U. S. ATOMIC ENERGY COMMISSION
REGION I
DIVISION OF COMPLIANCE

Report of Inspection

CO Report No. 247/69-2

Licensee: CONSOLIDATED EDISON COMPANY
Indian Point No. 2
License No. CPRR-21
Category A

Dates of Inspection: January 20 and 24, 1969

Dates of Previous Inspection: November 20 and 21, 1968

Inspected by: G. L. Madsen 2/19/69
G. L. Madsen, Reactor Inspector Date

Reviewed by : N. C. Moseley 2/19/69
N. C. Moseley, Senior Reactor Inspector Date

Proprietary Information: None

SUMMARY

The reactor vessel, primary pumps, three safety injection accumulators, pressurizer relief tank and a portion of the four steam generators have been installed.

The repair of the fuel pit liner is basically complete.

Nonconformance with the cadweld splice testing procedure, stated in the FSAR, was identified and will require resolution.

The repair of quality deficiencies in conventional pipe procured from Dravo is in progress. This item will require additional compliance followup.

The final fitup of the steam generators was in progress. The girth weld procedure does not include temperature control requirements for local stress relieving.

DETAILS

I. Scope of Visit

The Consolidated Edison Company (Con Ed) Indian Point No. 2, (IP-2) site was inspected by Messrs. G. L. Madsen and D. E. Whitesell, Reactor Inspectors, Region I, Division of Compliance, on January 20 and 24, 1968.

The following persons were contacted during the visit:

Con Ed

Mr. A. Corcoran, Site Construction Engineer

Mr. P. Leo, Assistant Site Construction Engineer

Mr. J. Dragosits, Welding Inspector

Mr. A. Karkosa, Superintendent, Nuclear (IP-1)

Westinghouse

Mr. G. Waldrop, Quality Assurance Engineer

Mr. L. Cunningham, Field Service Engineer

Mr. T. Lawson, APED Welding Engineer

Mr. B. Thompson, Westinghouse Heat Transfer Department (WHTD), Field Service Engineer

United Engineers and Constructors (UE&C)

Mr. J. Fant, Quality Control Supervisor

Mr. R. Phelps, Mechanical Quality Control

U. S. Testing (UST)

Mr. E. Dadson, Quality Control Inspector

II. Results of Visit

A. Organization Changes

Mr. John Dragosits has been assigned to the Con Ed site staff as a pipe and welding inspector. Mr. Dragosits was a welder on IP-1 and subsequently has worked as a maintenance foreman and welding inspector in other Con Ed facilities.

B. Status of Construction

1. Containment Building

Concrete has been placed to the 158 foot elevation. The reactor vessel, four primary pumps, three safety injection accumulators, pressurizer relief tank and portions of the four steam generators have been installed.

2. Turbine Building

The installation of the turbine condenser tubes is about 25% complete. The turbine rotor and generator installation is nearly complete.

3. Fuel Handling and Storage Facility

The repair of the previously reported* problem with the floor section of the fuel pit liner has been completed. Final inspection and cleanup was in progress. Fuel baskets were being placed in the fuel pit.

4. Primary Auxiliary Building

The majority of the components have been installed. Pulling of electrical cables between the auxiliary building and the main control room was in progress.

*CO Report No. 247/68-3, Paragraph II.G.

5. River Intake Building

The traveling screens, recirculation pumps and service water pumps have been installed.

6. Schedule

The proposed reactor loading date continues to be January of 1970. Major components which have not been delivered include the pressurizer and the core internals.

C. Containment Liner

The containment liner dimensional measurements have been completed. The liner is considered to be acceptable to the dome level and the final evaluation of the dome section measurements is in progress.

D. Cadweld Splicing

Test result records indicate that the average weekly ultimate strengths of cadwelds, tested since the last inspection, ranged from 87,900 to 102,200 psi. Two of the 22 randomly selected and tested splices had ultimate strengths less than the required 75,000 psi. These splices failed at 69,400 and 70,600 psi. The cadweld procedures and FSAR* requires testing of a splice formed by the same crew, immediately prior to or after the substandard splices.

Records indicated that crew No. 59 had formed the splice that failed at 69,400 psi. Testing of the previously formed splice resulted in an indicated ultimate strength of 95,400 psi. Test records indicate that six splices formed by crew No. 59 have been tested to date and the lowest ultimate strength previously encountered was 91,550 psi.

Crew No. 40 formed the splice which failed at 70,600 psi. Records indicate that retesting for this failure consisted of testing the 78th subsequent splice which crew No. 40 formed. This

*Appendix B, Page B-24.

splice had an ultimate strength of 96,200 psi. The inspector asked for a justification for this item of nonconformance. Mr. Fant stated that the removal of the splices formed directly prior to or after the substandard splice would have necessitated the removal of 12 splices and the formation of 24 additional splices, due to the existing installed bar configuration. Mr. Fant also stated that the UE&C site construction manager had consulted the UE&C Design Engineering office and that the above deviation from procedure was approved. The inspector informed Con Ed of this apparent deviation and was informed that they were not aware of this condition but would seek a resolution to the problem. The inspector indicated that this question would be pursued at a later date. The inspectors review of records indicated that 18 splices, formed by this crew, had been tested and the lowest ultimate strength previously encountered was 86,500 psi.

E. Concrete

1. Test Cylinders

Test cylinder records indicated that the compressive strengths, for 28-day curing, exceeded the 3000 psi design specification. The lowest recorded value, since the last inspection, was 3449 psi.

2. Concrete Placement

UST inspection reports indicated that observation of concreting operation at the batch plant and location of placement has been conducted in accordance with practices recommended by ACI and ASTM.

F. Reactor Coolant System

A detailed review of records pertaining to field erection and fabrication of the reactor coolant system was conducted. In addition, Mr. Whitesell evaluated records relative to the reactor coolant pipe materials. A summary of the inspection results on these subjects is included in Section A of Addendum I to this report.

G. Safety Injection System

One section (SI-108) of stainless steel safety injection pipe was observed to have surface fissures. As previously reported*, this section is scheduled for replacement. The inspector inquired as to the status of evaluation of this condition. Con Ed indicated that they were not presently prepared to take a position on this situation but did indicate that the pipe section is scheduled to be returned to Dravo for metallurgical evaluation. The inspector expressed a desire to obtain information relative to the cause of the condition and what action has been taken to assure that the other sections of similar pipe are sound. Mr. Corcoran indicated that a visual examination of the other stainless piping and dye penetrant checking of eight additional sections of pipe, revealed no further deficiencies. He also indicated that UST is scheduled to visit the Dravo fabrication in early February 1969.

H. Conventional System Piping

As previously reported** site receipt inspections revealed apparent quality deficiencies in the conventional system pipe, procured from Dravo. As a result of the initial visual and spot radiographic inspections and indicated deficiencies at the vendor plant,** Westinghouse and UE&C extended the investigation for all, on site, conventional pipe weld joints that did not receive a radiographic inspection at the vendor plant. This program included the following:

1. The inside and outside surfaces of the weld joints were visually inspected wherever possible.

2. A radiographic inspection was made on the joints that were not visually inspectable. The following criteria was applied:

   a. The radiographs were interpreted to the requirements of ASME Section VIII, paragraph UW-51.

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*CO Report No. 247/68-6, Paragraph E.2.
**CO Report No. 247/68-6, Paragraph E.

b. If one radiograph verified the presence of a backing ring, the weld was generally considered acceptable.

c. Joints without backing rings were 100% radiographed.

d. Presence of weld wire in any radiograph was cause for rejection of the entire weld joint.

UE&C records indicate that 1290 joints were inspected in the field. Of this number 409 were visually inspected and 881 were radiographically inspected. The results of the inspections were as follows:

1. 416 weld joints had backing rings.

2. 330 weld joints were rejected. (183 for the presence of weld wire in the joint and 147 for lack of penetration or elongated porosity.

The repair of rejected weld joints is in progress. Spot repairs are permitted. If cutting of the joint is required for repairs, a backing ring is being installed. On completion of repair, the weld joint is reinspected according to the above requirements. The repair activities included returning 63 section of pipe to the vendor. UE&C indicated that the repair work is about 50% complete. Upon inquiry by the inspector, Con Ed stated that their evaluation of the problem is not complete. A UST inspector is scheduled to visit the Dravo shop in February, 1969 to further evaluate the existing conditions.

Messrs. C. E. Jones and R. Oller, Reactor Inspectors, Region III, visited the Dravo plant during the period January 6 to 10, 1969. The results of this inspection are included in CO Report No. 247/69-1.

The conventional pipe problem will be reviewed during future visits with the principal concern being directed toward the main steam, normal feedwater, and emergency feedwater systems.

I. Steam Generators

Four tube sections and two steam separator sections of the steam generators have been moved to the containment building. A review of field procedures and records relative to the steam generator girth welds revealed the following:

1. Welding Procedure

The Westinghouse welding procedure No. 690024 is essentially the same as the steam generator shop welding procedure and is considered to be proprietary information by Westinghouse. The records pertaining to the qualification of the procedure were not available at the site. The procedure is considered to be associated with the steam generator fabrication and the qualification information is retained by the Westinghouse Heat Transfer Department in Lester, Pennsylvania.

The steam generator girth weld is to be formed by the manual arc process using AWS 8018 electrode. The procedure includes provisions for:

a. Control of electrodes, electric current characteristics, and use of the horizontal welding position only.

b. Magnetic particle testing of tack weld removal areas.

c. Preheating to 300° F.

d. No peening is permitted on the first or last weld pass and the maximum weld reinforcement permitted is 5/32 inch.

e. Stress relieving heatup, soak, and cooldown conditions are specified for treatment in a furnace and permits local stress relieving where the furnace is not practical. Temperature and holding times conditions, for local stress relieving, are not specified in the procedure but are instead included in a field erection instruction. This item will require future resolution.

f. The weld root pass is to be magnetic particle checked and the final weld, in the stress relieved condition, is to receive a magnetic particle and a radiographic inspection. The radiograph examination shall be performed to ASME Section III, paragraph N-624.

g. Weld repairs are to be made by grinding and re-welding and require preheating and stress relief.

2. The welder qualifications, weld material certifications, and the steam generator fitup were reviewed. The results are recorded in Addendum I of this report.

J. Reactor Vessel

The machining of the lower internal core supports was in progress. The initial fitup of the core internals is scheduled to begin in about six weeks.

K. Electrical

A portion of the 6900 volt switch gear has been energized. Placement of cables in the turbine building is about 75% complete and between the central control room and the auxiliary building is about 10% complete. The D.C. batteries have been installed and are contained in two rooms which are separated by a concrete barrier.

L. Control Room

Most of the instrument cabinets have been received and installation has begun.

M. Preoperational Testing

Preparation of systems preoperational testing procedures is in progress. Mr. Karkosa indicated that individual procedures are in varying degree of completion; however, none are presently in the finished status. He also indicated that Con Ed is awaiting detailed descriptions on some systems from Westinghouse. The inspector discussed the intended involvement by Compliance.

III. Management Interview

Separate exit interviews were held with Messrs. Prestele and Corcoran at the conclusion of the visit. The following items were included in the discussion:

A. Containment Building

Mr. Corcoran indicated that concrete placement on the containment building has been curtailed until spring.

B. Cadweld Splicing

The inspector informed Con Ed of the identified deviation from the cadweld forming procedure. Mr. Corcoran indicated that he was not aware of the condition but would seek a resolution. The inspector stated that this condition was indicative of a possible problem in communication and control relating to construction deviations.

C. Reactor Coolant System

The inspectors indicated satisfactory findings relative to the reactor coolant system field welding except that the welding procedure qualification test data, using F5 electrode, was not available.

D. Safety Injection Piping

The status of evaluations relative to the defective section (SI-108) of safety injection pipe was discussed. Mr. Corcoran indicated that they were not presently prepared to take a position on this matter. Con Ed's future review includes a scheduled visit to Dravo by a UST inspector. The inspector stated that evaluation and resolution of this problem would require additional followup by Compliance.

E. Conventional System Piping

Mr. Corcoran stated that Con Ed is generally satisfied with the repair program relative to the conventional system piping problem; however, they are not prepared to take an official position. He also indicated that they are awaiting Westinghouse's final approval.

F. Steam Generators

The field welding of the steam generator girth seams was discussed. The inspector indicated that the welding procedure does not include temperature control requirements, and that the procedure will require qualification for the conditions employed for local stress relieving. Mr. Corcoran stated that he would pursue this matter.

G. Preoperational Testing

The inspector discussed Compliance's intended involvement relative to preoperational testing of the various facility systems. Mr. Prestele indicated that Compliance will be kept informed of progress.

H. Major Components

Mr. Corcoran indicated that the pressurizer and the core internals are two major components that have not been received. The pressurizer is awaiting code approval and the core internal fabrication was delayed by a labor strike at the vendor shop.

I. Pipe Contractor

Mr. Corcoran stated that in the near future J. Courter Company will become a subcontractor to UE&C in the area of pipe welding. He also stated that Con Ed has employed this firm extensively in the past with satisfactory results. Upon inquiry, Mr. Corcoran stated that UE&C would retain the quality control responsibilities.

ADDENDUM I

CO Report No. 247/69-2

Licensee: CONSOLIDATED EDISON COMPANY
Indian Point No. 2
License No. CPRR-21
Category A

Dates of Inspection: January 20 and 24, 1969

Dates of Previous Inspection: November 20 and 21, 1968

Inspected by: D. E. Whitesell 2/19/69
D. E. Whitesell, Reactor Inspector (Construction) Date

Reviewed by: N. C. Moseley 2/19/69
N. C. Moseley, Senior Reactor Inspector Date

A. Reactor Coolant System

1. Westinghouse purchase specifications for the pumps and piping were not available at the site but will be reviewed at a future date.

2. Sketches of the spool pieces together with mill certifications for the piping material, furnished by Cameron Iron Works of Houston, Texas were audited and the following information was obtained:

   a. The mill certificates referenced Westinghouse purchase specification number G-676341 - Rev. 0, dated 4/25/66, and identified the pipe material as conforming to ASTM-A376 - TP316 - S2 (check analysis) and S6 (photomicrographs). The certificates show the part number, heat number, chemical analysis and physical properties at ambient temperatures. It certifies the yield strength to be 20.8 ksi and tensile strength to be 60 ksi at the design temperature of 650° F and further certifies the minimum yield to be 120% of the allowable stress at 650° F. The certificates show the ID, OD and wall thickness of the pipe and certify that it has been annealed at 1925° F for one hour and water quenched. The pipe and nozzles were dye penetrant and ultrasonic tested and found to be acceptable.

b. The sketches show the dimensions of the spool piece and all external nozzles and fittings. The sketches also note that all machine work is to be 100% radiographed.

c. The materials, pipe sizes and thickness are in agreement with the PSAR.

3. United Engineers and Constructors' (UE&C) welding procedures numbers 8 and 20 were audited. The procedures are for joining stainless steel base materials using the tungsten inert gas (TIG) and ASTM 317 filler wire ER308 and 316 (F7) with Grinnell or Electric Boat (EB) consumable insert for the root pass and cover passes. The remaining passes are specified to be with manual metal arc, using ASTM 298-E308-15 or 16 for 304 stainless materials and E316-15 or 16 for type 316 materials. The procedures provide for the joints to be machined, electric current characteristics, positions, techniques, cleaning, and repair of defects. The procedures specify that liquid penetrant examinations shall be performed in accordance with Section VIII, Appendix VIII, ASME code and acceptance standard as defined in case N-10, ASA code. Radiographic inspection was specified to be performed and evaluated in accordance with Section VIII, paragraph UW-51 of the ASME code. The qualification test for the procedure using the consumable insert and ER308 filler wire was available for audit and was found to be in accordance with Section IX, ASME code. The qualification test for the ER308-16 (F5) electrode was not available for review and will be audited at a future date.

4. Welder's qualification test records were audited for approximately 15 of the 33 welders qualified on the above procedure, and were found to be in accordance with the requirements of Section IX of the ASME code.

5. The weld records were audited and the inspector noted that the welds are identified by numbering each of the four loops followed by the joint number (1 to 8) in each loop. The records show that 16 of the 32 welds are being worked on and work on each end of a spool piece is performed simultaneously to maintain minimum shrinkage stresses. The records show the welders identification, amount of weldment deposited and date of the work.

6. In discussing the work with Mr. Franchuk, UE&C welding supervisor, the inspector learned that in addition to the dye penetrant inspection of the root pass, that periodic radiographs are being made as the weldment is deposited to enable defects to be spotted and corrected with a minimum amount of grinding. Mr. Franchuk also informed the inspector that the cover passes would be slightly over-reinforced to permit the removal of weld ripples and securing the final contour by grinding back to the reinforcement permitted by code, prior to making the final radiographs.

7. At the time of inspection, none of the welds had been finished, and no completed nondestructive test records were available for review. These records will be audited on a future visit.

8. The inspector witnessed a portion of the welding work in the field and observed the following:

   a. The work is being performed in accordance with the procedures.

   b. Individual holding ovens are in each work area and no electrodes were out of the ovens except the ones being used.

   c. The stainless steel spool pieces were wrapped for protection during the work, and no arc strikes were observed.

   d. The work is being closely monitored by Mr. John Dragosits, quality control welding inspector for Con Ed.

9. Mr. Dragosits and the inspector entered the reactor vessel for the purpose of inspecting the interior condition of the weld joints. Mr. Dragosits showed the inspector the rough, wavey condition of the interior surface of one of the spool pieces that had been of sufficient concern to him, that he had requested an ultrasonic check of the wall thickness. The results of this check, showed the wall thickness to be as specified. The fact that Mr. Dragosits is finding and questioning these conditions is a good indication that he is following the work very closely in the interest of the licensee.

B. Steam Generator

1. The qualification tests of the 20 welders qualified on the above procedures were audited, and found to conform to Section IX of the ASME code. The specification required qualification in the horizontal position only and the qualification tests were dated 12/30/68.

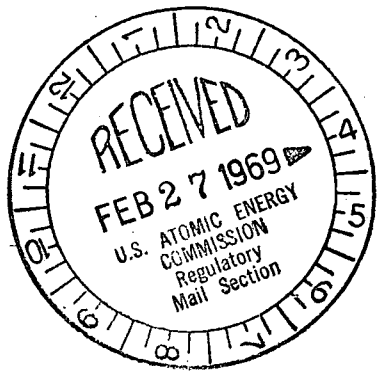
2. The mill certifications for the weld metal were audited for both the ASTM-233A E7018 and the ASTM-316A E8018 electrodes. The certificates show the lot number, chemical analysis, the physical properties in both the as welded and stress relieved conditions. The results of four (4) impact tests made at -10° F were noted, and all were found to be in accordance with Section III and IX ASME codes.

3. The fitup of the upper portion of one of the steam generators had been inspected by the code inspector and the welding work was proceeding in accordance with the specifications.

   a. One girth weld had been aligned and tacked and was waiting for inspection by the code inspector.

   b. The second generator was in the process of being aligned prior to tack welding.

   c. Mr. Dragosits informed the inspector that he had requested WAPD to provide the licensee with written procedures to cover any jacking or other cold springing of the two halves if required to obtain the alignment tolerance allowed by the code. This procedure had not been received at the time of the inspection and will be audited on a future visit.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