December 5, 1990

Docket No. 50-315

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Mr. Milton P. Alexich, Vice President
Indiana Michigan Power Company
c/o American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43216

Dear Mr. Alexich:

SUBJECT: AMENDMENT NO.151 TO FACILITY OPERATING LICENSE NOS. DPR-58 (TAC NO. 77109)

The Commission has issued the enclosed Amendment No. to Facility Operating License No. DPR-58 for the Donald C. Cook Nuclear Plant, Unit No. 1. The amendment consists of changes to the Technical Specifications in response to your application dated June 27, 1990, and supplemented by letter October 9, 1990.

This amendment permits the use of approved sleeves to repair defective steam generator tubes.

A copy of our Safety Evaluation and Notice of Issuance are enclosed. The Notice of Issuance has been forwarded to the Office of the Federal Register for publication.

Sincerely,

original signed by:

Timothy Colburn, Senior Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No.151 to DPR-58
2. Safety Evaluation
3. Notice of Issuance

cc w/enclosures:
See next page

LA/PD31:DRSP	PM/PD31:DRSP	D/PD31:DRSP	OGC
SMeador	TColburn/tg	RPierson	
11/16/90	11/16/90	11/16/90	11/20/90

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

December 5, 1990

Docket No. 50-315

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Indiana Michigan Power Company
c/o American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43216

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Project Directorate III-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

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cc w/enclosures:
See next page

Mr. Milton Alexich
Indiana Michigan Power Company

Donald C. Cook Nuclear Plant

cc:

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Mayor, City of Bridgman
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Special Assistant to the Governor
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Monitoring Section Office
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Department of Public Health
3500 N. Logan Street
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Lansing, Michigan 48909

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-315

DONALD C. COOK NUCLEAR PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 151
License No. DPR-58

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Indiana Michigan Power Company (the licensee) dated June 27, 1990 and supplemented October 9, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-58 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 151, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

For
L. B. Marsh, Director
Project Directorate III-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 5, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 151

FACILITY OPERATING LICENSE NO. DPR-58

DOCKET NO. 50-315

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
3/4 4-8	3/4 4-8
3/4 4-10	3/4 4-10
3/4 4-11	3/4 4-11
3/4 4-13	3/4 4-13
B3/4 4-2a	B3/4 4-2a
B3/4 4-3	B3/4 4-3

SURVEILLANCE REQUIREMENTS (Continued)

1. All tubes that previously had detectable wall penetrations (greater than or equal to 20%) that have not been plugged or repaired by sleeving in the affected area.

2. Tubes in those areas where experience has indicated potential problems.

3. A tube inspection (pursuant to Specification 4.4.5.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

c. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to a partial tube inspection provided:

1. The tubes selected for the samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.

2. The inspections include those portions of the tubes where imperfections were previously found.

The results of each sample inspection shall be classified into one of the following three categories:

Category	Inspection Results
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

Note: In all inspections, previously degraded tubes must exhibit significant (greater than or equal to 10%) further wall penetrations to be included in the above percentage calculations.

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.4 Acceptance Criteria

a. As used in this Specification:

1. Imperfection means an exception to the dimensions, finish or contour of a tube or sleeve from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal wall thickness, if detectable, may be considered as imperfections.

2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube or sleeve.

3. Degraded Tube or Sleeve means an imperfection greater than or equal to 20% of the nominal wall thickness caused by degradation.

4. Percent Degradation means the amount of the wall thickness affected or removed by degradation.

5. Defect means an imperfection of such severity that it exceeds the repair limit.

6. Repair/Plugging Limit means the imperfection depth at or beyond which the tube or sleeved tube shall be repaired or removed from service. Any tube which, upon inspection, exhibits tube wall degradation of 40 percent or more of the nominal tube wall thickness shall be plugged or repaired prior to returning the steam generator to service. Any sleeve which, upon inspection, exhibits wall degradation of 29 percent or more of the nominal wall thickness shall be plugged prior to returning the steam generator to service. In addition, any sleeve exhibiting any measurable wall loss in sleeve expansion transition or weld zones shall be plugged.

7. Unserviceable describes the condition of a tube or sleeve if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3.c, above.

8. Inspection determines the condition of the steam generator tube or sleeve from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg.

9. Sleeving a tube is permitted only in areas where the sleeve spans the tubesheet area and whose lower joint is at the primary fluid tubesheet face.

SURVEILLANCE REQUIREMENTS (Continued)

b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plugging or sleeving all tubes exceeding the repair limit and all tubes containing through-wall cracks) required by Table 4.4-2.

c. Steam generator tube repairs may be made in accordance with the methods described in either WCAP-12623 or CEN-313-P.

4.4.5.5 Reports

a. Following each inservice inspection of steam generator tubes, if there are any tubes requiring plugging or sleeving, the number of tubes plugged or sleeved in each steam generator shall be reported to the Commission within 15 days.

b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which this inspection was completed. This report shall include:

1. Number and extent of tubes inspected.

2. Location and percent of wall-thickness penetration for each indication of an imperfection.

3. Identification of tubes plugged or sleeved.

c. Results of steam generator tube inspections which fall into Category C-3 and require prompt notification of the Commission shall be reported pursuant to Specification 6.9.1 prior to resumption of plant operation. The written followup of this report shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

TABLE 4.4-2
STEAM GENERATOR TUBE INSPECTION

	1ST SAMPLE INSPECTION		2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug or sleeve defective tubes and inspect additional 2S tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug or sleeve defective tubes and inspect additional 4S tubes in this S.G.	C-1 C-2	None Plug or sleeve defective tubes
					C-3	Perform action for C-3 result of first sample
			C-3	Perform action for C-3 result of first sample	N/A	N/A
	C-3	Inspect all tubes in this S.G., plug or sleeve defective tubes, and inspect 2S tubes in each other S.G.	All other S.G.s are C-1	None	N/A	N/A
			Some S.G.s C-2 but no additional S.G. are C-3	Perform action for C-2 result of second sample	N/A	N/A
		Prompt notification to NRC pursuant to specification 6.9.1				
			Additional S.G. is C-3	Inspect all tubes in each S.G. and plug or sleeve defective tubes. Prompt notification to NRC pursuant to specification 6.9.1	N/A	N/A

S = 3 (N/n)% Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection

3/4.4.5 STEAM GENERATORS TUBE INTEGRITY

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these parameter limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged or sleeved. A steam generator while undergoing crevice flushing in Mode 4 is available for decay heat removal and is operable/operating upon reinstatement of auxiliary or main feed flow control and steam control.

Wastage-type defects are unlikely with the all volatile treatment (AVT) of secondary coolant. However, even if a defect of similar type should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging or sleeving will be required for all tubes with imperfections exceeding the repair limit which is defined in Specification 4.4.5.4.a. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be promptly reported to the Commission pursuant to Specification 6.9.1 prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

Degraded steam generator tubes may be repaired by the installation of sleeves which span the section of degraded steam generator tubing. A steam generator tube with a sleeve installed meets the structural requirements of tubes which are not degraded.

To determine the basis for the sleeve plugging limit, the minimum sleeve wall thickness was calculated in accordance with Draft Regulatory Guide 1.121 (August 1976). In addition, a combined allowance of 20 percent of wall thickness is assumed for eddy current testing inaccuracies and continued operational degradation per Draft Regulatory Guide 1.121 (August 1976).

The following sleeve designs have been found acceptable by the NRC staff:

1. Westinghouse Mechanical Sleeves (WCAP-12623)
2. Combustion Engineering Leak Tight Sleeves (CEN-313-P)

Descriptions of other future sleeve designs shall be submitted to the NRC for review and approval in accordance with 10CFR50.90 prior to their use in the repair of degraded steam generator tubes. The submittals related to other sleeve designs shall be made at least 90 days prior to use.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

3/4.4.6.2 OPERATIONAL LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 gpm. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitations provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The CONTROLLED LEAKAGE limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 52 GPM. This limitation is based on the maximum seal injection flow capability of the Reactor Coolant Pumps and ensures a maximum safety injection flow assumed in the accident analysis.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. DPR-58

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT NO. 1

DOCKET NO. 50-315

1.0 INTRODUCTION

By letter dated June 27, 1990, Indiana Michigan Power Company (the licensee) submitted a license amendment request to obtain authorization to use steam generator sleeves to repair defective steam generator tubes. A response to additional staff questions was subsequently submitted on October 9, 1990. The Technical Specifications currently require that all defective tubes be plugged. Sleeving has been demonstrated to be a safe and effective method of repair for certain types of defects. Use of sleeve repairs will reduce the number of steam generator tubes that must be removed from service and plugged.

The licensee has stated that they have no specific plan for steam generator tube sleeving. They further stated that the results of a complete steam generator inspection to be performed in late 1990 may make sleeving a desirable alternative to plugging.

2.0 BACKGROUND

The steam generator sleeving program at Cook Nuclear Plant Unit 1 would involve the installation of thermally treated Inconel 690 sleeves primarily in the hot leg of the steam generators. The steam generator tubes to be sleeved are the tubes where tube degradation in the tubesheet and just above the top of the tubesheet has exceeded the plant technical specification plugging limit. Also, tubes for which such a level of degradation is possible in the future may be sleeved in anticipation of such degradation. The sleeves will span from the bottom of the tube projecting out of the tubesheet to a point above the secondary face of the tubesheet. The sleeves to be used in the sleeving process are long enough to span the degraded areas of the tubing in the tubesheet region on either the hot or cold legs. The sleeve is secured in the tube by mechanical or welded joints at the top and the bottom of the sleeve.

To maintain tube integrity, allowable levels of tube wall degradation, referred to as "plugging limits," are established. Tubes which have eddy current indications of degradation in excess of the plugging limits must be repaired or plugged. Tubes to be sleeved are determined by the results and trends of eddy current test (ECT) indications. Tooling access, i.e., location of the tube within the tubesheet, is also considered in determining whether a tube is to be sleeved.

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3.0 DISCUSSION

The licensee stated that a variety of tube sleeving designs had been reviewed and two designs were selected for potential use at Cook Nuclear Plant Unit 1. Reports that describe these sleeving designs and provide the technical and safety evaluations to support their use were provided as follows:

> WCAP-12623, "D.C. Cook Unit 1 Steam Generator Sleeving Report (Mechanical Sleeves)," Westinghouse Electric Corporation.
>
> CEN-313-P, "D. C. Cook Unit 1 Steam Generator Tube Repair Using Leak Tight Sleeves," Combustion Engineering, Incorporated.

These reports provide a description of the analysis and testing performed to demonstrate the acceptability of these designs. In the reports, mechanical strength, corrosion resistance, installation methods, and inservice inspection techniques are described.

For each described sleeving process, analytical verification was performed using design and operating transient parameters selected to envelope loads imposed during normal operating, upset and accident conditions. Fatigue and stress analysis of sleeved tube assemblies were completed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III. The results of the qualification testing, analyses and plant operating experience was cited to demonstrate that each sleeving process is an acceptable means of maintaining steam generator tube integrity. The sleeve assemblies can be inspected by current techniques in accordance with Regulatory Guide (RG) 1.83 recommendations.

The function of the sleeve is to restore the integrity of the tube pressure boundary. The sleeves have been shown not to be subject to stress levels in excess of allowable limits for normal and postulated accident loading conditions. The sleeves have been designed and analyzed in accordance with the applicable sections of the ASME Boiler and Pressure Vessel Code. To determine the basis for the sleeve plugging limits, the minimum wall thickness of each of the sleeve designs was calculated in accordance with RG 1.121.

The material of construction of the sleeves will be nickel alloy 690. The staff has found that the use of Inconel 690 thermally treated (TT) sleeves is an improvement over the Inconel 600 material used in the original steam generator tubing. Corrosion tests conducted under the Electric Power Research Institute (EPRI) sponsorship confirm test results regarding the improved corrosion resistance of Inconel 690 TT over that of Inconel 600. Accelerated stress corrosion tests in caustic and chloride aqueous solutions have also indicated that Inconel 690 TT resists general corrosion in aggressive environments. Isothermal tests in high purity water have shown that, at normal stress levels, Inconel 690 TT has high resistance to intergranular stress corrosion cracking in extended high temperature exposure. EPRI concluded as a result of these laboratory corrosion tests, that Inconel 690 TT material could be used for PWR steam generator tubing with all volatile treatment secondary water systems. Inconel 690 is a Code approved material (ASME SB-163), covered by

ASME Code Case N-20, and is acceptable to NRC under RG 1.85 (Rev. 24, July 1986). The NRC staff has approved use of Inconel 690 TT tubing in replacement steam generators as well as previous sleeving applications.

3.1 Evaluation of Westinghouse Sleeves

The Westinghouse steam generator sleeving program involves the installation of thermally treated alloy 690 sleeves in both the hot and cold legs of the steam generators. The steam generator tubes to be sleeved are the tubes in which tube degradation within the tubesheet and just above the top of the tubesheet has exceeded the Technical Specification plugging limit of 40 percent of the nominal tube wall thickness. Also, tubes in which such a level of degradation is possible in the future may be sleeved in anticipation of such degradation. The sleeves span from the end of the tube, at the bottom surface of the tubesheet, to a point above the secondary side of the tubesheet. The sleeves to be used in the sleeving process are long enough in length to span the degraded areas of the tubing in the tube sheet region in either the hot or cold legs. The sleeve is secured in the tube by mechanical joints at the top and bottom of the sleeve. Tooling access, i.e., location of the tube within the tube sheet, is considered in determining tubes to be sleeved. The Code of Federal Regulations, 10 CFR 50.55a, requires that components which are a part of the primary pressure boundary be built to the requirements of Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Section 5.2.1.1 of the Standard Review Plan (SRP) (NUREG-0800), entitled "Compliance with the Codes and Standards Rule, 10 CFR 50.55a", addresses evaluations to be done by the NRC staff of the standards used. Any modifications, repair or replacement of these components must also meet the requirements of the Code to assure that the basis on which the unit was evaluated is unchanged. RG 1.121, "Basis for Plugging Degraded PWR Steam Generator Tubes," is used as the basis to determine the sleeve plugging limit. RG 1.83, "Inservice Inspection of Pressurizer Water Reactor Steam Generator Tubes," is used as the basis to determine the inspection requirements for the sleeve.

The sleeve design and installation process has been qualified through laboratory testing and actual field performance. Analytical verification has been performed using design and operating transient parameters selected to envelope all loads. Fatigue and stress analyses of sleeved tube assemblies have been completed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III. The results of the qualification testing, analyses, and plant operating experience have been used to demonstrate that the sleeving process is an acceptable means of maintaining steam generator tube integrity.

The function of the sleeve is to restore the integrity of the tube pressure boundary in the region between the sleeve joints. The sleeve has been designed and analyzed in accordance with the applicable sections of the ASME Boiler and Pressure Vessel Code including the implicit safety factors. The sleeve has been shown not to have stress levels in excess of appropriate limits for normal and postulated accident loading conditions for the analytical case of a complete guillotine break in that portion of the tube between the joints. To determine the basis for the sleeve plugging limits, the minimum wall thickness was calculated in accordance with the recommendations of

RG 1.121. Use of the ASME Code and RG 1.121 for the design and evaluation of the sleeves provides the basis for acceptance. Margins of safety are provided by the safety factors and assumptions in the ASME Code and RG 1.121.

3.2 EVALUATION OF COMBUSTION ENGINEERING SLEEVES

The CEN-313-P report describes the Combustion Engineering, Inc. sleeve design and installation processes, the analytical methods, laboratory testing programs and results that were used to verify the adequacy of their sleeving methodology for sleeving degraded or defective steam generator tubes. The sleeve dimensions, materials, and joints were designed to the applicable ASME Boiler and Pressure Vessel Code. An extensive analysis and test program was undertaken to prove the adequacy of the welded sleeve. This program determined the effect of normal operating and postulated accident conditions on the sleeve-tube assembly, as well as the adequacy of the assembly to perform its intended function. Design criteria were established prior to performing the analysis and test program which, if met, would prove that the welded sleeve is an acceptable repair technique. Based upon the results of the analytical and test programs, the welded sleeve fulfills its intended function as a leak tight structural member and meets or exceeds all the established design and operating criteria.

In as much as each sleeve is welded at both ends to each tube being sleeved, this process is considered to provide a leak tight repair. Essentially the process consists of cleaning the tube to be sleeved at the areas of the welds, insertion of the sleeve, expansion in the upper weld area, welding and inspection.

The installation of welded tube sleeves will be performed in a manner consistent with the applicable standards, will preserve the existing design bases, and will not adversely impact any plant systems. The design, installation and inspection of the welded sleeve will be done in accordance with ASME Boiler and Pressure Vessel Code criteria. By adherence to industry standards, the pressure boundary integrity will be preserved.

Three types of nondestructive examinations are used during the sleeving process. They are as follows: eddy current testing (ECT), ultrasonic testing (UT), and visual examination.

A dual cross wound probe and bobbin probe using the multifrequency eddy current method will be used to perform a baseline inspection of the installed sleeve for future reference. The ECT fixture is used on a manipulator arm to position the probe.

Ultrasonic testing using an immersion technique with demineralized water as a couplant is used to inspect the upper tube to sleeve weld. A transducer is positioned in the weld area and is rotated with an electric motor to scan the weld. The pulse echo tester has the ability to interface with an on-line data reduction computer to produce a display/hardcopy during radial and axial scanning.

An eddy current test has been qualified for the inspection of installed welded sleeves to detect flaws in the pressure boundary. Eddy currents circulating in the sleeve and steam generator tube are interrupted by the presence of flaws in the material which results in a change in test coil impedance. This impedance change is processed and displayed on the test instrument to indicate the presence of a flaw.

The pressure boundary is considered to be the sleeve up to and including the upper weld joint and the steam generator tube above the weld. Consequently, there are the three distinct regions relative to the inspection methods: (1) the sleeve below the weld, (2) the steam generator tube behind the top section of the sleeve (above the weld), and (3) the steam generator tube above the sleeve.

Using specialized probes and multifrequency eddy current techniques, it has been demonstrated that a 40 percent through wall defect (ASME calibration standard) is detectable anywhere in the tube behind the sleeve and above the weld. These techniques are also capable of detecting and sizing a 40 percent through wall flaw (ASME calibration standard) in the weld region. These inspection capabilities are documented in the Combustion Engineering Report CEN-313-P. The basis for the plugging limit of 40 percent is acceptable.

Visual examinations can be performed on the upper welds to support UT results and are performed on the lower welds to determine their integrity and acceptance. The welds are examined using a borescope examination system. The lighting is supplied as an integral part of the visual examination system. Each examination is recorded on video tape for optional later viewing and to provide a permanent record of each weld's condition.

The inspections are performed to ascertain the mechanical and structural condition of each weld. Critical conditions which are checked include weld width and completeness and the absence of visibly noticeable indications such as cracks, pits, blow holes, and burn through.

A post weld heat treatment (PWHT) has been developed that has been shown to increase the resistance of the welded joint in the Inconel 600 to stress corrosion cracking. The licensee has estimated that their steam generator tubes are not in a highly susceptible category and should complete the planned life of the plant (20-30 EFPY) without cracking in view of the reduction in hot leg temperature initiated in 1989. They also cite that welded sleeves without PWHT have been in service, with NRC approval, at Zion (1980), Ginna (1987) and Prairie Island (1988) without detected cracking to date. The staff strongly recommended the use of PWHT, but since there have been no reports of inservice problems, has accepted the licensee's position, in view of the commitment to inspection techniques which will incorporate state-of-the-art improvements as they are developed, verified and commercially available.

Based upon the review and evaluation of the information and data presented in WCAP 12623, "D.C. Cook Unit 1 Steam Generator Sleeving Report (Mechanical Sleeves)" and CEN-313-P "D.C. Cook Unit 1 Steam Generator Tube Repair Using Leak Tight Sleeves," the staff has concluded that the request by proposed amendment request to permit repair of steam generator tubes by installation of sleeves using the Westinghouse and Combustion Engineering, Inc. methodologies is acceptable. The staff concludes that the proposed sleeving repairs can be accomplished to produce a sleeved tube of acceptable metallurgical properties, strength, and mechanical stability, leak tightness and corrosion resistance. We also find that the pre-service integrity of the sleeved tubes can be assured by implementing the proposed sleeve installation examinations.

4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35 an environmental assessment and finding of no significant impact has been prepared and published in the Federal Register on December 4, 1990 (55 FR 50063). Accordingly, based upon the environmental assessment, the Commission has determined that the issuance of this amendment will not have a significant effect on the quality of the human environment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: December 5, 1990

Principal Contributor: H. Conrad

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

INDIANA MICHIGAN POWER COMPANY

DOCKET NO. 50-315

NOTICE OF ISSUANCE OF AMENDMENT TO

FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (Commission) has issued Amendment No. 151 to Facility Operating License No. DPR-58, issued to the Indiana Michigan Power Company, (the licensee), which revised the Technical Specifications (TS) for operation of the Donald C. Cook Nuclear Plant, Unit No. 1, located in Berrien County, Michigan. The amendment is effective as of the date of issuance.

The amendment permits the use of approved sleeves to repair defective steam generator tubes. The TS previously required that all defective tubes be plugged and removed from service.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment.

Notice of Consideration of Issuance of Amendment and Opportunity for Hearing in connection with this action was published in the FEDERAL REGISTER on October 19, 1990 (55 FR 42526). No request for a hearing or petition for leave to intervene was filed following this notice.

The Commission has prepared an Environmental Assessment related to the action and has determined not to prepare an environmental impact statement.

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Based upon the environmental assessment, the Commission has concluded that the issuance of this amendment will not have a significant effect on the quality of the human environment.

For further details with respect to the action see (1) the application for amendment dated June 27, 1990 and supplemented by letter dated October 9, 1990, (2) Amendment No. 151 to License No. DPR-58, (3) the Commission's related Safety Evaluation, and (4) the Commission's Environmental Assessment. All of these items are available for public inspection at the Commission's Public Document Room, the Gelman Building, 2120 L Street, N.W., Washington, D.C., 20555 and at the Maude Preston Palenske Memorial Library, 500 Market Street, St. Joseph, Michigan 49085. A copy of items (2), (3) and (4) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Reactor Projects III/IV/V.

Dated at Rockville, Maryland this 5th day of December 1990.

FOR THE NUCLEAR REGULATORY COMMISSION

Timothy G. Colburn

Timothy G. Colburn, Senior Project Manager
Project Directorate III-1
Division of Reactor Projects III/IV/V
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