

U. S. ATOMIC ENERGY COMMISSION
REGION I, DIVISION OF COMPLIANCE
NEWARK, NEW JERSEY

Report of Inspection

CO Report No. 247/70-7

Licensee: Consolidated Edison Company
Indian Point No. 2 (IP-2)
License No. CPPR-21
Category B

Dates of Inspections: June 26 and 29, 1970 and July 8 and 9, 1970

Dates of Previous Inspections: May 22, 25 and 26, 1970 and June 3, 11, 12,
15 and 16, 1970

Inspected By: G. L. Madsen 8/6/70
G. L. Madsen, Reactor Inspector Date

Reviewed by: N. C. Moseley 8/6/70
N. C. Moseley, Senior Reactor Inspector Date

Proprietary Information: None

SCOPE

Announced inspections were made of the Indian Point No. 2 (IP-2) construction site on June 26 and 29 and July 8 and 9, 1970. Major items inspected included witnessing the reactor coolant system hydrostatic test, status of pre-operational procedure preparation, mechanical surface cleanup, electrical installation, status of operation procedures preparations, and evaluation of unresolved items.

SUMMARY

Preparation of flushing and hydrostatic test procedures has been completed. Thirty-two of 82 Phase II pre-operational procedures have been issued by Wedco for Con Ed's review. Hydrostatic testing of the reactor coolant system was performed on June 29, 1970. (Section II A)

Placement and termination of electrical cabling is about 90 per cent complete. Con Ed initiated an installation review of safeguards instrument cabling. The review of the containment pressure to containment spray actuation chain revealed questionable conditions relative to separation of redundant channels. The identified questions are associated with design.

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Con Ed was encouraged to perform instrument cable design reviews. Con Ed agreed to pursue this matter. (Section II B)

Con Ed and Wedco have continued their mechanical systems cleanup program. The findings relative to previous cleanup was satisfactory; however, the protection of piping during support and restraint installation lacks control. (Section II C)

Con Ed is nearly prepared to take a position that reactor pressure boundary piping meets the requirements of Codes and/or Table A (Section II D)

The Containment pipe penetrations bellows material and weldment quality continues to be an unresolved question. Con Ed has agreed to pursue this matter. (Section II E.)

The cause of the circulating water bearing sleeve failures during service checkouts has been attributed to insufficient clearance between the sleeve and bearing. Modifications are in progress. This item is considered to be resolved. (Section II G)

Documentation and name plate data indicates that the steam generators conform with the FSAR. The welds on the insulation nut plates of the steam generators were MT and provided satisfactory findings. (Section II H)

The official core loading schedule continues to be September 7, 1970, however, available preliminary schedules indicate loading to begin October 15, 1970. (Section II I)

The facility procedures were evaluated to PI 2005.2a and 2005.2b. The proposed program was found to be generally satisfactory. Procedure preparation is in the outline stage. (Section II J)

Several previously identified items have been resolved. (Section II K)

A listing of items requiring resolution and/or followup is included. (Section II L)

DETAILS

I. Persons Contacted

Con Ed

Mr. A. Corcoran, Construction Project Superintendent
Mr. E. Dadson, Quality Assurance Supervisor
Mr. B. Cosgrove, Mechanical Engineer
Mr. R. Schuster, Quality Control Inspector

Mr. O. Buesse, Electrical Startup
Mr. T. Houlihan, Electrical Inspector
Mr. D. McCormick, General Superintendent
Mr. A. Karkosa, Assistant Superintendent, Operations
Mr. P. Sabodas, Electrical Engineer, Electrical Department

Wedco

Mr. E. Staffel, Executive Vice-President
Mr. T. Lawson, Manager, Site Quality Control
Mr. R. Matheny, Manager, Startup Operations
Mr. R. Kelley, Startup Engineer

Consolidated Testing Laboratories

Mr. J. Rumsen, Quality Control Inspector

II. Results of Inspection

A. Pre-operational Testing

1. Status of Procedure Preparation

Preparation of Phase I flushing and hydrostatic testing procedures has been completed. Thirty-two of 82 Phase II systems pre-operational test procedures have been issued by Wedco and are being reviewed by Con Ed. Six Phase II procedures have been approved for use.

2. Reactor Coolant Hydrostatic Test

The reactor coolant system hydrostatic test was performed on June 29, 1970. The inspector's review of the test procedure, witnessing of testing, and observation of data provided the following pertinent information:

- a. The hydro procedure was approved by representatives of Wedco and Con Ed.
- b. A test pressure at 3108 was maintained for one hour.
- c. The reactor coolant system was visually inspected for leaks at 500, 1500, 2400 and 3108 psig by representatives of Westinghouse, Wedco, Con Ed, Royal Globe Insurance Company and Lumbermans Insurance Company.
- d. Two Heise gauges were employed for reading reactor coolant pressure throughout the hydro. Calibration data was available and found to be acceptable.

- e. Eighteen thermocouples were placed at various locations on the steam generators, pressurizer and reactor vessel. Temperatures were recorded prior to and during pressurization of the system. Observed temperature readings were above 100°F.
- f. Acceptable quality of water was maintained throughout the test.
- g. Two over-pressure reliefs were set at 3200 psig.
- h. Several small leaks were observed during the inspection of the reactor coolant system hardware. The leaks were limited to valve packings and flange gaskets. A punch list of leaks was prepared and will be available for future reference.
- i. The final acceptance documentation had not been prepared by Westinghouse; however, Westinghouse, Con Ed and the insurance representatives verbally expressed satisfactory acceptance of the test. The formal documentation will be reviewed during the next inspection.

B. Electrical

1. Electrical Cable Installation

Placement and termination of electrical cables is about 90 per cent complete. Con Ed and Wedco are continuing their surveillance programs for determining installation conformance to electrical cable pulling schedules.* The proposed Wedco program is about 50 per cent complete and no additional significant problems have been identified. As a result of previous questions** by the inspector, Con Ed initiated an installation review of safeguards and protection instrument cabling. The review of the containment pressure instrumentation for actuation of the containment spray system revealed the following questionable conditions:

- a. The six pressure transmitters are contained in one rack with no separation.
- b. The six instrument cables are routed to a common terminal box.
- c. Some of the cables come together as they depart from the cable trays and enter the analog panels in the control room.

*CO Report No. 247/70-5, paragraph II.B.

**CO Report No. 247/70-5, paragraph II.B.2.

As a result of these findings, the Con Ed site personnel have initiated reviews of additional instrumentation. Upon inquiry, the inspector was informed that the above containment pressure instrument cable was installed according to design. The inspector contacted Con Ed Engineering and encouraged the performance of design reviews of safeguards instrument cabling. Mr. Sabodas agreed to pursue this matter. The inspector stated that this subject would require additional evaluations by Compliance.

2. Electrical Penetration Area

Sixty electrical penetrations are provided at a single penetration area for entry of instrument, control and power cables into containment. The design adequacy of this area was previously questioned.* The applicant has agreed to the installation of fire barriers to separate power cables from instrument and control cables.** In addition, the applicant agreed to a general rework of cabling to eliminate excess cable loops. The inspector observed that numerous rod power cables have been cut and are in the process of being shortened and reterminated. Available drawings indicate that installation of transite separation barriers over the power cables is scheduled. The proposed work should provide acceptable corrective action. Completion of the work will be audited during a future inspection.

C. Mechanical Systems Cleanup Review

Con Ed and Wedco have continued their mechanical systems cleanup program as previously described.*** Cleanup of systems was reported to be about 80 per cent complete. Records indicated that the mechanical cleanup was complete for all components included in the reactor coolant hydrostatic test. The inspector audited the surface condition of the pressurizer surge and spray lines. The conditions observed indicated that the previous cleanup program was effective. Installation of pipe supports and restraints was observed to be in progress. This work was being accomplished with no protection of the piping and resulted in weld splattering of the piping, which will require additional cleanup. The inspector pointed out his observation and Con Ed personnel agreed that proper precautionary measures were not being taken and additional cleanup would be required prior to installation of insulation.

*CO Report No. 247/69-12, Appendix A, Item E.2.

**DRL Report to ACRS dated July 2, 1970.

***CO Report No. 247/70-5, paragraph II.E.

D. Reactor Pressure Boundary

As previously reported, Con Ed is nearly prepared to take a position that all reactor pressure boundary piping meets the requirements of appropriate specifications and/or Table A.* The inspector reviewed eight mill certificates for materials included in the reactor pressure boundary and determined that the information previously presented to the inspector relative to available documentation was correct. The inspector is now awaiting Con Ed's final position on this subject. At that time, the subject will be handled as outlined previously.**

E. Containment

As previously reported, a United States Testings review at pipe expansion bellows for the containment building raised questions relative to material compatibility and quality of weldments.*** A letter from United Engineer and Construction (UE&C) design engineers indicated acceptability of materials; however, documentation to verify this was not immediately available. The inspector indicated that the available information did not provide sufficient evidence to assure acceptability of materials. Mr. Dadson agreed to pursue this matter. The inspector then indicated that evidence relative to questionable acceptability of weldments was previously identified by CO; however, to date no resolution or action on this item was evident. Mr. Lawson's review of correspondence revealed that Con Ed had requested Wedco to provide information on the weldments; however, no action had been taken. Mr. Lawson stated that followup on this item would be promptly initiated.

F. Nuclear Facilities Safety Committee PI 3800/1, Attachment N8

The FSAR**** outlines plans relative to the organizational make-up, functions and responsibilities of the Nuclear Facility Safety Committee. Discussions with Mr. McCormick revealed that the functions and responsibilities portion would be followed; however, the committee membership will be different than that presented in the FSAR. Mr. McCormick gave a brief description of the revised committee. The revised membership, as presented, is more extensive than that presently included in the FSAR. Mr. McCormick indicated that a revision to the FSAR on this subject will be issued.

G. Circulating Water Pumps

During service checkouts of the circulating water pumps, two pumps showed evidence of failure of the upper shaft bearing sleeve.***** The pumps were disassembled and returned to the shop for repairs. The cause of the failure was determined to be associated with insufficient clearance between the sleeve and bearing, which prevented adequate flow of water for

*CO Report No. 247/70-2, paragraph II.C.2.

**CO Report No. 247/70-2, paragraph II.A.

***CO Report No. 247/70-6, paragraph II.F.

****Volume IV, Section 12.5 and Volume V, Question 12.3.

*****CO Report No. 247/70-6, paragraph II.H.

lubrication. The wear sleeve to bearing clearance tolerance was increased from 0.002 - 0.009 inches to 0.010 - 0.015 inches on pumps 22 and 23. The pumps were re-installed and satisfactorily tested. The remaining four pumps are scheduled to be returned to the shop for a similiar modification. This item is considered to be resolved.

H. Steam Generators

A review of documentation and name plate data indicated the following to the inspector:

1. The vessels meet the standards of ASME Section III, Class A.
2. The secondary side of the vessels were designed to 1085 psi and were initially hydrostatic tested at 1356 psi.
3. The primary side of the vessels were designed for 2485 psi and initially hydrostatic tested at 3108 psi.

The above is in conformance to the requirements of the FSAR* and provides resolution for the previously identified item.** The welds on the insulation nut plates of the steam generator were MT, following final hydrostatic testing, and provided satisfactory results. This previously identified item is considered resolved.***

I. Schedules

Upon inquiry, the inspector was informed that the official core loading schedule date continues to be September 7, 1970. Con Ed personnel agree that this date is optimistic. The inspector reviewed a preliminary Wedco schedule which indicates a core loading date of October 15, 1970 and start of hot functional testing on September 10, 1970.

J. Facility Procedures (2000)

1. Administrative Control (2005.2a)

Management controls relating to writing, revising, updating and use of facility procedures are outlined in the FSAR.**** Written procedures are prepared by the Con Ed IP-2 startup group and are approved by the General Superintendent and the Nuclear Facility Safety Committee. Deviations from the basic operating procedures will require prior approval of the General Superintendent and the Nuclear Safety Committee. The proposed philosophy is

*Table 4.1-4.

**CO Report 247/70-5, paragraph II.I.9.

***CO Report 247/70-1, Appendix A, Item A.6.

****Volume V, Question 12.2.

consistent with that presently in use for IP-1 and is considered acceptable.

2. Procedure Coverage (2005.2b)

An outline of the proposed facility procedure coverage was presented to the inspector. The system as outlined includes the following:

- a. Startup and shutdowns under various conditions.
- b. Operation at critical, steady state and load change conditions.
- c. Thirty-one abnormal conditions procedures as outlined in the FSAR.* The inspector noted that loss of instrument air and loss of containment integrity was not included. Mr. McCormick agreed to consider the addition of procedures to cover these items.
- d. Radiation monitoring and radioactivity control.
- e. Periodic test procedures. This outline had not been completed in that the Technical Specification presentation and acceptance has not been completed.
- f. Maintenance procedures including such things as refueling, draining the reactor system and steam generator repair.
- g. Individual system procedures will be supported by a written set of systems descriptions and checklists which outline the normal operation condition for the systems.
- h. The Emergency Plan is a separate item and has been presented as Con Ed's, Indian Point Facility, Contingency Plan.**

The coverage provided by the proposed facility procedure system appears to provide sufficient coverage for control of the facility.

3. Status of Procedure Preparation

Preparation of system checklists and systems description is nearly complete. Facility operating procedure outlines have been formulated; however, only the emergency (contingency) plan is nearing completion. The inspector reminded Mr. McCormick

*Volume V, Question 12.2.

**FSAR, Volume V, Question 12.5.

that the AEC Reactor Operating Licensing people would need a set of operating procedures some six weeks prior to testing of personnel for reactor operator licenses. Mr. McCormick stated that he was aware of this and would make the procedures available as soon as practical.

K. Resolution of Previously Identified Items
(CO Report Reference in Parenthesis)

1. In Depth Quality Control Items (247/70-1, Appendix A)

- a. The steam generator insulation nut plates were satisfactorily MT following final hydrostatic testing of the vessels. (A.5)
- b. The omission of hydrostatic tests on RCS piping, supplied in accordance with ASTM-A376, was satisfied by performance of an installed system hydrostatic test at 3108 psig. Con Ed stated that this pressure exceeds the 2800 psig limit established for shop hydrostatic testing. The inspector considers this item resolved in that all pipe and weld joints of the RCS were inspected during the field hydrostatic test. (A.7.b)
- c. Some confusion relative to weld procedures and weldor qualifications was identified (B.1 and C.1). This documentation was organized and some additional qualifications of the procedures were performed. A review of the resultant documentation demonstrated that the confusion had been eliminated.
- d. The existence of a two inch section of pipe in spool piece SI 204 (C.4) was reviewed by Con Ed. The condition is considered to be acceptable to the requirements of B31.1 by UE&C and Con Ed.
- e. High pressure safety injection pump cables lacked separation (D.5). Consideration was given to extension of the conduits in question; however, metal covers were placed on the portions of the electrical trays in question, thereby providing separation equivalent to that provided for single electrical trays with metal separations barriers for redundant cables.
- f. Fire mains in the vicinity of the 480 V switch gear. (D.6) Concrete walls with metal doors have been erected to isolate the switch gear from potential water sprays from this source.
- g. Single electrical cable tunnel (E.4). The design was reviewed by DRL and is considered acceptable for IP-2.*

*Report to ACRS, Indian Point No. 2, from DRL dated July 2, 1970.

- h. The SIS Manual Actuation Panels electrical separation was questioned. (D.4) DRL has evaluated this condition and concluded that the modification of the as-built IP-2 panels would not provide sufficient, "substantial, additional protection which is required for public health and safety," to justify this requirement.*
- i. The battery room ventilation is not redundant and fluorescent lighting is provided. (D.7) This item was reviewed by DRL. Con Ed took the position that because of low hydrogen generation and the design of the battery rooms that this condition is acceptable.**
- j. The high pressure safety injection pumps are not physically separated (D.8). This item was forwarded to DRL for evaluation. The as-built condition conforms to the requirements of the FSAR.

2. Proposed Operating Staff (247/70-4, Paragraph II G)

DRL's evaluation of the proposed operating staff resulted in acceptable findings.***

- 3. The IP-2 plant was initially designed with automatic closure breakers between the 480-volt buses. The FSAR**** was revised and this automatic closure mode was eliminated. Discussion with Con Ed site personnel revealed to the inspector that this automatic closure equipment has been removed from the system.

L. Items Requiring Followup

Resolution is required for the following items from previous compliance inspections (CO Report Reference in parenthesis):

- 1. Completeness of SIS Weld Records (247/69-11, Section II B.2).
- 2. SIS Valves-CF8 vs CF8M (247/69-11, Section II B.3).
- 3. Reactor Pressure Boundary - Table A (247/69-11, Section II C).
- 4. Fuel Storage Building - completion of preops - FSAR discrepancies (247/69-9, II G).

*Report to ACRS, IP-2, from DRL dated July 2, 1970.

**Minutes of January 16, 1970 meeting, DRL and Con Ed on IP-2.

***Report to ACRS, Indian Point No. 2, from DRL dated July 2, 1970.

****Page 8.1-3.

5. Closure of Containment (247/69-9, Section II E).
6. Pipe Supports - Stainless Shims (247/69-9, Section II J).
7. Code "N" Stamp on Section III, Class "C" Vessels (247/69-7, Section II N).
8. Lateness of Pre-operational procedure preparation (247/70-2, Section II B).
9. Replacement of Main Steam Flow Nozzles (247/70-4, Section II I).
10. Containment Penetration Bellows (247/70-6, Section II F).
11. Electrical barriers installed (247/70-5, Section II B).
12. Cable tray loading audit (247/70-5, Section II B).
13. Pipe support installation and clearance review (247/70-6, Section II C).
14. In depth Quality Control followup items (247/70-1, Appendix A):
 - a. Pressurizer surge nozzles not UT.
 - b. Pressurizer surge line not PT.
 - c. Pressurizer Safety Valves - RT.
 - d. SIS - evidence of lack of first line quality control.
 - e. Need for independant cable design review.
 - f. Lack of control on electrical cable installation.
 - g. Emergency diesel control cables lack separation.
 - h. SIS boron tank valve modification.
 - i. Single electrical penetration.
 - j. 480 switchgear - air lines and air compressor.
 - k. Diesels in common room.
15. DRL report to ACRS, dated July 2, 1970
 - a. LOCA analysis question
 - b. IP-1 stack - removal of 80 feet

- c. Installation of strong motion siesmograph
 - d. Diesel auto start from 480 volt buses
 - e. Internals vibrational pre-operational test coverage
 - f. Demonstration of Hydrogen recombiner throttle back - pre-operational test
 - g. Alarm arrangement on protection channels
 - h. Installation of Hydrogen recombiner
 - i. Installation of redundunt electrical tunnel fans
 - j. Tunnel fire protection installed
16. DRL Requests:
- a. Possibility of defeating manual trip with reset buttons
 - b. Trip breaker annunciation and bypass interlocks
17. FSAR, Volume V
- a. Remote control and instrumentation outside of control room
 - b. Installation of modern fuel failure detection instrumentation

III. Management Interview

A management interview was conducted with Mr. Staffel and Mr. Dadson. Items discussed included the following:

A. Pre-operational Testing

The inspector related his continued concern relative to lateness of pre-operational procedure preparations. Mr. Staffel indicated he was aware of the status; however, he contends that the pre-operational program continues to be ahead of construction.

B. Reactor Coolant System Hydrostatic Test

The inspector indicated generally satisfactory findings with respect to the hydrostatic testing of the reactor coolant system; however, this item would not be considered closed until Wedco and Con Ed evaluation of the test results had been completed.

C. Electrical

The status of the Cable installation surveillance programs was discussed. The inspector indicated satisfaction that Con Ed had initiated an installation review of safeguards instrumentation cabling and stated that the negative findings associated with the containment pressure instrument cabling necessitates additional activity. Mr. Dadson indicated that the subject would be forwarded to Engineering for consideration.

D. Mechanical Systems Cleanup

The inspector indicated satisfactory findings relative to the mechanical system cleanup program; however, the lack of pipe protection during support and restraint installation lacks control. Mr. Dadson stated that this item had been covered previously with the constructors and actions will be taken to correct the condition. He stated that as a minimum the pipe system will require additional inspection and cleanup prior to installation of insulation.

E. Reactor Pressure Boundary

The status of work relating to pressure boundary component conformance to Table A. Mr. Dadson indicated that Con Ed was nearly prepared to answer relative to the piping and fittings.

F. Containment - Pipe Penetrations

The inspector indicated that the questions relative to material compatibility and weldment quality have not been answered. Mr. Dadson stated he would pursue the matter and would endeavour to provide more definitive information than has been presented to date.

G. Facility Procedures

The status of preparation of the facility procedures was reviewed. The inspector stressed the need for prompt completion of these procedures to permit Compliance to perform an evaluation and for Con Ed to submit them to the Reactor Operation Licensing Branch.

H. Previously Identified Items Requiring Resolution

The inspector indicated satisfactory resolution to the items discussed previously in this report* and stressed the need for resolution of the remaining items as outlined in this report.** Mr. Staffel was receptive to the comments and asked for a list of same. The inspector indicated that the items would be relayed through the licensee. Mr. Staffel indicated

*Paragraphs II.B-2, II.G and II.K.

**Paragraph II.L.

several reasons for delays in answering previous questions, and stated that he would exert additional effort to provide the necessary answers in a prompt and orderly fashion.