

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

Report of Inspection
CO Report No. 286/69-6

Licensee: Consolidated Edison Company
Indian Point No. 3
Category A

Date of Inspection: June 25-26, 1969

Date of Previous Inspection: April 30 and May 1, 1969

Inspected By: A. A. Varela 8/13/69
A. A. Varela, Reactor Inspector (Construction) Date

Reviewed By: N. C. Moseley 8/13/69
N. C. Moseley, Senior Reactor Inspector Date

Proprietary Information: None

SCOPE

A routine, announced inspection of Consolidated Edison Company's Indian Point No. 3 site was made by Mr. A. A. Varela on June 25 and 26, 1969. This is a 3025 Mwt reactor to be constructed at Buchanan, NY. The purpose of the inspection was to review with the applicant the status of deficiencies found in the last inspection, to inspect the concrete batch plant and the storage and control of aggregates, and to ascertain the status of written procedures specifically listed in Appendix E of the Quality Assurance Supplement to the PSAR.

SUMMARY

Six items of nonconformance with the PSAR were reported as a result of the last inspection of this facility. During this inspection two of these items were found to have been corrected. The remaining four have not been corrected; however, the Con Ed site engineer has notified Westinghouse that no further Class 1 concrete may be poured until all of the deficiencies have been resolved. The four uncorrected items are as follows:

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1. User samples of cement have not been made.
2. Slump tests are taken for every third truckload instead of for each truck.
3. Type II cement is being used instead of Type I.
4. Cadweld splices are not staggered to meet the minimum stated separation.

DETAILS

I. Persons Contacted

The following persons were contacted during the visit:

CON ED

Mr. A. Corcoran, Site Construction Engineer-Project Superintendent
 Mr. J. Verbeyst, " " " Assistant

UE&C

Mr. J. Fant, Quality Control Engineer

Westinghouse

Mr. G. Waldrop " " "

II. Results of Visit

A. Status of Items of Nonconformance

1. Certificates from cement manufacturer attesting conformity to ASTM C-150 for cement used between November 27, 1968 and January 10, 1969, have been received and are reported to be on file. The inspector was informed that the concrete supplier and Pittsburgh Testing Laboratory have been instructed to assure that mill test reports are kept current on future cement deliveries.
2. No documentation exists for user test samples of cement at the batch plant. As was previously reported, this is nonconformance to PSAR Supplement 2 which states in part, "All cement will be sampled at the ready-mix plant and tested to conform to ASTM C-150 standards." The inspector's review of correspondence between Westinghouse and UE&C disclosed that this item has been under discussion since February, 1969. No evidence was produced, however, which shows that any action

has been taken to comply with the PSAR. J. Fant of UE&C informed the inspector during this inspection that due to the small capacity of the batch plant (300 barrels), this provision of the PSAR has been difficult to accomplish. A method is being considered whereby user samples may be made at the cement mill where one of ten silos of about 300,000 bbl. capacity will be reserved exclusively for Indian Point No. 2 and 3.

- 3. Type II cement is still the only type available, whereas Type I is specified in PSAR Supplement 2. Although this item also was recognized by Con Ed, Westinghouse and UE&C in February, 1969, no positive action has been made by the applicant or his contractors to resolve the matter. After the inspection of April 30, May 1, 1969, however, Corcoran of Con Ed informed Anderson, Project Manager of Westinghouse, by letter on May 2, 1969, that this matter, as well as the user test of cement, should be reviewed with Con Ed Engineering before any additional concrete is placed in the Nuclear area. At the exit interview the inspector was informed of another letter from Corcoran to Anderson, dated June 26, 1969, where Westinghouse was reminded again to resolve these items without further delay.
- 4. Slump tests are still taken every third truckload, instead of each truckload, as specified in the PSAR. Correspondence between Westinghouse and UE&C reviewed by the inspector during the inspection specifies that a revision to the PSAR is required to correct this item.
- 5. The nonconformance to ACI 613 that resulted from change in cement brand in December 1968 was corrected in March 1969 by new trial mixes incorporating the new brand of cement.
- 6. The last inspection report* for this facility indicated nonconformance to PSAR Supplement 2 due to non-stagger of horizontal Cadweld splices in the containment wall. Four inside diameter circumferential rebars from about elevation 45 to 49 were constructed without stagger. During this visit the inspector observed that an attempt had been made to provide some stagger. The inspector was informed by Corcoran that UE&C obtained some movement by rotating the rebar hoops with a "come-a-long", but due to insufficient movement, UE&C design engineers would re-evaluate the non-stagger to justify the as-built condition and request a change in the PSAR. Corcoran's letter of May 2, 1969 to Westinghouse's Project Manager, D. E. Anderson, stated that the non-stagger violation must be corrected before concrete can be placed in the containment walls. During this inspection Corcoran assured the inspector that no containment wall concrete would be placed until this nonconformance was resolved.

*CO Report No. 286/69-5

B. Concrete Surveillance

1. Concrete Cylinder Tests

In CO Report No. 286/69-5, paragraph II. A., the concrete cylinder break results were reported to have decreased from December 1968 to March 1969. The twenty-eight day cylinders taken from the Turbine Generator Beam (4,000 psi concrete) resulted in a high of 5,170 psi to a low of 3,590 psi. During the previous inspection the inspector was told that due to the turbine generator beam erratic results, UE&C would perform 45 day tests and, if these were still in question, core drill test specimens would be taken according to ASTM C42. An audit of records during this inspection disclosed that the 45 day test results average of eight cylinders was 4,588 psi. Because this result was below the specified 15% overstrength factor, eight ninety day breaks were made instead of taking core drill specimens. The results of the ninety day cylinder breaks averaged 5,180 psi, which is above the 15% overstrength factor.

2. Reports by Others

U.S. Testing Company made two concrete inspections and audits for Con Ed; one on UE&C-PTL concrete mixing, placing and control, and the other, an analysis of all seven and twenty-eight day concrete cylinder breaks, or 2,000, 3,000 and 4,000 psi concrete from November 21, 1968 through April 2, 1969.

a. U. S. Testing Co. Report No. 10066-57 dated April 7, 1969 on visit of March 26, to observe concreting operations and to check on Quality Control performance of UE&C and PTL, reports six irregularities in field operations and documentation of records. In a letter, dated May 14, 1969, Corcoran forwarded this report to Anderson of Westinghouse and stated that two of the irregularities were cleared but emphasized that the following four items be resolved or complied with:

- (1) Users test by UE&C on cement.
- (2) Document inspections that reinforcement placement complies with project detail drawings and PSAR.
- (3) Concrete slump tests on each truck before placement.
- (4) Slump tests and test cylinders must be taken from each placement location.

- b. U. S. Testing Company Report No. 10066-75 dated May 21, 1969, is an evaluation and analysis of the compressive strength results on concrete cylinders. Extracts from this report are quoted below to show that field quality control was lacking. Corcoran's letter to Anderson of Westinghouse, dated June 6, 1969, forwarding the report, points to a lack of sufficient control measures to assure uniformity at the batch plant and on the site, and recommends that the control measures enumerated in the report be followed by Westinghouse to assure uniformity and eliminate the possibility of substandard concrete.

Extracts from:
 U. S. Testing Company, Inc. - Report No. 10066-75, May 21, 1969

"This evaluation is based on all 7 and 28 day test cylinder compressive strength results on file in the UE&C Quality Control office as submitted by Pittsburgh Testing Laboratory from November 21, 1968 through April 2, 1969. Results for each of the specified strengths were tabulated and the daily high, low and average strengths at 7 and 28 days were established. These results, along with other pertinent information is presented graphically with this report for the 2000, 3000 and 4000 psi concrete.

"A review of the information plotted on the graph indicates that in all instances the daily averages exceeded the minimum required strength. However, it should be noted that there is considerable fluctuation in the daily averages, as well as, in some instances, a wide range between the daily high and low cylinder. In the case of the 4000 psi concrete, several cylinders had actually broken below required strength while others broke high on the dates where low cylinders are noted.

"These variations are indicative of a lack of sufficient control measures to maintain uniformity during the productions and sampling of concrete. There is no record of any periodic tests having been conducted on the cements and aggregates to ascertain some measure of uniformity and compliance with the job requirements.

"It is suggested that the following requirements be instituted as control measures in order to reduce the degree of fluctuation in test results:

1. The aggregate stock piles should be visually examined daily to determine if there is any contamination. If there is any evidence of contamination, the stock pile should be rejected until physical tests indicate its acceptability.

2. A gradation on each aggregate should be conducted prior to its use to determine compliance with the specification grading requirements.
3. Aggregate moisture tests should be determined daily prior to batching operations and whenever there is an indication of moisture change.
4. User tests on random samples of cement and aggregate should be made periodically.
5. The exact amount of water used in the concrete mixer to establish the desired slump should be determined to ascertain water cement ratio. A change in water cement ratio between batches can greatly affect concrete strengths.
6. Mixing time should not exceed the limits established by ASTM.
7. In addition to slump tests and casting of test cylinders, density determinations should be made at the point of discharge from the trucks for correlation with the theoretical densities established in the design mixes. Should the densities vary greatly, it is an indication of a departure in the mix proportions and also result in a yield problem.
8. After casting, test cylinders should immediately be protected by placing them into field storage boxes until removal to the field laboratory for proper curing.

The results of this evaluation was verbally discussed with Mr. Verbeyst."

G. Batch Plant and Aggregate Storage Inspection

The inspector visited the batch plant on June 26, 1969, together with Verbeyst of Con Ed, Fant of UE&C, and Waldrop of Westinghouse. Concrete batching for IP-3 was not being handled at this time. This independent commercial plant is situated about one mile south of the reactor site, it furnishes concrete for IP-2 and IP-3, and it sells concrete to local contractors not connected with Con Ed. The inspector was informed by Con Ed that the plant equipment is about twenty-five years old and was situated somewhere else before being brought to the present location for Indian Point No. 1. The equipment was manufactured by the Blau-Knox Company and it is manually controlled. The weight scales are checked by the Sheriff's Office, County of Westchester, at least twice a year according to UE&C records audited by the inspector. Fant informed the inspector

that PTL has calibrated the scales also but documentation was kept by PTL. The inspector's visit to the plant was brief and he observed that it is old equipment, that the skeletal "operations room" is poorly illuminated, is composed of narrow walkways and appeared overcrowded by more than the operator. The inspector was informed that accuracy of batching was dependent entirely on experienced personnel and the surveillance of PTL's batch plant inspector. The inspector observed that continuous attention is needed to check the manual control of the facility, and this may be complicated by the presence of other quality control personnel for IP-2.

The inspector was informed that for economic reasons the company operating the batch plant decides the source of aggregates but, all five different sources of fine and coarse aggregate have been approved by PTL and, the twenty-five combinations were tested and approved in design mixes. The inspector audited UE&C records on aggregate sources and design mix combinations and found no item of nonconformance.

The inspector observed that coarse aggregates were stored over an area of several acres, above the level of the batch plant, where trucks end-dumped material from the same source in contiguous piles about 5 ft. high. A front-end loader digs into the piles and transports the aggregate, a distance of up to about 100 yards, to a ground level hopper for conveyor belt supply to the batch plant distribution hoppers. The inspector noted that recently worked piles had considerable dust contamination contiguous to which was some very clean unworked piles. When the inspector dug beneath the surface of the latter, he found that at hand depth these piles were also contaminated. The inspector concluded that recent rain had washed the surface of dust contamination but beneath the surface the contamination remained. When questioned as to control, Mr. Fant informed the inspector that PTL inspector daily checks out all aggregate in the distribution hopper for compliance with ASTM C-33. In a telephone conversation with Corcoran on July 3, 1969, the inspector was informed that on June 26, 1969 U. S. Testing Company tested samples from the coarse aggregate stock pile that the inspector had observed was contaminated and other suspect piles. From a verbal report of these tests, the 200 sieve fraction found did not exceed the limit specified in ASTM C-33; however, due to high content of dust in the coarse aggregate stock piles, Corcoran wrote a letter to Westinghouse on the necessity of close control of contaminated aggregates.

The inspector was shown a rejected stock pile of about 100 cubic yards volume that had been stockpiled at the lower level. This material was identified as a March 1969 deliver, that was rejected for poor gradation for any concrete at Indian Point, but was used in concrete for other work not at Indian Point. Mr. Fant assured the inspector that PTL's inspector made sure that the batch plant hopper had none of this aggregate for Indian Point concrete. The audit of UE&C records by the inspector disclosed that preceding the U. S. Testing Company's visit of March 26, 1969 (see paragraph B. 2. a.) PTL recommended to UE&C that additional personnel were needed to provide better coverage at the batch plant and pour site. Mr. Fant informed the inspector that PTL had added another man to their inspection force in April, 1969 for better control on all concrete work.

D. Status of Construction

As reported in CO Report No. 286/69-5, most of the work on the containment building under the exemption granted by the Director of Regulation on November 15, 1968 was completed and no work was then underway. On June 9, 1969, Chicago Bridge & Iron (CB&I) resumed work to complete installation of the bottom liner plate at elevation 43. Five qualified welders are now at work and about 80% of bottom liner is installed. Pea gravel concrete has been placed, screeded and troweled flush with leveling tees for a few sections of the bottom liner, since the last inspection; however, no other work was underway on the containment building. Concrete for the turbine generator pedestals and turbine hall heater building is 100% complete and three structural steel columns on the turbine hall heater building have been erected. The estimated overall completion for Indian Point No. 3 nuclear and non-nuclear construction is reported by Con Ed to be 15% (10% attributable to non-nuclear, plus 5% to nuclear).

E. Status of Written Quality Control Procedures

1. Con Ed

Inspection Report No. 286/69-1 was directed toward the overall quality assurance program and the applicant's involvement in implementing the program as outlined in the Quality Assurance Supplement to the PSAR. During this inspection Con Ed informed the inspector that the status of written procedures specifically listed in Appendix E of the QA Supplement was as follows:

QAP-5, "Procedures for Continuous Monitoring of Construction on Site" - This is completed and waiting for approval by Con Ed task force.

QAP-7, "Procedure for Reporting, Review and Documentation of Nonconformance" - This is in final draft form but has not been reviewed by Con Ed task force.

QAP-1 thru 8 - These are in various stages of completion, are now being worked on, and date of completion is expected to be August 15, 1969.

2. Westinghouse and UE&C

None of the procedures indexed in Appendix E of QA Supplement to PSAR were available for review at the site and the status was unknown.

F. Exit Interview

An exit interview was held at the site with Con Ed's Project Superintendent Corcoran and Assistant Verbeyst on the afternoon of June 26, 1969. Relative to the deficiencies on non-stagger of cadweld splices in containment wall, the inspector was informed that the field correction of the four circumferential hoops to provide stagger was not satisfactory, and UE&C design engineers were re-evaluating the non-stagger in an effort to justify the condition to DRL. Corcoran assured the inspector that Con Ed would permit no containment wall concrete placement until this item was resolved.

Regarding the deficiencies in concrete and concrete placement, Corcoran told the inspector that he had informed D. E. Anderson, Assistant Project Manager of Westinghouse by letter dated June 26, 1969 that these issues must be resolved without further delay, and that no further Class I concrete could be poured until they are resolved. This letter also informed Westinghouse that better quality control of concrete should be provided to assure no scattering of cylinder tests results such that only one in ten falls below design strength and average is at least 15% above the design strength.