	Personnel Qualification Requirements
UT	Personnel are presently qualified in accordance with their employer's written practice. In accordance with 10 CFR 50.55a, personnel performance demonstrations will be through the EPRI/ PDI.
ECT PT Magnetic Particle (MT) RT Visual (VT-1, VT-2, VT-3)	Personnel are qualified in accordance with their employer's written practice, which meets the requirements of ASNT-SNT-TC-1A, 1984 edition and 1989 Edition of ASME Boiler and Pressure Vessel Code (B&PV), Section XI, IWA-2300.

As discussed previously, any indications exceeding code acceptance criteria that cannot be resolved as non-relevant (e.g., UT geometric reflectors) are documented on an AR generated in accordance with the sites' corrective action program.

Any indication of leakage or cracks will be evaluated and characterized prior to repair using a combination of surface and/or volumetric examinations. Characterization and evaluation of all surface and volumetric indications that exceed the allowable acceptance standards shall be completed and included in the ISI Record. If leakage is detected, it will be investigated and repaired as needed, in accordance with the current NMC repair/replacement program at Palisades including applicable codes and standards. When examinations performed in accordance with ASME Section XI reveal indications exceeding the acceptance standards, additional examinations, as required by the Code, shall be scheduled and completed.

NMC will notify the NRC immediately if the NDE defines the flaw as potential circumferential PWSCC in either the pressure boundary or non-pressure boundary portions of any locations covered under the scope of Bulletin 2004-01. An appropriate inspection plan will be developed which will define additional sleeves to be inspected by NDE, sufficient to determine the extent of condition commensurate with the characterization of the flaw.

The basis for concluding that the Palisades Nuclear Plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections is based on Palisades meeting all applicable requirements of the ASME Section XI Code, the augmented inspection requirements for NDE of the surge line, spray line and the temperature elements, as required by previous NRC commitments, and the new commitments to perform bare metal examinations, as outlined above.

NRC Requested Information

(d) In light of the information discussed in this bulletin and your understanding of the relevance of recent industry operating experience to your facility, explain why the inspection program identified in your response to item (1)(c) above is adequate for the purpose of maintaining the integrity of your facility's RCPB and for meeting all applicable regulatory requirements which pertain to your facility.

NMC Response

(d) NMC has concluded that the inspections and evaluations described above comply with the ASME BP&V Code, Section XI, as invoked by 10 CFR 50.55a. Palisades Technical Specifications require that the Inservice Inspection Program, which provides controls for inservice inspection of ASME Code Class 1, 2, and 3 systems and components, be established, implemented, and maintained.

NMC understands the relevance of the recent industry operating experience associated with Alloy 600. Palisades' Alloy 600 Program meets the ASME code inspection requirements. Meeting the code requirements, together with the augmented inspection requirements as previously committed to, and the new commitments to perform bare metal examinations, as outlined in (1)(c) above, is adequate for the purpose of maintaining the integrity of the Palisades Nuclear Plant primary coolant pressure boundary.

ATTACHMENT 1
BULLETIN 2004-01
PALISADES NUCLEAR POWER PLANT 60-DAY RESPONSE
ALLOY 600 PRESSURIZER PENETRATIONS AND STEAM SPACE PIPING

Area	Coverage Achieved	Examination Performed	Examination Method	Documentation*
PORV Nozzle to Safe-End and Safe-End to Pipe (Penetration 59)	100%	Each Refueling Outage	VT-2	Written Report
	100%	1993	External and Internal Liquid Penetrant and Radiography	
	100%	1995	Liquid Penetrant and Automated Ultrasonic	
Spray Elbow to Safe-End and Safe-End to Nozzle (Penetration 60)	100%	Each Refueling Outage	VT-2	Written Report
	100%	1993	Liquid Penetrant and Radiography	
	100%	1995	Liquid Penetrant and Automated Ultrasonic	
	100%	1998	Manual Ultrasonic	
	100%	2001	Liquid Penetrant and Manual Ultrasonic	
Surge Elbow to Safe-End and Safe-End to Elbow (Penetration 61)	100%	Each Refueling Outage	VT-2	Written Report
	100%	1993	Manual Ultrasonic using IGSCC Qualified Personnel	
	100%	1995	Liquid Penetrant and Automated Ultrasonic	
	100%	1996	Liquid Penetrant and Automated Ultrasonic	
	100%	1999	Liquid Penetrant and Manual Ultrasonic	
	100%	2003	Manual Ultrasonic using PDI Qualified Personnel	

*Documentation received from vendors is in accordance with ASME Section XI documentation requirements.

ATTACHMENT 1
BULLETIN 2004-01
PALISADES NUCLEAR POWER PLANT 60-DAY RESPONSE
ALLOY 600 PRESSURIZER PENETRATIONS AND STEAM SPACE PIPING

Area	Coverage Achieved	Examination Performed	Examination Method	Documentation*
Safety Valve Nozzle to Flange Weld (Penetration 62, 63 and 64)	100%	Each Refueling Outage	VT-2	Written Report
	100%	1993	External and Internal Liquid Penetrant, Radiography and Manual Ultrasonic using IGSCC Qualified Personnel	
Safety Valve Nozzle to Flange Weld (Penetration 62 and 64)	100%	1995	Liquid Penetrant and Automated Ultrasonic	Written Report
Upper and Lower Level Nozzles, Nozzle End to Safe-End (Penetrations 65 through 72)	100%	Each Refueling Outage	VT-2	Written Report
Upper Level Nozzles, Nozzle End to Safe-End (Penetrations 65 through 68)	100%	1993	Liquid penetrant and Radiography	Written Report
	100%	1995	VT-2 Bare Metal	
Heater Sleeves (Penetrations 73 through 192)	100%	Each Refueling Outage	VT-2	Written Report
	Partial	1993	VT-2 with partial insulation removal	

*Documentation received from vendors is in accordance with ASME Section XI documentation requirements.