U. S. ATOMIC ENERGY COMMISSION Directorate of Regulatory Operations REGION I

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RO Inspection Report No. 50-247/72-10		
Subject: Consolidated Edison Company		· · · · · ·
Indian Point No. 2	License 1	NoDPR-26
Location:Buchanan, New York	Priority	· · · ·
	Category	В
Type of Licensee: PWR (873 Mwe) Westinghouse		• • •
Type of Inspection: Unannounced		
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Dates of Inspection: June 27 and July 7, 18, 19, 1972	· · · ·	
Dates of Previous Inspection: June 12-13, 1972		818/22
Principal Inspector: G. L. Madsen, Reactor Inspector		Date
Accompanying Inspectors: None	•	
Accompanying inspectors. None	·	Date
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	. •	Date
Other Accompanying Personnel: None		
Reviewed By. EABrune		Date 8/8/7 2
E. J. Brunner, Chief, Reactor Testing & Star Branch	rtup	Date
Proprietary Information: None	· ·	
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## Section I

#### Enforcement Actions

The fuel assembly guide thimble repair Quality Control inspection was not conducted in accordance with existing approved procedures and the requirements of the AEC Regulations 10 CFR Part 50, Appendix B, Criteria VI. (Paragraph 5)

## Licensee Action on Previously Identified Enforcement Matters

## Unresolved Items

A. Dynamic analysis of a "full blow" condition for the pressurizer safety valves disclosed a potential overstressed condition. Corrective actions are in progress. (Paragraph 7)

#### Status of Previously Identified Unresolved Items

- A. Control rods failed to operate in accordance with design, during preoperational rod drop testing. Repair work and control rod drag testing has been completed. Performance of additional control rod drop testing remains. (Paragraph 6)
- B. The eight accumulator check valves received a partial overlay to obtain acceptable wall thickness. This subject is still under review.
- C. Contingency Plan implementation no change.
- D. Resolution of two radioactive waste system deficiencies. Work in progress.
- E. Dynamic analysis of a "full blow" condition for the main steam safety valves disclosed a potential overstressed condition. A final RO review of the modification remains.
- F. The residual heat exchangers developed tube leaks. Clarification of code data sheets has not been completed.

## Design Changes

None

## Unusual Occurrences

None

## Persons Contacted

## Consolidated Edison Company

Mr. J. Makepeace, Chief Engineer, IP-2
Mr. M. Shatkowski, Reactor Engineer, IP-2
Mr. M. Imai, Engineer
Mr. G. Case, QC Supervisor
Mr. W. Wedler, QC Engineer

## Westinghouse Electric Company

Mr. R. McDaniels, WNFD, Project Manager
Mr. J. Ludwiczki, WNFD, Engineering
Mr. D. Moss, WNFD, Reliability
Mr. A. Rutkowski, WNFD, Quality Control
Mr. W. Singer, WNFD, Quality Control

#### Management Interview

The following subjects were discussed:

June 27, 1972

A. Fuel Assemblies

The inspector indicated some concern relative to the position that lint in itself is not a reason for rejection. The inspector asked if there were other conditions which would not be a cause for rejection of a fuel assembly. No additional exceptions were offered; however, the parties agreed that formal approval of procedure changes would be obtained if a justifiable reason were available. The inspector indicated a desire to review the NFSC meeting minutes relating to its review of the fuel assembly repair program. Upon questioning, the inspector was informed that the fuel assembly repair activities would be included in the control rod malfunction report to Licensing. (Paragraph 5)

#### B. Reactor Coolant System

The inspector indicated an intent to review the records of the reactor coolant system cleanup program, during a subsequent visit. (Paragraph 8)

## C. Fire Repair

The inspector indicated that the records pertaining to the checkout of components affected by the PAB fire are only 80 percent complete. Mr. Makepeace indicated that this work will be accomplished prior to initial criticality. (Paragraph 1)

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#### July 7, 1972

## A. Fuel Assembly Repair

The inspector indicated that the fuel assembly records indicate that the activities were not being accomplished in accordance with the approved procedures, in that the repair activities did not include a 100% borescope of all thimbles for an assembly with identified non-acceptable thimbles and the failure to do a 100% borescope of thimbles repaired by the same crew on the same shift. Mr. McDaniel indicated that verbal approval had been obtained. The inspector stated that the repair activities were not in accordance with existing approved procedures and was considered to be in noncompliance with Appendix B, Criteria VI of the AEC Regulations 10 CFR Part 50. Mr. Makepeace indicated that steps will be taken to provide corrective actions or justifications.

## July 19, 1972

#### A. Fuel Assembly Repair

The inspector indicated that the fuel assembly repair records indicate that the work was conducted in accordance with the latest approved revisions of the repair and inspections procedures; however, the inspection sampling techniques employed for the repair activities does not provide the high reliability factor which is desirous for this type of repair activity. The inspector was informed that Con Ed and Westinghouse considers the overall reliability of the repair to be high, for the following reasons:

- 1. All fuel assembly thimbles, whose companion control rod encountered medium to severe surface scratching, were inspected by borescoping following repair.
- 2. Fuel assemblies with non-repairable thimbles have been restricted to use in non-control rod positions.
- 3. Drag testing, of 61 rod assembly to fuel assembly combinations, produced drag forces less than five pounds.

Additionally the inspector was informed that the planned repeat of the preoperational rod testing will provide confirmatory data.

## Section II

Additional Subjects Inspected Not Identified in Section I, Where No Deficiencies Were Found

- 1. Primary Auxilary Building Fire Damage\*
  - a. Reviewed three functional test procedures for components affected by the PAB fire. Procedure preparation has been completed.
  - b. Reviewed test records pertaining to component functional testing which has been completed. (About 80 percent complete)
- 2. Main Steam Safety Valves
  - a. Discussed status of the main steam safety valve modifications, for correction of a potential overstress condition, during a "full blow". A verification of work completion by RO:I remains.
  - b. Reviewed the test procedures for verification of the setpoints for the twenty main steam safety valves.
- 3. Core Reloading Procedures
  - a. Reviewed the prerequistes for core loading and core loading procedures S-7 and S-8, respectively.
- 4. Nuclear Facility Safety Committee
  - a. Reviewed minutes of the Nuclear Safety Committee Meetings Nos.
    133 to 145.
    (2) to 1071 to New (1072)
    - (October 16, 1971 to May 6, 1972)

## Details of Subjects Discussed in Section I

5. Fuel Assemblies

As previously reported,\*\* a sample examination of 12 fuel assemblies revealed the presence of surface scratching, metal galling, and conditions that had the appearance of weld splatter, in all guide thimbles that were examined. On June 27, 1972, the inspector reviewed the guide

\*CO Report No. 50-247/71-15, Section II \*\* CO Report No. 50-247/72-08, Paragraph 2 thimble repair procedure, discussed the repair procedure qualification, and reviewed the repair and inspection records for the first 17 fuel assemblies processed. The results of this activity follows:

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a. Fuel Assembly Repair Procedure

Repair procedure No. XARF 14018 Rev. 3, was being utilized. This procedure was prepared and approved by Westinghouse Electric Company ( $\underline{W}$ ). Upon questioning, the inspector was informed that the Con Ed, Nuclear Facility Safety Committee (NFSC) had reviewed the procedure and Con Ed had approved the repair procedure for use. The inspector was advised that the NFSC minutes were in preparation. The inspector indicated that these minutes would be reviewed during a subsequest inspection.

The fuel assembly repair procedure consists of stepwise handling instructions; specified repair step instructions; and handling and repair step documentation checklists. The repair steps consist of:

- (1) Removal of water from the botton of each thimble with a syphon.
- (2) Use of a "flapper tool" with 150 grit emery cloth (aluminum oxide media) inserted in slots throughout the length of the rod. This tool was rotated with a variable speed drill motor.
- (3) Honing the dashpot section of the thimble.
- (4) Use of a cone shaped aluminum oxide emery cloth to dress the transition area between the upper thimble and the dashpot.
- (5) Several vacuuming steps for the removal of loose material. The materials were collected on a filter paper, for each fuel assembly repaired. The contents collected were to be placed in an envelope and identified for future reference.
- (6) Final cleaning with a cotton "daub" on a rod. The daub" was wetted with acetone.
- (7) Inspection to be performed by Quality Assurance.
- b. Quality Control Inspection Procedure, Rev. 2

This procedure was prepared and approved by  $(\underline{W})$ . The inspector

was informed that Con Ed had reviewed the procedure and approved it for use. The procedure includes the following:

- (1) Operating instruction for the use of the borescopes.
- (2) Verification that all thimbles in an assembly have been subjected to the polishing repair, by use of a short borescope, prior to movement of the assembly to the final QC inspection station.
- (3) Instructions for recording data on a route card, for each assembly.
- (4) Instructions for an external cleaniness inspection of each assembly.
- (5) Borescopic examination of fuel assembly thimbles per a specified sample plan. The sample plan includes the following:
  - (a) Borescope 8 randomly selected thimbles from each assembly (total thimbles per assembly - 20). Additional instructions specified inclusion of all thimbles, whose companion control rod showed medium to severe surface condition, in the sample of 8.
  - (b) If nonacceptable conditions are found, all thimbles repaired on the same shift by the same crew will be borescoped. Rework will be performed on nonacceptable thimbles only. These reworked thimbles will be borescoped 100%.

## c. Repair Procedure Qualification

The inspector was advised that the fuel assembly repair and inspection procedures were qualified at the Westinghouse Nuclear Fuels Division (WNFD) fabrication plant in Columbia, South Carolina. The inspector was advised that this qualification consisted of subjecting the thimbles from assembly A-34 (previously shipped from IP-2), sectioning a portion of the thimbles for visual observation, and establishment of a borescopic observation acceptance standard. In addition, the majority of the personnel involved in the repair activity at the IP-2 site were checked out at the WNFD shop.\*

\*Report "Examination of Indian Point 2 Control Rod Thimbles at Westinghouse Nuclear Fuel Division, Columbia Plant, 6-29-72, W. Potapovs. The inspector was advised, that as a result of site activities, some changes have been incorporated into the procedures. These changes included:

- (1) Deletion of honing of the upper thimble section, Experience showed that the "flapper" tool was providing an adequate cleanup. Upon questioning, the inspector was advised that borescoping of the upper guide thimble section was not performed, following use of the "flapper" tool, during the procedure qualification at the WNFD plant.
- (2) Final vacuum is being performed with the fuel assembly in the horizontal position, since some lint was observed to be remaining in the thimbles following vacuuming in the vertical position.
- (3) Use of acetone and/or demineralized water during the final "daubing" step, since there was a potential explosive condition in the vacuum box when using acetone only.

# d. Fuel Assembly Repair and Inspection Observations

The fuel assembly repair and inspection was being conducted in the IP-2 fuel storage building. Westinghouse personnel were performing the repair and inspections. The individuals involved were primarily management personnel from the WNFD fabrication shop. The repair activities were being conducted in accordance with the approved procedure. Upon questioning, the inspector was advised that the material collected on vacuum filters, to date, had not been analyzed.

Con Ed personnel were witnessing the repair program on a spot check basis. No formalized program was available; however  $(\underline{W})$  personnel advised the inspector that Con Ed had provided considerable constructive input toward improvements of the overall program.

The inspectors borescopic observation of guide thimbles at the QC inspection station revealed no discrepancies relative to the acceptance observation standard.

On July 7, 1972 the inspector resumed the review of the fuel assembly guide thimble repair program. The inspector was advised that the repair program was nearing completion with a limited amount of re-

vacuuming, control rod drag testing, and external inspection of fuel assemblies remaining. A review of current procedures, discussions with personnel, and a review of repair records revealed the following:

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## a. Procedures

The latest approved repair procedure was Revision No. 4. This revision was essentially the same as revision No. 3 which was reviewed on June 27, 1972. Additional vacuuming steps were included, specifically for the removal of loose foreign material in the form of lint.

The latest issue of the QC procedure was revision No. 3. This revision includes additional clarification relating to the sample plan. The changes in wording included, "During borescoping of 8 thimbles, if lint\* is found, revacuum all 20 thimbles and reinspect thimbles which contained lint."

#### b. Status of Repair

Discussion with personnel revealed that the fuel assembly repair was considered complete, except for the following:

- (1) Nine assemblies require revacuuming.
- (2) Two assemblies, B-07 and B-35 have been shipped to the WNFD fabrication shop in Cheswick, Pennsylvania for the repair of handling damage.
- (3) Control rod drag testing of 44 rod-fuel assembly combinations remain to be performed.
- (4) Final inspection of the external surfaces of the fuel assemblies.

## c. Repair and Inspection

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The inspector was advised that as a result of borescopic examinations, six assemblies have been declared unfit for use in conjuntion with a control rod assembly. Upon inquiry, the inspector was informed that this condition will be handled procedurally and no positive preventive measure, such as welding of the insert to the fuel assembly, is planned.

\*Lint is not in itself a reason for rejection of the tube surfaces.

A spot review of the repair and inspection summary sheet and the fuel assembly repair trailer cards revealed several instances where loose materials were noted during borescopic examination; however, a 100% borescopic examination of all thimbles in the assembly was not performed, as specified in the QC inspection procedure. The corrective actions taken consisted of revacuuming all thimbles in that fuel assembly and reinspecting the thimbles which were observed to contain loose materials. Tn addition, the records did not contain information to substantiate that all thimbles repaired by the same crew, on the same shift were borescoped, in cases where nonacceptable thimble conditions were observed. Discussions that followed indicated that a loose interpretation, of what is a nonacceptable condition, was employed, even though the approved procedure specifies lint as the only item that in itself is not a reason for rejection. The inspector indicated that the above condition is considered to be an apparent item of noncompliance with the AEC Regulation 10 CFR 50, Appendix B, requirements. The inspector was advised that verbal approval for the changes in inspection techniques had been received from all parties, that officially approved the previous revisions of the procedures. The inspector pointed out that the AEC Regulation 10 CFR 50, Appendix B, Criteria VI, which specifies measures for controlling the issuance of documents. The inspector pointed out that criteria VI states in part, "These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed work is being performed."

The inspector continued the review of the fuel assembly guide thimble repair program on July 18 and 19, 1972. The inspector was presented a WNFD QC procedure, Rev. 4. This revision was provided as verification for verbal agreements to changes to the repair program. The revised procedure changes and the justifications for the changes included the following:

- (1) The fuel assemblies were inspected for external cleanliness while leaving the QC inspection area and later in the fuel storage pit, because of a crane handling bottleneck.
- (2) Those thimbles corresponding to medium and severely scratched control rods would be part of the 8 thimble random sample. (<u>W</u>) indicated that this added an assurance that the most severely scored thimbles were being repaired.

(3) A 100% inspection or rework is allowed if an unacceptable thimble

is found during sampling. If 100% of the thimbles are reworked, then a new 8 thimble random sample is to be borescoped. The inspector was informed that this change was made, since those assemblies not sufficiently repaired by one cycle of repair were easily identifiable. The inspector was informed that an increased reliability was attained by performing a 100% rework of all thimbles and reinspecting 8 thimbles on a sample basis, including those thimbles with known questionable conditions. The inspector was informed that more than 90% of the fuel assemblies, subjected to a rework, were found acceptable on the 8 of 20 thimble reinspections and that the other assemblies were not repairable and have been restricted to non-control rod locations.

- (4) The addition of a 100% revacuum or reswab and revacuum, to remove loose material without rejecting the assembly. The inspector was informed that as the vacuum tube saw considerable use, the internal walls would become coated with wet materials, which had been vacuumed from the thimbles. As a result, a reduced suction was encountered and the removal of minute particles could not be assured. Additionally, the inspector was informed that these small amounts of loose material was not considered a harmful condition; however, it was felt prudent to check the vacuum tube and to insure quality of revacuum. The thimbles with known loose materials were reinspected.
- (5) Deletion of the requirement that if nonacceptable thimbles are found, all thimbles repaired by the same crew on the same shift will be 100% borescoped. The inspector was informed that some of the more severely scored thimbles would not pass the acceptance standard after one repair cycle, regardless of the quality of the repair crew. Also it was pointed out, that after a 100% inspection of assembly A63 and B41, (mates to rejected assemblies A46 and B42 respectively) it was evident that the assemblies were from two distinct families of conditions. Additionally, the overall efficiency of repair (first time repair cycle accepted versus total repaired) showed no distinct individual crew dependency.

#### d. Status of Repair

The inspector was provided a summary sheet relating to the fuel assembly repair program. This summary, plus discussions, revealed that the thimble repair is complete and in accordance with revision 4 of the repair and QC inspections procedures.

The inspector was informed the fuel assemblies A13, A18, A41, A53, and B44 were not repairable because of existing thimble surface conditions. Additionally, the inspector was advised that assemblies A06 and C25 were rejected during the correction

of internal thimble diameter program. The inspector was advised that these seven fuel assemblies are considered rejects and will be utilized in non-control rod locations only.

The inspector was advised that assemblies B07 and B35 are still at the WNFD, Cheswick plant being rework to correct damages that were caused during handling. These assemblies are scheduled to arrive at IP on July 19, 1972.

## e. Review of Repair Records

A review of the repair and inspection summary records indicated that the activities were accomplished in accordance with Revision No. 4 of the repair and QC procedures. A sample audit of the summary records versus the trailer cards for the individual fuel assemblies revealed no discrepancies.

# f. External Inspection

The inspector reviewed a Con Ed, QC final external inspection procedure. The procedure included an inspection of all external surfaces, removal of any items found, and documentation of the results. A sample audit of records indicated that the inspection was being accomplished in accordance with the procedure; and an inspection of assemblies A39, A61, B16, B41, B50, and B64 have not been accomplished. Additionally, assemblies B07 and B33 are scheduled to be inspected upon receipt from WNFD, Cheswick.

#### g. Report To Licensing

The inspector inquired as to the status of the report to Licensing relating to the fuel assembly repairs and the control rod malfunctions. The inspector was advised that an interim report has been prepared and should be submitted soon, and that a final report will follow.

#### 6. Control Rods

As previously reported, control rod malfunctions were encountered and repairs were accomplished\*. Subsequently, repairs of fuel assembly guide thimbles were performed.\*\* The inspector's review of testing of control rod assemblies with mated fuel assemblies, revealed that drag forces were less than 5 pounds in all 61 drag tests performed.

\*CO Report No. 50-247/72-08, Paragraph 1. \*\*CO Report No. 50-247/72-08, Paragraph 2 and Paragraph 5 of this report. Upon questioning, the inspector was advised that the control rod retesting procedure has not been finalized; however, present plans include the repeat of the initial preoperational rod drop testing program.

## 7. Pressurizer Safety Valves

A dynamic analysis of a "full blow" condition for the pressurizer safety valves, disclosed a potential for an overstressed condition. The inspector was informed that a modification is required, and the modification would consist of reinforcement of the weldments which attach the safety valve piping to the pressurizer. This item will require followup.

## 8. Reactor Coolant System

As previously reported,\* Westinghouse and Con Ed concurred that the reactor coolant system should be inspected for foreign materials. The inspector verified that an approved procedure exists for a systematic inspection and cleanup program for the reactor vessel, main coolant lines, reactor vessel internals, and the control rod guide tube assemblies. A review of the documentation checklist indicated that the inspection and cleanup program was performed in accordance with the procedures. The records indicated that the loose material found included: metal chips, string, loose weld bead, lint, and slivers of wood. Thirty five control rod guide tubes were identified as having metal chips or debris inside the guide tubes. A review of photographs of the foreign material collected was reviewed. About 1/8 of a cup of foreign material was identified and removed during the course of the reactor coolant system inspection.

# \*CO Report No. 50-247/72-08, Paragraph 3.