

U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION I

RO Inspection Report No: 50-219/74-12 Docket No: 50-219
Licensee: Jersey Central Power and Light License No: DPR-16
Oyster Creek Priority: _____
Parsippany, New Jersey Category: C
Location: Forked River, New Jersey

Type of Licensee: BWR MW(e) 640
Type of Inspection: Announced, Special
Dates of Inspection: June 6, 7, 17, 22, July 11, 1974
Dates of Previous Inspection: _____

Reporting Inspector: G. A. Walton 7/18/74
G. A. Walton, Reactor Inspector Date

Project Inspectors: E. Greenman 7/18/74
E. Greenman, Reactor Inspector Date

Date

Date

Date

Other Accompanying Personnel: NONE _____
Date

Reviewed By: J. H. Tillou 7-18-74
J. H. Tillou, Senior Reactor Inspector Date

8/4/74

SUMMARY OF FINDINGS

Enforcement Action

None

Licensee Action on Previously Identified Enforcement Items

Not inspected during this inspection.

Design Changes

None

Unusual Occurrences

None Identified

Other Significant Findings

A. Current Findings

1. The inspector reviewed the history of leaking in-core 28-05. No deficiencies were identified. (Details, Paragraph 3)
2. The inspector's review of the licensee's proposed evaluation to determine location and extent of leak in the area of in-core 28-05 revealed no apparent discrepancy. (Details, Paragraph 4)
3. Licensee's method for fix of leaking in-core 28-05 is detailed in report dated June 17, 1974 from licensee to Directorate of Licensing. Lead responsibility was transferred from RO:I to Licensing. (Details, Paragraph 5)
4. The inspector reviewed the ultrasonic inspection results of test performed on in-core 28-05. The raw data presented to the inspector appears to conflict with a statement in the report to Licensing regarding the evaluation results of the ultrasonic inspection. The licensee informed the inspector a formal evaluation is being performed by the inspection contractor. This is an open item. (Details, Paragraph 6)
5. The inspector reviewed the eddy current inspection results of test performed on in-core 28-05. The raw data presented to the inspector appears to conflict with a statement in the report to Licensing regarding the evaluation results, of the

eddy current inspection. The licensee informed the inspector a formal evaluation is being performed by the inspection contractor. This is an open item. (Details, Paragraph 7)

6. The inspector reviewed the helium leak test results performed on in-core 28-05. No discrepancies were noted. (Details, Paragraph 8)
7. The inspector reviewed the data available on the results of the tube expansion on test mockups. This included a direct observation by the inspector. No discrepancies were noted. (Details, Paragraph 9)
8. The inspector reviewed the data of the rolling process for sealing the leak in in-core 28-05. No discrepancies were noted. (Details, Paragraph 10)
9. The inspector witnessed the leak test and noted no weepage in the area of in-core penetration 28-05. The leak test was conducted at a pressure of 850/865 and a temperature of 155°F. The inspector reviewed the data available for NDE of the tube after the rolling process was completed. No discrepancies were noted. (Details, Paragraph 11)

B. Status of Previously Identified Unresolved Items

1. The inspector discussed the NDE applied on CRD housing 18-47. An ultrasonic test was performed on the CRD housing to stub tube field weld. The inspector noted no inspection could be performed on the head to housing "J groove weld". No discrepancies were identified. This clears open item in RO Report 50-219/74-10. (Details, Paragraph 12)

Management Interview

A management meeting was held on July 11, 1974 at the plant site in Forked River, New Jersey, attended by the following:

Jersey Central Power and Light Company

D. Ross, (Telephone) Manager of Nuclear Generating Stations
D. Reeves, Chief Engineer

Items discussed are summarized below:

The inspector stated this inspection was a continuation inspection to previous visits by the inspector on June 6, 7, 17, 21 and 22, 1974 and one report would cover all inspections.

The inspector stated that the scope of his inspection was primarily limited to the repair of leaking in-core tube 28-05.

The inspector stated there appears to be a conflict regarding the raw data reviewed by the inspector versus the evaluation results presented to Licensing for eddy current and ultrasonic test results.

The licensee noted this comment and states the completed evaluation would be made available for review. The inspector stated these would be carried as open items.

DETAILS

1. Persons Contacted

Jersey Central Power and Light

Joe Carroll
Don Reeves
John Sullivan

General Electric

Ed Finney

2. General

An inspection was made of the repair program used to seal the primary coolant leak at in-core tube location 28-05 located in the bottom head of the reactor vessel. The first inspection was conducted by the inspector June 6, 7, 1974. Followup inspections were performed June 17, 21 and 22. The exit interview was conducted July 11, 1974.

3. History of Leaking In-Core 28-05

As reported in Amendments 29, 35, 37 and 40, the reactor vessel lower head was repaired in 1968 to eliminate any furnace sensitized stainless steel which could be exposed to the reactor coolant, and to correct weld defects found in the field welds between the control rod drive housings and the stub tubes, and also between the in-core housings and the lower head. The records reveal the in-core field weld on 28-05 was liquid penetrant acceptable on the first inspection, however subsequent surface preparation for cosmetic reasons was performed and re-liquid penetrant inspection revealed a linear 1/16 inches indication located in the field weld. The records indicate the indication was removed.

On May 28, 1974 during refueling outage the reactor vessel was subjected to an 850 psi pressure test at 164°F. A visual inspection performed by the licensee while at 850 psi pressure revealed a measurable leakage of approximately 0.02 gallons per minute in the areas of in-core instrumentation tube 28-05. In addition a small amount of light colored deposit similar in appearance to that found

at in-core penetration 28-05 was observed around the periphery of CRD penetration 18-47. The amount of deposit was much less than in the case of in-core 28-05. The only leakage or weepage observed during the leak test of the reactor vessel in the region of the CRD and in-core penetration was at location 28-05.

In-core tube 28-05 is one of 69 in-core tubes located in the bottom head and penetrate the 8-3/4" thick bottom head. The tubes are welded with a partial penetration "J" type weld on the inside of the reactor vessel.

In-core housing 28-05 is a spare and has not been in use, it does not contain a flux monitor tube, and is capped with a blind flange. When the vessel is operating this tube is subject to pressure on the inside of the tube and also the outside at the partial penetration weld. The completed tube extends about 12 feet below the reactor vessel head, terminating at the blind flange.

The lead responsibility for evaluation of the abnormal occurrence and proposed repair was transferred from RO:1 to the Assistant Director for Operating Reactors by memo dated June 6, 1974.

4. Evaluation by NDE of Leak Areas

The licensee established the following program to (1) determine the location of the leak (i.e., to determine whether the leakage occurred through the in-core housing tube weld below the field weld or in the field weld itself). (2) to attempt to obtain any evidence of corrosive attack of the tube and (3) to determine if there is any evidence of vibration or other structural fatigue which could result in cracking of the housing material.

- a. Boroscope examination of the inside of in-core housing 28-05.
- b. Eddy Current examination of in-core housing 28-05 tube material.
- c. Ultrasonic examination of in-core housing 28-05 and field weld.
- d. Helium leak test of in-core housing 28-
- e. Leak test with temporary plug installed.

The results of licensee's evaluation were transmitted to Directorate of Licensing by report dated June 17, 1974.

5. Proposed Repair of In-Core 28-05

The licensee's report dated June 17, 1974 to Directorate of Licensing proposed an expansion method of tube rolling to seal the leak in the in-core 28-05.

6. Ultrasonic Inspection Results

The inspector reviewed the ultrasonic test data obtained from examination of the housing tube material and the Inconel field weld of the in-core penetration 28-05.

The report to Licensing dated June 17, states; no continuous leak path through the weld could be determined by the UT examination. The inspector's review of the raw data could not justify this statement made by the licensee.

The licensee stated a formal evaluation was being performed by General Electric Company and was not yet available. The inspector requested this information be made available for review by the inspector during a subsequent inspection. This is an open item.

7. Eddy Current Results

The inspector reviewed the eddy current test data obtained from examination of the housing tube material. The raw data report states; no indications of thru wall defects, however, the tube appeared to have indications of shallow I.D. pitting.

The report submitted to Licensing stated the eddy current examination revealed no indications of defects in the housing material. The inspector stated there appeared to be a conflict of evaluation results from the raw data to the report submitted to Licensing. The licensee stated a formal evaluation was being performed by Conam Inc. and was not yet available. The inspector requested this information be made available for review by the inspector during a subsequent inspection. This is an open item.

8. Helium Leak Test

The inspector reviewed the helium leak test results. The test was performed by pressurizing the inside of the tube with helium to 20 psig. The area immediately below and around the annulus between the vessel penetration and the housing OD was checked using helium mass spectrometer leak detection equipment. No deficiencies were identified.

9. Expanding Tube on Test Mockup

The inspector reviewed the data taken from performing simulated expansion by rolling on two test mockups. After rolling of the tube in the mockup, the joint was pressurized to 1425 psi. It was then heated to 550°F and cooled to room temperature 10 times followed by leak testing at 1280 psig. No leakage occurred during this testing. Data indicates a wall reduction of 2.8% occurred in the tube expanded area due to the rolling process. The average wall thickness of the tube in penetration 28-05 is 0.280" thick. The design minimum wall thickness of the tube is 0.166" thick. These numbers indicate that sufficient wall will be maintained after the rolling process is complete.

10. Expanding Tube on Reactor Vessel

The inspector reviewed the data of the rolling process for sealing the leak in in-core tube 28-05. The expanding process started at the 152.25" elevation which is just below the lowest point of the partial penetration "J" groove weld. The tube was then expanded in four successive rolls such that it was expanded a total distance of 6 $\frac{1}{4}$ ".

The records indicate the maximum torque applied during the rolling process was 100 ft/lbs. Dial indicators attached to the outside indicate a tube growth length of .053". No deficiencies were identified.

11. NDE and Leak Test on Tube After Expanding

The licensee inspected the tube material in the expanded area after the rolling operation was complete by eddy current and ultrasonic shear wave techniques.

The eddy current results revealed no change in the tube quality as a result of the rolling process. In addition a leak test was performed at a pressure of 850/865 and a temperature of 155°F. The leak test was witnessed by the inspector. No weepage was present in the area around in-core tube 28-05.

To preclude the possibility of ejection of in-core housing 28-05 from the reactor vessel in the event of complete failure of the housing or field weld, a mechanical restraint was installed below the lower flange of the housing by the licensee.

12. NDE Evaluation of CRD 18-47

Because of the white deposit noted in the area of CRD housing 18-47, the licensee performed an ultrasonic examination of the CRD housing and field weld. The examination was performed using a longitudinal beam, immersion method. Records of the examination of the CRD housing and field weld at location 18-47 showed no indication of defects in either the housing or field weld. No deficiencies were identified.