

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

RO Inspection Report No: 50-286/74-02 Docket No: 50-286
Licensee: Consolidated Edison Company License No: CPPR-62
4 Irving Place Priority: _____
New York, New York Category: B

Location: Indian Point 3, Buchanan, New York
Type of Licensee: PWR, 1050 MWe (Westinghouse)

Type of Inspection: Routine

Dates of Inspection: January 23-28, February 19-22, 1974

Dates of Previous Inspection: January 11, 1974

Reporting Inspector: A. N. Fasano
A. N. Fasano, Reactor Inspector

2/5/74
Date

Accompanying Inspectors: None

Date

Date

Date

Date

Other Accompanying Personnel: None

Date

Reviewed By: A. B. Davis
A. B. Davis, Senior Reactor Inspector

3/5/74
Date

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SUMMARY OF FINDINGS

Enforcement Action

None

Licensee Action on Previously Identified Enforcement Action

None

Design Changes

Not inspected

Unusual Occurrences

None

Other Significant Findings

A. Current

1. Program Status

a. Preoperational Test Program

The following reflects the licensee's estimate of current status for preoperational testing:

	Phase I	Phase II
Procedures Written	100%	30%
Procedures Approved	75%	4%
Tests Performed	9%	1%

b. Projected Project Completion Dates for "Crucial Reactor Programs"

<u>Title</u>	<u>Projected Date of 100% Completion</u>
Emergency Procedures	July 1, 1974
Security Procedures	July 1, 1974
Operational QA Program Implementation	July 1, 1974

<u>Title</u>	<u>Projected Date of 100% Completion</u>
Review of Proposed Technical Specification	*
Power Ascension Test Program Procedures	Not Known
Environmental Monitoring Program Implementation	**
Radiological Health Procedures	July 1, 1974
Operating Procedures	July 1, 1974

* Dependent upon both Licensing and licensee. The licensee could not project on his own in this area.

** This program in progress and is continuing.

2. Facility Procedures

a. Reactor Coolant Pump Operation SOP-RCS-1, Rev. 0, 11/20/73

The licensee has written a procedure to minimize possible pressure spikes that have occurred in the early test and operational stages of Indian Point Unit 2. (Details, Paragraph 2)

b. City Water Procedure, Reference FSAR Appendix 14A

The licensee is preparing a Technical Specification addition relative to city water availability for emergency cooling water to the charging pumps and flush water for the concentrated boric acid and piping from the outlet of the Boric Acid Storage Tanks to the charging pumps. (Management Interview, Paragraph B)

c. Check Valve Operability Tests (Low Pressure-High Pressure Systems)

The licensee plans to write a procedure to check the operability of check valves associated with the following systems: (1) Boric Acid Injection Tank, (2) High Head Safety Injection, (3) Hot Leg Injection, (4) Accumulators, and (5) RHR, where high to low pressure boundaries exist. The procedure will cover a scheduled surveillance test that will be "tentatively" entitled "Check Valve Operability Test."

d. Diesel Oil Supply*

The licensee stated that an oil truck will be available for moving diesel oil from storage tanks to fuel tanks for continued operation of diesel generators. The licensee stated that procedures will be written for the movement of the oil supply. (Management Interview, Paragraph C)

A review of this procedure will be made during a subsequent inspection.

3. Reportability of Repetitive Failures

The licensee stated that plans are to add into their Technical Specification the requirement to report to the AEC as unusual events (30 day report) whenever a safety related piece of equipment is inoperable more than 5 times over a 6 month period.

B. Status of Previously Reported Unresolved Items

1. Preoperational Test Program (FSAR Listing)**

a. System Expansion Restraint Tests

The licensee has stated in his answers to Questions 4.17 and 4.31*** regarding pipe supports and vibration, that the piping standards do not require the designer to be responsible for observation under startup or initial operation to assure vibration is within acceptable levels. During hot functional testing the licensee will observe the piping and any vibration problems will be eliminated.

The RO inspector stated that the answers as presented in the FSAR do not appear to describe the test details for assuring the accumulation of data for comparison with design expectations. (Management Interview, Paragraph D)

b. Boric Acid Injection Test**

The test procedures that address this issue will be written. The issue will be covered in Test Procedures 4.5.2 and 4.5.4. The procedures have not yet been forwarded from WEDCO.

* Reference "Safety Evaluation Report by DL," September 21, 1974, Paragraph 9.5.3.

** RO Inspection Report 50-286/73-08, Details, Paragraph 2.

*** Indian Point FSAR, Question and Answer 4.17 and 4.31.

Assurance was given to the RO inspector that the tests are planned to be performed. This item is considered closed.

c. Leak Detection Systems*

The licensee stated that a separate test for Indian Point 3 is not contemplated. Unit 3 will use data obtained from Indian Point 2 tests. The data will be correlated to Unit 3 for the setting of Leak Detection Systems.

The licensee position on this issue is not in agreement with the FSAR written position, Reference Page 6.7-18. The position as written states that during hot functional testing steam will be admitted into containment at a known rate and calibration will be achieved. (Details, Paragraph 4)

d. Reactor Component Handling System*

A cross reference to Unit 2 test procedure IPP-S4-4.12, "Fuel Handling Facility Checkout," June 22, 1970, was made available to the RO inspector. The procedure for Unit 3 will be equivalent to Unit 2 procedure with changes and upgrading where differences may exist. This appears to be satisfactory. This item is considered closed.

e. Control Rod Drop Test**

The licensee has agreed to drop each of 53 control rod bundles one time each in four different primary system conditions.

The licensee has stated that if all rods fall within 2.61σ (standard deviation) there will be no further rod drops for the given condition of the primary system. If one or more rods fall outside the slow rod drop time limit or fast rod drop time limit one rod in each (slowest and/or fastest) condition will be dropped an additional 10 times. (Management Interview, Paragraph E)

f. Loss of Offsite Power***

FSAR Question 3.15 and answer in Supplement 22 dated October 1973 addresses this test in parts. This does not meet

* RO Inspection Report 50-286/73-08, Details, Paragraph 2.

** RO Inspection Report 50-286/73-08, Details, Paragraph 6.

*** RO Inspection Report 50-286/73-08.

Regulatory Guide 1.68 requirements of power conditions, i.e., > 10% generator output.

The licensee stated that the tests described in the FSAR demonstrate control over such a failure. The licensee remains fixed in his position.

The RO inspector stated that this item will be referred to RO Headquarters for determination of the equivalence of the licensee's test to the Regulatory Guide. This item remains open.

g. Shutdown from Outside the Control Room*

This test is described in the same FSAR reference as above. The test description lacks the conditions of the test as specified in Regulatory Guide 1.68. The test is presented in the FSAR as a listing of individual system functional tests that the licensee plans to perform and in performance to demonstrate controllability of a shutdown from outside the control room.

The equivalence of the licensee's test to Regulatory Guide 1.68 will require similar action as stated above. This item remains open.

2. AEC Licensee Candidate Training Record Review

The RO inspector examined in detail the licensee's documentation concerning implementation of their AEC licensee candidate training program.

The program and its implementation were found to be in apparent agreement with ANSI N 18.1 and with FSAR requirements. (Details, Paragraphs 5-6)

Management Interview

A management interview was held at the Indian Point Site, Unit 3, Buchanan, New York, with Mr. Cantone, Mr. Whittier and Mr. Perry on February 22, 1974.

A. Scope and Findings

The licensee representatives were informed by the RO inspector, Mr. Fasano, that the purpose of this inspection was primarily to

* RO Inspection Report 50-286/73-08.

review the documented implementation of their reactor operator training program. The documentation reviewed showed apparent conformance with FSAR requirements and appears to satisfy ANSI 18.1 criteria.

B. City Water Procedure

The licensee representative has agreed to write a surveillance test procedure and an emergency procedure for the use of city water. (Details, Paragraph 3)

C. Diesel Oil Supply

The licensee stated that an FSAR addition, covering this subject, will be sent to the AEC.

D. System Expansion Restraint Test

The RO inspector stated that the answers relative to this issue appear to be unsatisfactory with respect to measurement and transients to be included into the System Expansion Restraint Test. It is expected that the licensee will write a detailed test procedure to cover this issue.

The licensee stated that this issue, including measurement and acceptance criteria, remains to be discussed further with WEDCO.

This item remains open for review.

E. Control Rod Drop Test

The licensee has proposed an alternative criterion for multiple drops of rods. The Regulatory Guide 1.68, "Preoperational and Initial Startup Test Program For Water Cooled Power Reactors," specifies 10 drops of the fastest and slowest rod. The licensee proposes to pick one rod at each extreme if the rod(s) fall outside a 2.61 sigma band. If no rods fall outside this band there will be no multiple drops.

The licensee's method of choice could result in no multiple rod drops which appears to be less conservative than the referenced guide criteria.

This item remains open.

DETAILS

1. Persons Contacted

Mr. S. Salay, Chief Engineer, Unit 3
Mr. A. Kohler, Jr., Resident Construction Manager
Mr. S. Cantone, Operations Engineer, Unit 3
Mr. D. Hartsfield, Superintendent, QA Construction
Mr. D. Whittier, Test Engineer, Unit 3,
Mr. V. Perry, Superintendent, Field Operations

2. Facility Procedure

SOP-RCS-1, Rev. 0, Reactor Coolant Pump Operation, 11/20/73

The RO inspector stated that due to the problem encountered at Unit 2 where overpressurization of the primary system had occurred on a number of occasions it would be advisable to take precautionary steps to avert similar occurrences from the start at Unit 3.

The licensee stated that a procedure, SOP-RCS-1, has been written to control conditions when such occurrences are most apt to occur. The procedure details the verifications and operations required to start, operate, and shut down a reactor coolant pump, RCP. It also addresses pressure spikes which exceed Reactor Coolant System, RCS, pressure-temperature relationship requirements of the Technical Specification, and it allows for the use of a gas bubble in the RCS. Either a nitrogen or steam bubble is to be established in the pressurizer or complete temperature equilibrium between water in the reactor vessel and water in the Steam Generators must exist prior to RCP start. The later condition does not have instrumentation to assure the specified temperature equilibrium and remains a judgment decision. To make the judgment the history of the system must be known. Cautionary notes are included in the event a pressure rise is experienced.

3. City Water Procedure

Appendix 14A of the FSAR, "Likelihood and Consequences of Turbine Overspeed at the Indian Point Nuclear Generating Unit No. 3," October 1970, Page 14A-42 describes the need for city water backup requirements.

The licensee is preparing a Technical Specification addition relative to city water availability as a source of emergency cooling water to

remove heat from the fluid drive coupling of the charging pumps in the event of a loss of service water. Cooling to the charging pumps will be accommodated by connections to the charging pump cooling water header allowing direct cooling via the city water supply.

Page 14A-50 addresses a cross connection at the discharge of the boric acid tanks to the city water supply. This connection is to be used for flushing the pipe lines between the boric acid tanks and the charging pumps.

4. Leak Detection Systems

The licensee plans to change the description of this test as reflected in the FSAR.

The RO inspector stated that the Unit 2 test remains to be completed and that the test appears to require that a containment reference temperature of 120°F be available.

The RO inspector stated that the issue remains unresolved until FSAR changes are made and documented justification for correlation of Unit 2 data to Unit 3 is resolved.

5. AEC Licensee Candidate Training Record

The RO inspector reviewed documentation on the implementation of the "Unit 3 Startup Training Program."

a. Qualifications

A review of 16 candidate resumés was made. The records were available and contained information that indicated all have a high school diploma or equivalent. Most of the candidates have been in the training program since May 1972; one candidate started in August 1972. Experience on nuclear power systems are reflected in naval nuclear training and experience at commercial nuclear power plants.

b. Unit 3 Startup Training Program - Hot License IP-2

Documentation reviewed indicates that the AEC Examination is to begin March 4, 1974 for the written part and March 18, 1974 for the oral part. (Reference Letter from Consolidated Edison to Operation Licensing Branch, Directorate of Licensing, December 6, 1973)

The training program is based on hot licensing on IP-2 with a reciprocal licensing on IP-3. Three months of "differences" between IP-2 and IP-3 training will be given to the trainees after hot license examinations have been passed for IP-2.

c. Training Program Phases (Ref. Details, Paragraph 3.f)

The documentation reviewed indicates that the program is divided into 8 phases. Records indicate that the trainees are in the operation of the simulator phase of the program.

The following constitutes the phases and the schedule for accomplishment based on a sequence of months from 1 month to 26 months:

<u>Phase</u>	<u>Month</u>
Academic	1-5
Systems	7-13
Overall Review	14
Watch and Small Transient Operation	17-19
Simulator	20-22
Pre-licensing Examination and Individual Review	23
AEC Exam	23-24
Difference Course	24-26

d. Program Coverage

The program requires 3323 hours of participation by the trainees. The following indicates the areas covered and the time allocated to each area:

<u>Area</u>	<u>Hours</u>
Academic Background Material	210
Reactor theory	260
Core Design	124
Primary System Design	117
Auxiliary Systems	173
Operating Characteristics	214
Reactivity Control	199
Safety Systems	147
Emergency Systems	193
Containment Shielding	15
Procedures	365
Radiation Monitoring	78
Health Physics	91

<u>Area</u>	<u>Hours</u>
Facility License	266
Core Loading	116
Radioactive Waste Handling	104
Conventional Plant	651
Total hours	3323

e. Job Descriptions

The RO inspector reviewed the job description that would apply to the trainees upon completion of the "Startup Training Program." The following is a brief description of the job descriptions and their content.

(1) Nuclear Plant Operator - Conventional, NPO-Conventional

An NPO-Conventional must be intimately familiar with the secondary side or conventional power plant side of the Unit to which he is assigned. This means knowledge of conventional plant systems, components and interrelationship of systems.

The description lists all systems such as Hot Penetration Cooling System Conventional, Ventilation System, Main and Reheat Steam System, etc.; that the NPO must know.

(2) NPO-Nuclear

This position requires the holder to be intimately knowledgeable of the nuclear side of the unit.

(3) NPO - Rover or Auxiliary Rover

This position requires knowledge of both the conventional and nuclear plant. He also must be familiar with refueling procedures.

(4) Reactor Operator - RO

This position requires all the qualifications of the NPO - Rover with the addition of knowledge of systems such as Reactor Vessel Internals, Plant Chemistry Primary Sampling System, etc., and additional Facility Procedures. He must pass the Reactor Operator AEC Examination.

(5) Senior Reactor Operator - SRO

This position includes all qualifications required for the RO, and requires passing the AEC Examination for Senior Operator License.

f. Content of the 8 Phases of the Startup Training Program

- I. Academic - This phase is made up of lectures, homework, written examinations, and problem solving for a total of 828 hours. Records of the examination and results are kept on file.

The academic phase contains:

1. Math 140 total, T, hr. (70 hours Lecture, L, 70 hours Study, S):

Slide rule, vectors, algebra and equations, graphing, logarithms and exponents and time rate of change.

2. Heat Transfer and fluid flow - 120 T, (60 L 60 S):

Basic - pressure, temperature, gas laws, and hydraulics; energy - First Law of Thermodynamics, fluid flow (Bernoulli's Equation), head loss, pump characteristics, Second Law of Thermodynamics; properties of water - steam tables, steam power cycles, PWR primary and secondary systems, heat transfer, boiling, DNB.

3. Electrical - Total 60 T, (30 L 30 S):

Basic DC circuits, AC circuits, generators, motors, breakers and safety.

4. Materials - Total 40 T, (20 L 20 S):

Mechanical properties, irradiation of materials, brittle fracture, reactor pressure vessel operation curves, nondestructive testing, plant construction materials.

5. Chemistry - 80 T, (40 L 40 S):

Periodic chart, compounds, chem equations, solutions, pH, ion exchange, gases and solutions, corrosion, radiation effect on water chemistry, detailed chemistry specifications, boric acid analysis.

6. Radiological Control - 80 T, (40 L 40 S):

Rad effects in man Rem/Rad/Roentgen, somatic effect, legal limits, sources of radiation and shielding, radioactive decay, exposure control, principles of radiation detection, internal exposure, radiological control.

7. Instrumentation - 40 T (20 L 20 S):

Controllers and feedback systems, pressure and temperature transmitters, familiarization with electrical schematics, lead-lag and other time dependent units, motor and valve control circuits.

8. Reactor Theory - 260 T (130 L 130 S):

Mechanics, Newtonian interactions, electrostatics and magnetics, atomic physics, nuclear structures and binding energy, nuclear stability and radioactivity, interaction of radiation with matter, the fission process, rate of nuclear reactions, slowing down and thermal diffusion, neutron multiplication process, calculation of neutron multiplication factors, reactivity and factors affecting reactivity, coefficient of reactivity, fission product poisons, reactor kinetics, startup and shutdown operations, reactor control and behavior, heterogeneous effects, and lifetime characteristics.

9. Plant Indoctrination - 8 hr Lectures

II. System Phase Total 1135 hours - Lectures (L), self study (S), field work (F), oral and written exams are used. The goal is to understand plant systems, procedures, and Technical Specifications. Records are kept.

1. Reactor coolant 40 T (10 L, 20 S, 10 Field, F)
2. Reactor vessel and internals 40 T (12 L, 8 S)
3. CVCS 80 T (20 L, 40 S, 20 F)
4. Aux. Cooling System 40 T (10 L, 20 S, 10 F)
5. Liquid Waste Disposal System (WDS) 30 T (10 L, 10 S, 10 F)
6. Gaseous WDS 30 T (10 L, 10 S, 10 F)
7. Solid WDS 30 T (10 L, 10 S, 10 F)
8. Primary Makeup Water System 8 T (2 L, 2 S, 4 F)
9. SG Blowdown System 8 T (3 L, 2 S, 3 F)

10. Plant Chemistry 24 T (8 L, 12 S, 4 F)
11. Primary Sampling System 8 T (2 L, 3 S, 3 F)
12. Engineered Safeguards System 100 T (30 L, 40 S, 30 F)
13. Ventilation System 20 T (6 L, 8 S, 6 F)
14. Rad Monitoring and Protection Systems 30 T (10 L, 10 S, 10 F)
15. Nuclear Instrumentation 40 T (20 L, 10 S, 10 F)
16. Incore Instrumentation 40 T (20 L, 10 S, 10 F)
17. Core Design and Control 80 T (30 L, 40 S, 10 F)
18. Full Length Rod Control Clusters 25 T (10 L, 10 S, 5 F)
19. Roller Nut Drive Mechanism - Partial Length RCC 15 T (6 L, 6 S, 3 F)
20. Position Indication System 10 T (4 L, 4 S, 2 F)
21. Fuel and Core Component Handling System 40 T (15 L, 10 S, 15 F)
22. Main and Reheat Steam 15 T (5 L, 5 S, 5 F)
23. Extraction Steam and Heater, Moisture Separator Drains and Vents 15 T (5 L, 5 S, 5 F)
24. Condensate System 20 T (5 L, 5 S, 5 F)
25. Feedwater System 40 T (12 L, 18 S, 10 F)
26. Intake Structure 8 T (3 L, 3 S, 2 F)
27. Circulating Water System 8 T (3 L, 3 S, 2 F)
28. Service Water System 24 T (5 L, 10 S, 9 F)
29. Secondary Sample 8 T (3 L, 3 S, 2 F)
30. Main Turbine Generator 40 T (10 L, 15 S, 15 F)
31. Overall Limit Protection System 80 T (20 L, 40 S, 20 F)
32. Auxiliary Steam System 8 T (3 L, 2 S, 3 F)
33. Instrument Air 24 T (8 L, 8 S, 8 F)
34. Station Air System 8 T (2 L, 3 S, 3 F)
35. Chemical Feed System 8 T (3 L, 3 S, 2 F)
36. Flash Evaporators 16 T (5 L, 5 S, 6 F)
37. City Water and Fire Protection 8 T (3 L, 2 S, 3 F)
38. N₂ and H₂ to Nuclear Equipment 8 T (2 L, 3 S, 3 F)
39. Cranes and Monorails 8 T (2 L, 6 F)
40. Electrical 40 T (12 L, 12 S, 16 F)
41. Miscellaneous 11T

III. Overall Review - Total 150 hours: 1. operating procedures, 2. emergency procedures, 3. detailed procedures, 4. station and unit procedures, 5. Technical Specifications, 6. contingency plans, 7. refueling procedures.

1., 2., 3., and 4., consist of 60 hours of seminars, 5., 40 hours, 6., 40 hours, 7., 20 hours.

IV. Watch and Small Plant Transient Operation - Total 480 hr - This requires Oral Exams to be given by a qualified Foreman on Watch. He ascertains qualification to be Nuclear, Conventional and Rover Nuclear Plant Operator, Reactor Operator and SRO. His checkouts are signed on qualification cards for each trainee. He checks for knowledge of system, procedures and the trainee response to required on the job actions.

V. Simulator - 80 hours total - CE has Singer Link simulator to duplicate Unit 2 CR and duplicate Unit 2 responses. Trainees were currently involved in this phase of training.

Each man will get: 8 simulator reactor startups and shutdowns, see a minimum of 20 malfunctions and he is expected to perform appropriate emergency procedure requirements to phase simulated plant into a safe condition.

VI. Pre-licensing Examination and Individual Review and Study - 160 hr - Each trainee will be given a complete Exam and walk-through. Then four weeks will be used for correcting weaknesses of trainees prior to the AEC Exam.

VII. AEC License and Exam and Wait Period.

VIII. Difference Course and AEC Waiver of Exams - 480 hours - This will be a lecture and study program for all systems under Phase II stressing differences. The difference course will be developed towards the end of Unit 3 construction.

6. "Unit 3 Training Records"

Records were reviewed and indicate that the trainees are entering the simulator phase of training. Records are available for attendance by each trainee and each trainee's examination results are recorded. It appears that the trainee class has gone from 21 trainees enrolled to a current 16 trainees enrolled.

a. System Exams Record

Records of grades for each trainee for systems comprehension have been documented for each trainee.

b. Watch Results Records

Contains walk-through evaluations and on the job reactor experience on Unit 2 for each trainee.

7. General Adm. Directive TR-GAD 2, Rev. 1, Title: AEC Licensed Operator/Senior Operator Retraining Program

Purpose: To establish a retraining program for personnel holding AEC Operator or a Senior Operator License. The procedure had been written and approved 12/20/73.

The procedure appears to establish the guidelines for a retraining program.

8. Quality Assurance Over Hangers, Supports and Restraints

The RO inspector reviewed records and procedures being maintained and used to assure quality control over hangers, supports and restraints.

QC Procedure WQA 4-0-17, "Inspection Procedure, Hangers, Supports, and Restraints for Class I and II Piping," 5/25/73 was reviewed. The procedure was written to establish a uniform system of inspection by WEDCO Quality Control personnel to insure that hangers, supports and restraints are installed in accordance with approved drawings and specifications.

The permanent records generated from implementing this procedure are to be maintained by WEDCO Mechanical Construction. Records will be turned over to Con Ed at completion of Unit 3.

The procedure requires that:

Prompt inspection be performed,
Procedure documentation be specified,
Rejection instructions be specified,
Corrective action and responsibility be stated, and
Acceptance and record verification be addressed.

The RO inspector stated that the type of fluid noted in the procedure for B-P snubbers requires review for possible change. (Reference above procedure)

The RO inspector reviewed an example line-cut, Line 656. The documents contain pipe support details and line-cut isometrics showing restraint location and identification numbers.

The RO inspector stated that the procedure and the implementation forms appear to be satisfactory to assure WEDCO checking of hanger replacement.

The licensee stated that Con Ed does a second level inspection to back up what WEDCO concludes. Con Ed uses the same procedure and instruction guidance.

9. Socket Welds - Vent and Drains

The RO inspector discussed with the licensee the method being employed at Unit 3 with placement and installation of socket welds.

The licensee stated that the socket welds are presented on drawings at predetermined locations and that the socket welds are put into the line at the fabricator's factory.