

UNITED STATES
NUCLEAR REGULATORY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

FEB 4 1975

Commonwealth Edison Company
ATTN: Mr. Byron Lee, Jr.
Vice President
P. O. Box 767
Chicago, Illinois 60690

Docket No. 50-237

Gentlemen:

This refers to the inspection conducted by Messrs. Johnson, Erb, McGonnagle, and Kister of this office on December 16-18 and 27, 1974, of activities at Dresden Unit 2 authorized by NRC Operating License No. DFR-19 and to the discussion of our findings with Mr. Stephenson and members of his staff at the conclusion of the inspection.

A copy of our report of this inspection is enclosed and identifies the areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with plant personnel, and observations by the inspectors.

During this inspection, it was found that certain of your activities appear to be in noncompliance with NRC requirements. The item and reference to the pertinent requirements are listed under Enforcement Action in the Summary of Findings Section of the enclosed inspection report.

This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office within

twenty days of your receipt of this notice, a written statement or explanation in reply, including: (1) corrective steps which have been taken by you, and the results achieved; (2) corrective steps which will be taken to avoid further items of noncompliance; and (3) the date when full compliance will be achieved.



FEB 4 1975

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this notice, the enclosed inspection report, and your response to this notice will be placed in the NRC's Public Document Room. If this report contains any information that you or your contractors believe to be proprietary, it is necessary that you make a written application to this office, within twenty days of your receipt of this notice, to withhold such information from public disclosure. Any such application must include a full statement of the reasons for which it is claimed that the information is proprietary, and should be prepared so the proprietary information identified in the application is contained in a separate part of the document. Unless we receive an application to withhold information or are otherwise contacted within the specified time period, the written material identified in this paragraph will be placed in the Public Document Room.

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely yours,

Gaston Fiorelli, Chief
Reactor Operations Branch

Enclosure:

RO Inspection Report
No. 050-237/74-11

cc: B. B. Stephenson
Station Superintendent, w/encl

bcc: RO Chief, FS&EB
RO:HQ (4)
Licensing (4)
DR Central Files
RO Files
PDR
Local PDR
NSIC
TIC
A. Roisman

U. S. NUCLEAR REGULATORY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

Report of Operations Inspection

RO Inspection Report No. 050-237/74-11

Licensee: Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dresden Nuclear Power Station
Unit 2
Morris, Illinois

License No. DPR-19
Category: C

Type of Licensee: GE BWR, 810 MWe

Type of Inspection: Special, Unannounced

Dates of Inspection: December 16-18 and 27, 1974

Dates of Previous Inspection: October 21 - 25, 29 and November 1, 1974
(Operations)

Principal Inspector:

P. H. Johnson
P. H. Johnson

1/29/75
(Date)

Accompanying Inspectors:

H. B. Kister
H. B. Kister
(December 18, 27)

1/29/75
(Date)

W. J. McGonnagle
W. McGonnagle (December 16-18)

C. M. Erb (December 16-17)

Other Accompanying Personnel: None

Reviewed By:

R. C. Knop
R. C. Knop
Senior Reactor Inspector
Projects Unit 1

2/3/75
(Date)

SUMMARY OF FINDINGS

Enforcement Action

The following noncompliance item is considered to be of Category II severity:

Section 6.0.E of the Technical Specifications requires that procedures for "maintenance operations which could have an effect on the safety of the facility" be reviewed and approved by the operating engineer and the technical staff supervisor. Dresden Administrative Procedure 30-158, which outlines procedures to be used in conducting a review, states in Paragraph C.2 that participants in this function are "responsible for conducting critical and thorough reviews."

Contrary to this requirement, the review performed by the Dresden Onsite Review group on December 26, 1974, of special procedures related to the use of jet pump seals was not a "critical and thorough" review as evidenced by the following errors noted in the procedures:

1. Shutdown cooling isolation valve designations for the A and B Loops were reversed in the seal installation procedure and the loop draining procedure.
2. The LPCI Loop selection logic jumper procedure erroneously provided for LPCI lineup to the A Loop during replacement of the bypass piping in the A Loop.
3. The procedure for draining the A Loop called for tagging the recirculation pump suction and discharge valves out of service in the B Loop instead of the A Loop.

Licensee Action on Previously Identified Enforcement Matters

Not Reviewed.

Unusual Occurrences

- A. Cracks were discovered in the non-isolable pipe-to-weldolet weld in the 4" recirculation bypass piping on December 13, 1974.
(Paragraphs 3, 5, and 7)

Other Significant Findings

A. Current findings

The licensee plans to replace all of the 4" recirculation bypass piping (except for the short section replaced in October 1974) during the current refueling outage.

B. Status of Previously Reported Unresolved Items: Not Reviewed.

Management Interview

The inspectors conducted management interviews with Mr. Stephenson (Station Superintendent) and members of his staff on December 18 and 27 at the close of the site visits. Mr. J. Galle (Section Engineer, Station Nuclear Engineering) also participated by telephone in the December 18 interview. The following matters were discussed:

December 18, 1974

- A. The inspectors stated that one question of particular interest was whether the crack discovered in December had been present but perhaps overlooked when the examinations were conducted in September 1974. Licensee representatives, including one individual who had participated in the September examinations, stated they were certain that the crack did not exist in its present form during that examination.
- B. The inspector asked the licensee whether he intended to replace the 4" recirculation piping. The licensee responded that the matter was still under review and that a decision would be forthcoming within two weeks.
- C. Additional matters discussed during the interview included other indications revealed by the ultrasonic examination, continuing investigation into the cause of the cracking, and the licensee's preliminary plans for repairs to the 4" piping. The inspector subsequently requested during a January 8 telephone conversation with Mr. Stephenson that the licensee define what additional investigation would be conducted in light of the continuing crack problem.

December 27, 1974

- D. The inspectors stated that they had examined the temporary jet pump seals and reviewed procedures related to their installation and subsequent draining of the recirculation piping. The licensee was informed that significant errors noted in the procedures gave

strong reasons to doubt the thoroughness of the procedure review conducted by the onsite review group. The inspectors stated that noncompliance with review requirements was apparent. The inspectors made additional comments which, although not indicative of errors in the procedures, were directed at possible improvements in the procedures. (Paragraph 3.e)

- E. The inspectors asked to be informed prior to installation of the jet pump seals.

REPORT DETAILS

Part I

Prepared By: P. H. Johnson and H. B. Kister

1. Persons Contacted

Dresden Station

B. Stephenson, Station Superintendent
A. Roberts, Assistant Superintendent
T. Watts, Technical Staff Supervisor
D. Adam, Radiation/Chemistry Supervisor
E. Johnson, QC Engineer
R. Meadows, QC Engineer
R. Thomas, Instrument Maintenance Foreman
R. Williams, Lead Engineer, Unit 2

Off-Station

D. Galle, Section Engineer, Station Nuclear Engineering
W. Witt, Associate Engineer (ASNT Level II)

2. General

This special inspection was conducted to review activities related to the discovery of cracks in the 4" recirculation bypass piping of Dresden 2. During site visits on December 16-18, the inspectors reviewed and discussed the discovery of the pipe crack, further examinations performed by the licensee, and plans for resolution of the problem. During the December 27 site visit, the inspectors examined the temporary jet pump plugs and reviewed procedures related to their use.

3. Recirculation Bypass Piping Cracks

a. Crack Discovery

On December 13, 1974, while on site for an inspection of Dresden 1, the inspection was informed by a licensee representative that a crack had been discovered in the 4-inch recirculation bypass piping, loop B. The inspector examined the leak, and observed two pin-sized streams of water coming from the pipe at approximately the 8 o'clock position (viewed while

facing the 28-inch recirculation pipe) in the heat-affected zone on the pipe side of the non-isolable pipe-to-weldolet weld. This was the same location as the non-isolable loop A weld which was found to be cracked in September 1974. A light wisping spray was also evident from a position slightly below the two pin-sized leaks. The inspector discussed the leaks with a craftsman which had been grinding on the weld shortly before discovery of the leak. The craftsman stated that he had noticed and reported the leakage upon completion of grinding, but that he was uncertain whether leakage had existed before grinding commenced.

Licensee representatives stated that the 4-inch recirculation piping associated with both loops was being reexamined as followup to the repairs completed in October, and that representatives of Peabody Testing, the NDE examiner, had requested that the crown of welds to be examined be ground to permit an L-wave examination of the welds in addition to the other examinations which had been performed by Commonwealth Edison personnel in September. The inspector was made aware during subsequent discussions that two preliminary ultrasonic test indications had been observed in the leaking weld on December 11 or 12, but that (1) the change to the examination procedure which called for grinding of the weld crowns was unrelated to these earlier indications and (2) the complete examination procedure had not been completed for this weld at the time the leak was discovered, to the effect that the preliminary indications had not yet been evaluated.

b. Related Operating Records

The following facility records were reviewed for possible information relating to the cause or indication of the observed leakage:

- (1) The reactor log was reviewed for the period of operation following repair of the previous cracks until commencement of the refueling outage on November 2 for indication of operating sequences which might have resulted in thermal transients to the recirculation bypass piping, such as opening the bypass valve during operating or hot standby conditions. No indication of such an operating sequence was discernible.

- (2) Review of daily readings from the drywell continuous air monitors showed no discernible trend prior to commencement of the refueling outage.
- (3) Weekly samples taken from three locations near the observed crack, using the installed multipoint sampling manifold, showed some increase in activity levels prior to the refueling outage, as shown below. No conclusion was reached regarding the cause of the increase (measurements in picocuries per liter):

<u>Date</u>	<u>2 B Recirc Pump Seal</u>	<u>2 B Recirc Pump Discharge</u>	<u>2 B Recirc Header</u>
10/11	.21	.18	.19
10/18	.26	.23	.27
10/25	.48	.54	.95
11/1	.60	.64	.90

c. Recirculation Bypass Piping Reexamination

Examination of the remaining welds in the 4-inch recirculation bypass piping disclosed three additional welds in the B Loop and two welds in A Loop to have one or more ultrasonic test indications. The leaking pipe-to-weldolet weld in the B loop was determined by ultrasonic examination to be cracked from approximately the two o'clock to the six o'clock and from the seven o'clock to the 8:30 positions. After further evaluation of the remaining indications, aided by the use of radiographic examinations, the licensee initially evaluated one additional weld, the downstream valve-to-pipe weld in the B bypass line, to be cracked. The remaining indications were judged by the licensee to be surface indications. Licensee representatives stated after still further evaluation that the valve-to-pipe indication was considered to result from weld preparation imperfections on the inner surface, and not from a crack as originally concluded. In subsequent discussions with the licensee on December 23, the inspector was made aware that ultrasonic test records showed indications on two additional A Loop welds which had not been previously reported to have indications.

Findings related to the inspectors' review of the licensee's ultrasonic and radiographic examinations will be found in Section III of the Report Details. Review of the licensee's examination was not completed and conclusions relating to the adequacy or correctness of his evaluation were not drawn. Since the licensee had by this time committed to replace all 4-inch recirculation bypass piping, further evaluation of the acceptability of the installed piping was considered unnecessary.

d. Temporary Jet Pump Seals

At the time of the inspection, the licensee was considering the use of temporary jet pump seals to isolate the recirculation piping from the reactor. The inspectors examined a jet pump seal and observed its insertion into a spare jet pump located in the turbine building. The seal was noted to position itself at the inlet to the throat of the jet pump, with a toggle-actuated device then bringing a rubber seal into contact with the jet pump nozzle. An apparently good seal was obtained, although the same seal would not fit into an adjacent spare jet pump. The inspectors stated that the licensee should consider rehearsing the plug installation from a vertical distance similar to that which would be experienced in the reactor vessel. A licensee representative subsequently reported that this was accomplished by erecting a jet pump and inserting a temporary seal from the operating floor of the turbine building. During subsequent attempts to install the temporary seals in the reactor vessel jet pumps, difficulty was experienced in obtaining a proper fit, and plans to use temporary jet pump seals were deferred pending possible redesign of the seal. A licensee representative stated that the change in plans was necessitated by dimensional differences allowed by the design tolerances of the jet pump forgings. The representative stated that the freeze plug method used in September 1974 would be reused for loop replacement if a successful redesign of the jet pump seals could not be accomplished. The inspector noted that even if a proper temporary seal of the jet pumps is accomplished, noticeable leakage may be experienced through the metal-to-metal fit between the ram's horn and the jet pump riser.

e. Jet Pump Isolation Procedures

The inspectors examined procedures issued and approved by the licensee on December 26, 1974, to effect isolation of the 4" recirculation piping for replacement. The inspectors commented on the procedures as follows:

- (1) Installation of Jet Pump Seals. The inspectors stated that the procedure should require verification of proper seating of the temporary seals using a videocamera. The inspectors also noted one error in the valve lineup sheet.
- (2) LPCI Loop Selection Alignment. The purpose of this procedure was to line up the LPCI to inject into the non-isolated recirculation loop. It defined jumpers to be installed

to inject into either Loop A or Loop B. The portion which applied to injection into the B Loop was incorrect, such that injection would actually have occurred to the A Loop. The inspectors also commented that valves to be tagged out of service should be more specifically identified.

- (3) Loop Draining Procedure. Two similar procedures, one for draining each loop, were reviewed. The procedure for draining the A recirculation loop was noted to have two incorrect identifications, to the effect that the loop would not have been isolated from the reactor. The shutdown cooling loop isolation valves were also reversed. The inspectors commented that the procedure should provide an estimate of the amount of water to be drained from the isolated loop and provide for quantitative monitoring of the draining to enable operating personnel to assess possible leakage through the jet pumps or isolation valves.

Licensee representatives stated in response to questions that no individual had made an independent detailed check of the valve lineup and jumper arrangements. The inspectors stated that the procedures did not appear to have been properly reviewed, and that the incorrect valve lineups and LPCI logic jumper arrangements were of particular concern. The licensee was informed that the matter was considered to represent a violation of procedure review requirements.

REPORT DETAILS

Part II

Prepared By: C. M. Erb 1/29/75
C. M. Erb (Date)

Reviewed By: D. M. Hunnicutt 2/3/75
D. M. Hunnicutt (Date)

4. Persons Contacted: See Paragraph 1.
5. Recirculation Bypass Piping Cracks

a. Laboratory Results

The licensee representative reported that laboratory investigations of the fracture area by Argonne National Laboratory, Southwest Research Institute, and other consultants revealed a satisfactory chemical analysis and normal microstructure for the pipe material.

One consultant did report a slight difference in the residual stress remaining in the weld preparation area of the pipe, depending upon whether the preparations were machined or ground. However, this slight difference did not appear to be of any consequence in causing failure, since it appears that both shop welds and field welds have developed cracks which represent both ground and machined weld preparations.

A study of the cracks by metallography and other means has been concluded, and the concensus is that the intergranular cracks were caused by stress-assisted corrosion cracking. Radiographs appeared to substantiate this conclusion.

b. Possible Corrective Actions

The following courses of action have been considered for correcting the problem, which has occurred previously at Quad-Cities, Dresden, Millstone, and two Japanese plants:

- (1) Operate with the four-inch bypass valve open at all times, thus minimizing water stagnation and temperature differential between the twenty-eight-inch line and the four-inch line.

- (2) Replace the Type 304 stainless steel four-inch bypass line material with a different heat of 304 stainless steel.
- (3) Revise the support and hanger for the bypass line.
- (4) More frequent inspection of the line.

c. Conclusion

- (1) Course No. b(4), will be followed until the effectiveness of the corrective action has been established.
- (2) Course No. b(1), will be taken by the licensee, which should result in a more uniform temperature distribution and less stress on the four-inch pipe line.
- (3) Course No. b(2), replacement of the four-inch bypass piping with a different heat of stainless 304, was being considered. The licensee subsequently decided that the bypass piping in both loops would be replaced.

REPORT DETAILS

Part III

Prepared By: W.J. McGonagle 1/30/75
W.J. McGonagle (Date)

Reviewed By: D. M. Hunnicutt 2/3/75
D. M. Hunnicutt (Date)

6. Persons Contacted: See Paragraph 1.

7. Recirculation Bypass Piping Cracks

a. Ultrasonic Inspection

Ultrasonic shear and L-wave inspections were made on the 4-inch bypass line welds for recirculation loops A and B of Dresden II. The procedure used was Commonwealth Edison Company Nondestructive Testing Procedure NDT-C-2 Revision 7 (approved November 27, 1974). This procedure requires a shear wave beam angle of 45° and a test frequency of 2.25 MH Z. Procedure NDT-C-2 gives the details for calibration of the equipment using side drilled holes. It was necessary to grind the welds to get a satisfactory surface for making an L-wave examination of the welds. This additional examination, not performed in September 1974, was requested by Magnaflux to assist in the evaluation of indications. L-wave examination of the base metal was performed in both September and December 1974.

The ultrasonic inspection of the Dresden II welds was done by Magnaflux, Inc. The personnel were Level II inspectors. Magnaflux inspectors reported indications of cracks in several welds. A review of the records of the ultrasonic inspection made in September 1974, revealed no indications of cracks in these welds at that time. Radiographs were made on these welds to assist in evaluating the ultrasonic results.

The September 1974 ultrasonic testing was performed by Commonwealth Edison personnel. The person in charge was a Level III inspector and the NDE was actually done by a Level II inspector. The procedure used in December 1974 was essentially the same as the one used in September 1974. No differences between the NDE performed in September and in December were noted other than the change in personnel performing the inspection and the additional L-wave examination of the welds discussed above.

b. Radiography

The radiographs made of the welds in the Dresden II bypass loops were not of good quality. This was not unexpected because (1) the pipe was full of water, (2) the radiation level in the area was high, (3) there was only limited access to the weld area for positioning the source, and (4) there was limited opportunity to compare the radiograph with the physical appearance of the weld.

On the radiographs reviewed, there were large density variations on the film, and one could not see the outline of the penetrometer or the 2T hole. Rough calculations indicated that the source to object distance was adequate. There were crack-like indications on the radiographs of two welds. Further evaluation would have been necessary to make a determination of the acceptability of the welds; however, since the licensee decided to replace the piping no further evaluation was performed.