U.S. NUCLEAR REGULATORY COMMISSION
REGION III

Docket No:	50-255
License No:	DPR-20
Report No:	50-255/96016(DRS)
Licensee:	Consumers Power Company 212 West Michigan Avenue Jackson, MI 49201
Facility:	Palisades Nuclear Generating Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	November 19-21, and December 16, 1996
Inspectors:	D. Jones, Reactor Inspector
Approved by:	W. J. Kropp, Chief, Engineering Branch 1 Division of Reactor Safety

Report Details

II. Maintenance

M3 Maintenance Procedures and Documentation

M3.1 Inservice Inspection (ISI)

a. Inspection Scope (73753, 73051, 73052, 73755)

The inspector reviewed and evaluated the ISI program, procedures, ISI personnel certifications, and ISI data taken during the 1996 refueling outage for compliance with technical specifications, ASME Code, ASNT SNT-TC-1A, "Nondestructive Testing Personnel Qualification and Certification," and NRC requirements.

b. Observations and Findings

The inspector's review of the ISI program concluded that it met the ASME Code Section V, 1989 Edition. The ISI plan was well organized with augmented inspections of applicable welds scheduled and distinguished by separate, well defined inspection categories based on the requirement source.

Review of the licensee's inspection program, procedures, analysis guidelines, examiners certifications, and graphics and inspection data concluded that the licensee's steam generator (SG) performance was good and the inspection program was conservative. The program utilized state-of-the-art equipment and inspection techniques including the Westinghouse TC 6700 remote data acquisition unit (RDAU) controlled by the Westinghouse ANSER acquisition software.

The NRC inspector observed portions of SG eddy current testing. Testing was performed in accordance with commitments to Generic Letter 95-03. Although an inspection sample of only 3% of the tubes was required, the licensee inspected 20% of the tubes. The sample was expanded in the "A" steam generator to include 100% of the tubes in rows 1 and 2 to the top of the U-bend, and 100% of the top of the tubesheet area using the motorized rotating pancake coil (MRPC) plus point probe. The twenty-percent sample using the bobbin coil found no pluggable indications, however the MRPC examination using the plus point probe found four indications in SG "A", two axial crack indications and two volumetric indications, which were plugged.

Engineering analysis, performed by Westinghouse, of the two axial cracking indications demonstrated past structural integrity. The engineering structural integrity analysis report concluded that the burst pressures at the two axial cracking indications would be greater than five times the normal operating differential pressure.

In addition, the steam generators were subjected to sludge lancing and a visual examination of the tubesheet area. The inspector reviewed the video tape of the removal operation of a small piece of foreign material

(similar in size to a wire tie) from the "A" SG. The licensee determined that the material was from a flexitallic gasket used on the flange-to-flange joint on the main steam lines.

c. Conclusions

The ISI program complied with NRC and ASME Code requirements and no violations or deviations were identified. The inspector considered the ISI plan particularly well organized and documented. The use of "state of the art" equipment to perform eddy current examinations for the Inservice Inspection Program demonstrated an important element of a quality program. The steam generator eddy current inspection program was conservative with a positive management oversight.

M3.1 Inservice Inspection (Inconel Alloy 600 components)

a. Inspection Scope (73753, 73051, 73052, 73755)

The inspector reviewed and evaluated the Inconel Alloy 600 ISI program, procedures, ISI personnel certifications, and ISI data taken during the 1996 refueling outage for compliance with technical specifications, ASME Code, SNT-TC-1A and NRC requirements.

b. Observations and Findings

ISI procedures used in support of the Alloy 600 Project Plan were reviewed by the NRC inspectors. The ISI procedures were found to be acceptable and in accordance with ASME Section V, 1989 Edition as modified by requirements of the Alloy 600 Inspection Specification, Revision 0. The inspector reviewed qualifications and certifications of all licensee personnel performing ISI, verifying conformance with the licensee's Alloy 600 specification Revision 0 requirements.

The engineering department's performance of the Alloy 600 project was excellent. The licensee's use of mockups to demonstrate and qualify nondestructive examination techniques, including automated data acquisition using optimized angles and transducers for dissimilar metal welds, was a strength. The licensee qualified the techniques under the EPRI performance demonstration initiative (PDI), although the PDI was only required for similar metal welds. Also, the ALARA goal for the Alloy 600 project was set at 30% of the last Alloy 600 inspection dose, which was unexpectedly high. At the end of the inspections, the licensee was well within the goal with a total dose of 75% of the projected dose.

The licensee's Alloy 600 Project Plan, represented a sound technical approach to managing primary water stress corrosion cracking (PWSCC) in Inconel Alloy 600 materials within the primary coolant system (PCS). The nondestructive testing (NDE) techniques and acceptance criteria used were reasonable and consistent with analysis and industry practices. The NDE inspections completed this outage assured components in the most susceptible category, Group I, and the more susceptible components category, Group II, received ultrasonic (UT) or dye penetrant (PT) and visual inspection (VT). All identified Alloy 600 locations in the PCS

received a visual inspection as a minimum. No PWSCC was found during inspections performed this outage.

The Alloy 600 plan included, as one of several goals, the development of an inspection program to identify and to characterize PWSCC in Inconel Alloy 600 components. Toward this goal, the plan identified 251 Inconel Alloy components potentially susceptible to PWSCC in the plant. These components were grouped into three levels of inspection priority based on susceptibility to PWSCC, consequence of failure, detectability and ALARA considerations.

During this outage, all planned inspections were completed. During the last outage the original scope of planned inspections was reduced to save total project radiation dose expenditure. However, the completed inspections covered all Inconel Alloy 600 components listed as the highest priority (group I) in the plan. The licensee will perform the lower priority inspection categories listed in the original plan, which were deleted during the last outage, over the 10-year inspection interval.

The following observations were noted as strengths associated with the planned inspection of Inconel Alloy 600 components:

- During the last outage, an unidentified flow diverter plate in the pressurizer spray line prevented a planned I.D. penetrant inspection (I.D. PT) on the pressurizer spray safe end. However, during this outage an external UT and PT was performed in lieu of the I.D. PT;

- To address the possibility of exterior fatigue cracking, the licensee used PT inspections on outside surfaces of components to augment the UT or VT performed;

- The ALARA planning effort resulted in a significant radiation dose reduction associated with planned inspection activities at approximately 23% of the last Alloy 600 inspection dose;

- The use of mockups, EPRI PDI qualified NDE techniques, and scanning equipment designed and built specifically for Palisades components.

c. Conclusions

The Engineering Department's planning and implementation of the Alloy 600 project was observed to be positive. The UT and PT examination data reviewed was found to be in accordance with the applicable ISI procedures and the Alloy 600 Specification, Revision 0.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Inspector Review of Updated Safety Analysis Report (UFSAR)

While performing the inspections discussed in this report, the inspector reviewed UFSAR sections:

1.6 Inservice Inspection
4.3 Primary Coolant System-System Design and Operation
4.5 Primary Coolant System-Tests and Inspections
6.9 Inservice Inspection of Class 1, 2 and 3 Components

The inspector did not identify any UFSAR discrepancies as a result of this special review.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management during an exit meeting on November 21, 1996. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

*J. Beer, Health Physics Support Supervisor
*D. Fadel, Systems Engineering Manager
*J. Ford, Systems Engineering Supervisor
*T. Fouty, Senior Technical Analyst
*B. Gerling, Design Engineering Deputy Manager
*K. Powers, General Services Manager
*T. Rexius, Technical Analyst
*B. Roberts, Licensing
*B. Vincent, Licensing Supervisor
*F. Yanik, NPAD

U.S. NRC

*M. Parker, Senior Resident Inspector, Palisades
*W. Kropp, Chief, Engineering Specialists Branch 1, DRS

Westinghouse

B. Pollice, Eddy Current Coordinator

*Present at exit meeting on November 21, 1996.

INSPECTION PROCEDURES USED

IP 73051:	Inservice Inspection - Review of Program
IP 73052:	Inservice Inspection - Review of Procedures
IP 73753:	Inservice Inspection
IP 73755:	Inservice Inspection - Data Review and Evaluation

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
PWR	Pressurized Water Reactor Plant
CPCO	Consumers Power Company
DRS	Division of Reactor Safety
EPRI	Electric Power Research Institute
GL	Generic Letter
ID	Inside Diameter
IR	Inspection Report
ISI	Inservice Inspection
MRPC	Motorized Rotating Pancake Coil
NDE	Non-destructive Examination
NRC	Nuclear Regulatory Commission
UT	Ultrasonic Testing
PCS	Primary Coolant System
PDI	Performance Demonstration Initiative
PDR	NRC Public Document Room
PT	Dye Penetrant Test
PWSCC	Primary Water Stress Corrosion Cracking
RDAU	Remote Data Acquisition Unit
RT	Radiographic Testing
SG	Steam Generator
UFSAR	Updated Final Safety Analysis Report
VT	Visual Testing