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

Report of Inspection

CO Report No. 247/68-3

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

Dates of Inspection: March 14, 1968
June 17 - 19, 1968

Dates of Previous Inspection: February 27 and 28, 1968

Inspected by: G. L. Madsen 7/18/68
G. L. Madsen, Reactor Inspector Date

Reviewed by: R. T. Carlson 7/19/68
R. T. Carlson, Senior Reactor Inspector Date

Proprietary Information: None

SUMMARY

The containment liner has been deemed dimensionally acceptable to the 91 foot elevation. Evaluation of measurements taken above this elevation continues.

Cadweld splicing of reinforcement bars continues to produce satisfactory results.

Compressive strengths of concrete test cylinders have exceeded the design specifications. Quality control at the concrete batch plant continues to be a problem. Additional control actions have been initiated for all future concrete mixing for IP-2. The use of concrete with a 7 inch slump for the containment building is considered acceptable.

Evidence of cracks in the polar crane rail has prompted a decision to replace the entire rail. The desirability of using the polar crane for construction activities, with the present rail, is being evaluated.

Blasting at IP-3 is nearing completion. The control techniques employed are considered acceptable.

Major components such as the steam generators and reactor vessel have begun arriving at the site.

The quality assurance inspection, for off-site fabricated components, is conducted on a shop surveillance basis by Con Ed and Westinghouse. Con Ed's records are presently limited to reports of inspections and do not necessarily contain fabrication details such as mill reports.

DETAILS

I. Scope of Visits

The Consolidated Edison Company (Con Ed), Indian Point No. 2 (IP-2) site was visited on June 17 and 18, 1968, by Mr. G. L. Madsen, Reactor Inspector, Region I, Division of Compliance. The visit included:

A. Tour of the construction site.

B. Review of quality control records.

C. Review of dynamite blasting at the site.

D. Review of a polar crane rail crack problem.

In addition, Mr. Madsen visited the Con Ed Engineering offices on March 14 and June 19, 1968, to discuss and review available records of the quality assurance program for vendor fabricated components.

The principal persons contacted during the visits included:

A. Con Ed

Mr. J. A. Prestele*, General Superintendent

*Present at March 14, 1968 meeting.

Mr. A. Corcoran*, Site Construction Engineer
Mr. P. Leo, Site Construction Engineer Assistant
Mr. Carl Larsen**, Division Engineer, Nuclear Division
Mr. George Waslenko**, Engineer, Nuclear Division
Mr. Jack Grob*, Assistant Mechanical Plant Engineer
Mr. R. Freyburg*, Assistant Manager for Operations, Production Department

B. Westinghouse

Mr. C. G. Durfee*, Manager Quality Assurance
Mr. G. Russell*, Engineer, Quality Assurance
Mr. Homer Deakman, Project Superintendent

C. United Engineers and Constructors (UE&C)

Mr. James Fant, Quality Control Supervisor

II. Results of Visits

A. General Construction Status

1. Containment Building

The erection of the containment liner is essentially complete. Six 5 foot lifts of concrete have been poured. Cadweld splicing of reinforcement bars continues to provide satisfactory results. The polar crane is in place; however, numerous cracks have been detected in the crane rail.*** Present plans call for replacement of the rail. The reactor support and refueling pit concrete has been poured. Two steam generator supports and the four primary pump pedestals are in place.

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*Present at March 14, 1968 meeting.
**Present at June 19, 1968 meeting.
***Discussed in Section II.E. of this report.

2. Turbine Building & Heater Bay

Fabrication of the turbine condensers continues. Installation of the condenser tubes is scheduled to begin during the next month. One low pressure turbine rotor has been received and installation of the turbine bearings is in progress. The feedwater heaters, moisture reheaters, condensate pumps, air ejectors, and flash evaporator are in place.

3. Screen Well

The building is complete. Fabrication of the re-circulation lines to the turbine building is essentially complete. The recirculation pumps have not been installed.

4. Fuel Handling and Storage Facilities

The building is basically done. Installation of the stainless steel pit liner is in progress.

5. Primary Auxiliary Building

The final addition to the building has been erected. Most of the components have been received. The boric acid tanks, charging pumps, safety injection pumps, waste gas compressor, containment spray pumps, and numerous other items are in place.

6. Transformer Area

Installation of the electrical conduits between the transformer area and the switchgear rooms is complete. The unit auxiliary transformer and two of the four station service transformers have been received.

7. Emergency Diesel Generator Building

The pedestals for the diesel generators have been constructed. Erection of the building has not been started.

8. Tanks

Field fabrication of the primary and refueling storage tanks is nearing completion. The condensate storage tank pad has been poured. Chicago Bridge and Iron is the fabricator of these tanks.

9. Schedule

Since the last inspection, a labor problem at IP-2 resulted in a loss of activity ranging from 2 to 4 weeks for the various crafts. The inspector inquired as to the total effect on the estimated construction completion date. Mr. Deakman stated that the present official reactor loading date is October 1969. The inspector was also informed that the major problem that resulted from the recent labor disturbance was a loss of 60 boilermakers. To date, only 20 have returned to work at IP-2. The effect of this situation on the overall construction schedule is under evaluation.

B. Containment Liner

As previously reported*, two areas of the containment liner did not meet the specifications which limit diameter deviations between elevations 43 and 95 feet to ± 2 inches. Discussions with Messrs. Corcoran, Deakman, and Fant revealed that additional, more precise, dimensional measurements have been taken between elevations 46 and 190 feet. The results of these measurements have been reviewed by the UE&C designer to elevation 91 feet. The present position of UE&C, Westinghouse, and Con Ed is that the liner conforms to the required specifications to elevation 91 feet. The evaluation of the data for elevations 91 to 190 feet is in progress. Based on a review of available records, the inspector considers the containment liner to be dimensionally acceptable to elevation 91 feet.

*CO Report No. 247/68-1, Paragraph II.B.

Discussions with Mr. Fant revealed that the quality of some of the welds attaching the Nelson studs to the liner had been questioned. Mr. Fant stated that all Nelson stud welds above elevation 80 feet were inspected and the necessary corrective rewelding has been completed. The inspector inquired as to the acceptability of the stud welds below elevation 80 feet. Mr. Fant stated that these studs were attached to the liner plates on the ground, prior to inclusion in the containment liner, and that the associated welds were considered acceptable.

The inspector inquired as to the availability of the containment liner field fabrication radiographs and was informed that the film was not at the IP-2 site. After additional discussions, Mr. Corcoran stated that these radiographs would be made available to the inspector for review at a later date.

C. Cadweld Splicing

A review of test results since the last inspection revealed that two splices out of 33 randomly selected and tested splices had ultimate strengths of less than the required 75,000 psi. These splices failed at 70,250 and 72,250 psi. In accordance with procedure, the splices formed immediately prior to the below specification splices were removed and tested. The ultimate strengths of the latter splices were greater than 75,000 psi. The average weekly ultimate strengths, for the period March 1, 1968, to June 17, 1968, ranged from 86,070 to 101,600 psi. The quality of the splicing operation appears to be continuing at an acceptable level.

D. Concrete

1. Test Cylinders

A review of test cylinder records for concrete poured since the last inspection revealed that compressive strengths, for 28-day curing, exceeded the 3000 psi design specification. The average compressive strength was about 3800 psi and the lowest recorded value was 3360 psi.

2. Batch Plant

As previously reported*, the batch plant operation has been a continuing area of concern since the plant does not contain automated features. For this reason UE&C, Con Ed, and U. S. Testing (UST) have been making numerous spot checks of the batch plant performance and the Vacca Testing and Research Co. (Vacca) coverage.

The inspector's review of UST inspection reports revealed that a control problem was encountered at the batch plant on May 8, 1968. During the referenced visit, the UST inspector determined that the Vacca inspector was unable to perform the required plant analysis on the aggregate, but instead was adjusting batch mix weights on the basis of a materials analysis which had been previously performed by another Vacca employee. In addition, it was determined that crushed stone coarse aggregate was actually being batched into the mix instead of the normally used gravel. The UST inspector obtained samples of the sand and coarse aggregate for analysis. Two test cylinders were cast by the UST inspector of this material. Compressive strengths for 28-day curing were measured and found to meet the design specification of 3000 psi. Additional discussion on this problem revealed the following:

a. Forty cubic yards of concrete, with the crushed stone coarse aggregate included in the mix, was included in the 352 cubic yards of concrete placed in the containment building at elevations 70 to 78 feet.

b. Vacca had previously designed and tested a concrete mix which includes the use of the crushed stone coarse aggregate. This mix had been approved for usage at IP-2.

*CO Report No. 247/68-1, Paragraph II. D. 3.

c. Correspondence between Con Ed, UE&C, Vacca, and Westinghouse does not conclusively indicate that the crushed stone coarse aggregate design mix was employed for mixing the subject 40 cubic yards of concrete.

d. During future concrete placements at IP-2, a UE&C Quality Control inspector will be stationed at the batch plant to observe the concrete batching and Vacca testing performance.

Con Ed is continuing to evaluate the consequences of the above batch plant problems. The inspector plans to pursue this matter further during the next site inspection.

3. Containment

As previously reported*, concrete with a 7 inch slump is being used for the containment building. In addition, a "placewell" admixture has been added to the concrete. A review of records indicates that the mix was designed and tested by Vacca, and that it had received the approval of UE&C. Based on a review of records, an evaluation of the admixture chemical composition and comparisons with applicable codes, the inspector considers the use of this concrete mix to be acceptable.

A review of test cylinder results, for 28-day cured concrete with a 7 inch slump and placewell admixture, revealed the compressive strengths to be in excess of the 3000 psi design specification. The average compressive strength was about 3800 psi and the lowest recorded value was 3480 psi.

*CO Report No. 247/68-1, Paragraph II. D. 2.

E. Polar Crane

Numerous cracks have been discovered in the polar crane rail.* Initial investigations revealed two visually observable cracks plus 15 less severe cracks, the latter having been detected by liquid penetrant inspection. A section of the rail was removed for metallurgical examination. The results indicated that the rail was metallurgically acceptable as received, and that the cracking was presumed to have been caused by the heat effects of welding the rail to the base plate, which is solidly attached to the concrete polar crane wall. An engineering analysis was initiated and resulted in a decision to replace the entire rail, but permitted continued use of the polar crane for construction activities, with the present rail. As a precautionary measure, plans included a magnaflux of the entire rail with incremental increases in loading. Subsequently, the polar crane was rotated and magnafluxing of the rail revealed a total of 33 cracks of varying sizes. The occurrence of these additional cracks prompted a decision to discontinue use of the crane until additional investigation and appropriate actions have been completed.

The possible effects that this problem might have on the overall construction progress have not been determined. Presently, it is postulated that the new rail will be attached to the base plate by employing clips, which will be welded to the base plate but not to the rail.

F. Blasting

Production blasting at Indian Point No. 3 (IP-3) is nearing completion. A review of routine vibrational monitoring records indicated that the maximum particle velocity, at the IP-1 conventional building or nuclear service building, was 0.206 inches/second versus the planned limit of 1.36 inches/second. Maximum particle velocities noted at the chemical system building during periodic vibrational measurements, was 0.106 inches/second.

*Inquiry Memorandum No. 247/68-A, dated May 8, 1968.

Based on the records reviewed, the inspector believes that production blasting at IP-3 has been properly controlled.

G. Spent Fuel Storage

Installation of the stainless steel liner for the spent fuel storage pit is in progress. Vacuum testing of the pit's bottom welds has revealed leakage and the presence of water. The method by which this leakage problem will be corrected has not been formulated.

H. Steam Reheaters

The inspector related the San Onofre reheater problem* and the subsequent installation of baffles to eventually distribute the steam. Mr. Corcoran stated that he was not aware of this problem. He indicated that he would look into this matter and would initiate the proper actions.

I. Steam Generators

The four steam generators have been received and are in storage at the site. Each steam generator was received as a tube section and a steam separator section. A visual inspection of these components revealed no apparent surface damage. Mr. Corcoran showed the inspector a series of photographs which were taken throughout the movement of the steam generators from the barge to the IP-2 site. Based on the photographic review, observation of the external surfaces and discussions with cognizant personnel, the inspector feels that the movement of these components was handled in an acceptable manner. The inspector observed that each component was properly sealed and signs on each unit indicated that each component contained 21 bags of desicant.

J. Reactor Vessel

The reactor vessel was scheduled to arrive at the plant on June 21, 1968. Present plans call for external storage of the vessel until about mid August 1968, at which time it will be installed within the containment vessel.

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*CO Report No. 244/68-1.

K. Quality Assurance

During the inspector's last visit to the IP-2 site, the compliance program relative to quality assurance of off-site fabricated components was discussed.* The discussion revealed that complete quality assurance records were not being maintained by Con Ed for these components.

A follow-up meeting was held at the Con Ed offices in New York City on March 14, 1968. A discussion on the compliance quality assurance program and the degree of availability of records relative to off-site fabricated components revealed the following:

1. Records are generally maintained by the fabricators of the components.

2. Westinghouse is procuring the major portion of the individual components. Their quality assurance program is carried out at the fabricator's shops. The Westinghouse records are presently limited to reports of inspections and do not necessarily contain fabrication details such as mill reports and welding data.

3. Con Ed has engaged UST to perform quality assurance surveillance. Reports of UST's activities serve as the basis of Con Ed's quality assurance program.

4. Con Ed and Westinghouse are willing to permit compliance inspections of the various component fabricator shops and will make the arrangements as requested.

Subsequent to the March 14, 1968 meeting, Con Ed provided the inspector with a listing of components which includes specification numbers, purchase order numbers, names of fabricators, and general status of fabrication or shipment.

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*CO Report No. 247/68-1, Paragraph II. E.

The inspector revisited the Con Ed Engineering office on June 19, 1968, to become acquainted with the information which Con Ed has available on the subject of off-site quality assurance. Discussions with Messrs. Larsen and Waslenko revealed that the present records consist principally of component specifications, drawings and UST reports of inspections. The inspector made a general review of the 41 vendor inspections which UST has made of IP-2 components, and made a preliminary review of the specifications for the steam generators and the safety injection system accumulators.

In discussions with Mr. Larsen following the records review, the inspector indicated that the information presently available at Con Ed's Engineering office did not appear sufficient to adequately demonstrate to Compliance that an acceptable quality assurance level was maintained for vendor procured components. In addition, the inspector indicated a possible future intent to conduct quality assurance surveillance with Westinghouse and possibly some of the vendors.

L. Management Interview

Separate management exit interviews were held with Messrs. Prestele and Corcoran at the conclusion of the visits. The following items were discussed.

1. Containment Liner

The containment liner dimensional measurement program was reviewed. The inspector indicated that the dimensional measurements appeared acceptable to elevation 91 feet, and that the measurements above the 91 foot elevation would be reviewed during the next visit. The inspector stated a desire to review the radiographic film for the containment liner. Mr. Corcoran stated that the field fabrication radiographs would be made available for a later review.

2. Cadweld Splicing

The inspector indicated a satisfactory finding with respect to Cadweld splicing of the reinforcement bars.

3. Concrete

The batch plant control problem was reviewed. The inspector indicated that there appears to be a lack of conclusive evidence that the proper design mix was employed for mixing the 40 cubic yards of concrete which contained the coarse aggregate material which was placed in the containment building on May 8, 1968. Mr. Corcoran indicated that Con Ed is evaluating the significance of this problem.

The inspector indicated utilization of a placewell admixture and a 7 inch slump for the containment building appears to be acceptable.

4. Polar Crane

The polar crane rail crack problem was reviewed. Mr. Corcoran indicated that appropriate actions have not been formulated. He agreed to keep the inspector informed of any significant developments.

5. Blasting

The inspector stated that the control of the blasting activities at IP-3 appears to have been handled in a satisfactory manner.

6. Spent Fuel Storage Pit

The spent fuel pit liner weld problem was discussed. Mr. Corcoran did not have an explanation for the presence of water beneath the liner, and was not in a position at this time to indicate a method of repair.

7. Steam Generators

The inspector reflected satisfactory findings with respect to handling techniques for moving the steam generators. Upon request, Mr. Corcoran indicated that the welding of the tube section to the steam separator would be accomplished inside the containment dome under the direction of the Westinghouse Heat Transfer Division.

8. Reactor Vessel

The scheduled handling of the reactor vessel was discussed. The inspector indicated a desire to witness a portion of the reactor movement activities. Mr. Corcoran volunteered to keep the inspector informed of developments.

9. Quality Assurance

The subject of quality assurance with reference to vendor fabricated components was reviewed. The inspector stated that the presently available information, at the site or Con Ed Engineering office, did not appear to be sufficient to adequately demonstrate to Compliance that an acceptable quality assurance level was maintained for vendor-procured components.