U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-456/84-34(DRP); 50-457/84-32(DRP)

Docket Nos. 50-456; 50-457 Licenses No. CPPR-132; CPPR-133

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Braidwood Nuclear Power Station, Units 1 and 2

Inspection At: Braidwood Site, Braidwood, IL

Inspection Conducted: November 12 through December 19, 1984

Inspector: R. D. Schulz

R. Gardner

Approved By: W. L. Forney, Chief
Projects Section 1A

12/28/84
Date

Inspection Summary

Inspection on November 12 through December 19, 1984 (Report No. 50-456/84-34(DRP); 50-457/84-32(DRP)
Areas Inspected: Routine, unannounced safety inspection of allegations, licensee action on previously identified items, work activities observed during plant tours, piping material traceability verification program, pipe supports, hydrogen recombiner power and control cabinet, licensee nonconformance reports, electrical cables, and reactor coolant piping. The inspection consisted of 139 inspector-hours onsite by two NRC inspectors including 12 inspector-hours onsite during off-shifts.
Results: Of the nine areas inspected, no items of noncompliance were identified in six areas, one item of noncompliance was identified in each of the remaining areas. (Deficient HVAC welds - Paragraph 4; lack of appropriate pipe support, welding inspection procedure - Paragraph 6; and failure to follow material control procedures - Paragraph 7).

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*M. Wallace, Project Manager
*G. Fitzpatrick, Assistant Manager Quality Assurance Corporate
*C. Schroeder, Licensing and Compliance Superintendent
*D. Shamblin, Construction Superintendent
T. Quaka, Quality Control Supervisor
G. Groth, Assistant Construction Superintendent
S. Hunsader, Quality Assurance Supervisor
R. Wrucke, Licensing Engineer
E. Netzel, Quality Assurance Supervisor
M. Gorski, Engineer
R. Tate, Quality Assurance Engineer
*W. Vahle, Field Engineering Manager
*L. Kline, Project Licensing Compliance

Phillips Getschow Company (PGCo)

*T. G. O'Connor, Site Manager
*J. Carlson, Quality Control Supervisor
L. J. Butler, Assistant Quality Control Supervisor
W. Berg, General Foreman
G. Galloway, Assistant Project Engineer
R. Hamilton, Welding Supervisor
M. Knaff, Engineering Group Instrument Supervisor

G. K. Newberg Company

C. Zavada, Level II Inspector

L. K. Comstock and Company, Inc. (LKC)

*I. Dewald, Quality Control Manager
L. Seese, Assistant Quality Control Site Manager
M. Lechner, Lead Inspector
J. Malmquist, Area Manager
T. Simile, Welding Engineer

Pullman Sheet Metal

*D. Grant, Site Quality Assurance Manager
*G. Minor, Quality Control Supervisor

Sargent and Lundy

D. A. Gallagher, Field Project Manager
K. Fus, Field Coordinator

*Denotes those personnel contacted concerning inspection findings.

2. Allegations

a. (Closed) Allegation (RIII-84-A-0096). Part I - Phillips-Getschow rusted pipe was described on August 9, 1984, as having less than minimum wall thickness.

Commonwealth Edison identified a 10 CFR 50.55(e) reportable item on June 21, 1984, regarding wall thickness inadequacies for one heat of 2" S/80 pipe. The inspector investigated the minimum wall issue and identified numerous heats of pipe with potential minimum wall deficiencies in Inspection Report 84-17. The investigation resulted in two violations designated by control numbers (456/84-17-01; 457/84-17-01) and (456/84-17-02; 457/84-17-02). The violations concerned failure to adequately control pipe in a rusted condition. In addition, an open item designated by control number (456/84-17-03; 457/84-17-03) is documented in Inspection Report 84-17 for 337,350 feet of pipe which requires analysis for wall thickness degradation. This allegation is considered to be closed.

Part II - Holes burned in steel above the reactor which were thought to be identified.

Flame out holes in steel have been identified in the containments and documented in nonconformance reports, with the corrective action approved by Sargent and Lundy. The Gust K. Newberg Construction Company identified the holes in the following nonconformance reports:

Nonconformance No.	Description
213-557	Structural Steel, Containment II
213-558	Structural Steel, Containment I
213-577	Structural Steel, Containment I
213-599	Structural Steel, Containment II
213-602	Structural Steel, Containment II
213-609	Structural Steel, Containment II
213-619	Structural Steel, Containment II
213-620	Structural Steel, Containment II
213-623	Structural Steel, Containment II
213-630	Structural Steel, Containment II
213-637	Structural Steel, Containment II
213-656	Structural Steel, Containment II
213-658	Structural Steel, Containment II
213-660	Structural Steel, Containment II
213-676	Structural Steel, Containment II
213-835	Structural Steel, Containment I

This allegation is considered to be closed.

b. (Closed) Allegation (RIII-84-A-0119). On August 17, 1984, the alleger, an employee of the L. K. Comstock quality control department, stated that he was intimidated and harassed by L. K. Comstock quality control supervisory personnel. On September 21, 1984, the inspector met with the alleger and four other quality control inspectors. The five individuals did not provide any specific examples or records substantiating intimidation or harassment. During the course of the interview, it was revealed that the main issue is a morale problem which appears to be related to monetary matters and subjective opinions of poor management. The inspector met with Commonwealth Edison Project management and Construction Superintendent to discuss the issue of intimidation and harassment. Subsequently, Commonwealth Edison management met with the L. K. Comstock Site Quality Control management to ensure that all parties understood that any form of intimidation or harassment would not be tolerated by Commonwealth Edison or the NRC. This allegation is considered closed.

3. Licensee Action on Previously Identified Items

a. Bulletins

The following Bulletins are considered closed because they concern boiling water reactors which are not used at Braidwood:

I. E. Bulletin 80-13 - Core Spray Spargers
I. E. Bulletin 80-14 - Scram Discharge Volume
I. E. Bulletin 80-25 - Target Rock SRV's
I. E. Bulletin 80-01 - Air Operated ADS Valves
I. E. Bulletin 80-07 - Jet Pumps
I. E. Bulletin 80-17 - BWR Control Rods

b. Unresolved Items

(Closed) (456/83-10-05; 457/83-10-05): Calibrated instruments utilized to verify acceptable pipe bends, in numerous cases, are not traceable to inspection records. This item was additionally identified in inspection report number 83-09 and will be tracked by control number 83-09-02(c). The item is closed due to duplicate findings, however, 83-09-02(c) will remain open and be reviewed at a later date for adequate corrective action.

(Closed) (456/84-08-05; 457/84-08-05): Six high strength bolts were below the required structural steel torque values. The six bolts were re-tightened by the turn of the nut method and this problem was determined to be an isolated case, as these bolts had been removed and replaced without proper authorization. Training was conducted with regard to the proper procedures to follow in the removing and replacing of items. The six bolts were documented on nonconformance report number 213-795 on June 5, 1984.

c. Open Items

(Closed) (456/84-17-05; 457/84-17-05): Blockwall columns with structural steel bolted and welded connections missing inspection reports. A sampling inspection plan was originally proposed by the licensee to assure quality work; however, the licensee has decided to inspect all connections or provide additional support to those not inspected. This action was based upon the numerous weld deficiencies identified. All connections are to be repaired or additionally supported as required. This corrective action was documented on November 2, 1984, in a 10 CFR 50.55(e) transmittal by the licensee to the NRC. The 50.55(e) is identified by designated number 82-10.

(Closed) (456/84-17-07; 457/84-17-07): Instrument piping drawing contained a statement, "pitch pipe 1/2" per foot if possible". The note on the drawing has been changed and now states single pipe pressure instruments are recommended to have their sensing lines installed with a continuous slope (1/2" per foot recommended), however, it is acceptable to have horizontal runs without slope and a high point without high point vent valves, provided no traps are formed. Flow lines must have 1/2" per foot slope. No lines were identified by the NRC inspector with unacceptable pitch and an instrument line retro-fit program, per quality control procedure, has been instituted by the piping contractor to verify acceptable pitch.

4. Plant Tours

The inspector observed work activities in-progress, completed work, and plant status during general inspections of the plant. Observation of work included high strength bolting, safety-related pipe welding, anchor bolts, structural welds, and cable trays in the containments and auxiliary building. Particular note was taken of material identification, nonconforming material identification, housekeeping, and equipment preservation. Craft personnel were interviewed in the work areas.

While touring the containment and fuel handling building, the inspector noticed numerous pieces of small bore piping laying on the floor with a hold tag attached to each bundle of pipe containing five or six pieces. This pipe was on hold per Phillips Getschow Co. nonconformance report number 2001 as a result of potential minimum wall deficiencies. This issue was discussed with Phillips Getschow Co. quality control supervision, and since the pipe laying on the floor was not an optimum material control practice, a decision was made by quality control supervision to remove this pipe to designated hold areas. The pipe has been removed from the containments and fuel handling building and the inspector considers this issue closed.

The inspectors toured the plant on several occasions and identified HVAC duct welds that had cracked completely in a direction parallel to the weldment. These welds were designed to join a companion angle to the

duct but the cracking resulted in no bonding of the weld metal to the companion angle. The welds were made by a silicone bronze braze process. The cracked safety-related welds and associated ducts identified by the inspector are detailed below:

Duct	No. of Welds	Systems
4024-Unit II	5	Aux. Bldg. Vent System
4032-Unit II	1	Aux. Bldg. Vent System
4684-Unit I	4	Aux. Bldg. Control Room Vent Sys.
4686-Unit I	3	Aux. Bldg. Control Room Vent Sys.

Sargent and Lundy Specification F/L-2782, HVAC Work, commits to either AWS D1.1, 1977 or AWS D1.3, 1978 for the welding of stiffener angles, companion angles, or support angles to the duct. Engineering Change Notice 4591 was incorporated in Specification F/L-2782 on June 6, 1983 and allowed the welding of angles to duct to the criteria of either AWS D1.1 or AWS D1.3. Neither welding codes, AWS D1.1 or AWS D1.3, allow cracks in welds. The cracked welds are in violation of 10 CFR 50, Appendix B, Criterion IX (456/84-34-01; 457/84-32-01). Additionally, the inspectors noticed other welds on ducts 4684 and 4685 that appeared to be cracked, however, these cracks were not complete cracks resulting in a lack of bonding and may only be surface cracks. The welds were painted, making weld quality determination difficult. The inspectors requested Pullman Sheet Metal quality control supervision to investigate these cracks and subsequent inspections by Pullman resulted in the documentation of twenty-nine weld cracks in Correction Notices 5534 and 5535. Subsequent inspections by the licensee will determine the severity of the cracking in the HVAC duct system and Sargent and Lundy will analyze the cracking for design significance.

The inspector reviewed Pullman silicone bronze braze welding procedure, PSM-WP-307, which was approved by Sargent and Lundy on March 3, 1981. The procedure only rejected weld cracks that were parallel to weldment. This is not in accordance with AWS D1.1 or AWS D1.3 which do not allow cracks in any direction. Furthermore, rejection of only parallel cracks results in difficult inspection criteria with regard to the definition of the allowable angle for parallel cracks. Parallel cracks did not appear to be defined. The rejection of only silicone bronze cracks parallel to the weldment will remain an open item awaiting analysis and justification by the licensee (456/84-34-02; 457/84-32-02).

5. Piping Material Traceability Verification Program

The material traceability verification program was reviewed. The program was instituted as a result of an NRC finding identified in Inspection Report Number 83-09, which stated that a documented inspection program to verify correct material installation had not been implemented for 2" and under safety-related piping prior to July 1983, and for over 2" safety-related piping prior to November 1982. As a result of this finding the licensee decided to inspect all the piping installed prior to

the above applicable dates in order to determine the acceptability of piping material installations. Completion of the material traceability verification program is expected by February 28, 1985.

As of November 23, 1984, the following inspection results have been recorded by Phillips, Getschow Co. for large bore and small bore piping:

Large Bore Piping(Over 2")

Total number of items inspected - 1679
Percentage of total items - 18%
Total number of probable items accepted - 1440
Total number probable rejections - 25
Total number of items requiring further analysis - 213

Small Bore Piping (2" and under)

Total number of items inspected - 4668
Percentage of total items - 28%
Total number of probable items accepted - 3870
Total number of probable rejections - 12
Total number of items requiring further analysis - 786

The final acceptance and rejection of items will be made by the licensee.

No violations or deviations were identified.

6. Pipe Supports

The inspector reviewed Visual Examination Procedure, VE-01, Revision 2, and discovered that Phillips, Getschow Co. had a procedure for ASME Section III, Subsection NF, Welds and ANSI B31.1 Safety-Related Welds, but did not have an inspection procedure for safety-related AISC Steel Welds under the jurisdiction of AWS D1.1, Structural Welding Code, 1975.

Sargent and Lundy Specification F/L-2739, July 5, 1977, Amendment G, Piping System Installation, commits to AWS D1.1, Structural Welding Code, 1975, for AISC safety-related steel welds not under the jurisdiction of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NF. However, the architect engineer, Sargent and Lundy, did not specify on the drawings that the weld inspection was under the jurisdiction of AWS D1.1. In addition, the final pipe support documentation did not indicate the Code acceptance criteria that the non-NF safety-related welds were inspected to for compliance; although the NF welds were documented as being in compliance with ASME Section III, Subsection NF acceptance criteria. Numerous safety-related pipe support welds fall under the jurisdiction of the AWS D1.1, Structural Welding Code. The acceptance criteria for both ASME and AWS D1.1 welds contain the attributes of porosity and crater pits, however, crater pits and porosity are not inspection criteria for ANSI B31.1 safety-related welds. Therefore, the acceptance criteria for ASME and AWS D1.1 welds are more restrictive and evidence should be provided by the licensee to assure that the non-NF

safety-related welds were inspected to the applicable AWS D1.1 or ASME criteria and not to the ANSI B31.1 acceptance criteria. The inspector interviewed six quality control welding inspectors and all stated that they rejected welds for porosity and crater pits and they were inspecting all safety-related welds to the ASME procedure. The inspector also has examined numerous AWS D1.1 pipe support welds and these welds met the acceptance criteria of AWS D1.1, 1975. The six welding inspectors and NRC examined pipe support welds are only a sample of their respective total populations, and this sample does not provide statistical assurances that all non-NF safety related weld inspections were performed to the AWS D1.1 Code or ASME Code. Failure to have an AWS D1.1, Structural Welding Code, visual inspection procedure is in violation of 10 CFR 50, Appendix B, Criterion V (456/84-34-03; 457/84-32-03).

Constant and variable supports were examined for proper markings and the supports were identified in accordance with Specification F/L-2739 and Engineering Change Notice No. 7595. The markings included manufacturer's catalog number, serial number, size, load, and travel.

The inspector randomly selected eight pipe supports and examined the tube steel, wide flanges, and plate used in the supports for material traceability. The supports are detailed below:

Support No.	System
1RH02081S	Residual Heat Removal
1RC12101S	Reactor Coolant
1RY09100S	Reactor Coolant Pressurizer
1RC04004V	Reactor Coolant
1RC13091S	Reactor Coolant
1RC13053S	Reactor Coolant
1RC13090S	Reactor Coolant
1RC13044S	Reactor Coolant

All material inspected was the correct type. The plate and wide flanges met the requirements of ASTM A-36 and the tube steel met the requirements of ASTM A500 Grade B. Material receipt inspection reports and material test reports were reviewed and found to be satisfactory.

Additionally, eight pipe supports were randomly selected and examined for compliance to Sargent and Lundy Specification F/L-2739, drawings, and Phillips Getschow Co. Procedure, QCP-B23, Revision 8, Installation and Inspection Of Component Supports. The supports inspected and their system identification are as follows:

Pipe Support	System
1CV06001V	Chemical and Volume Control
1SI20020X	Safety Injection
1SI09036X	Safety Injection
1CV06009C	Chemical and Volume Control
1RH02006R	Residual Heat Removal

Pipe Support	System
1CV06015R	Chemical and Volume Control
1RYF47A036T	Reactor Coolant Pressurizer
1SI09034V	Safety Injection

The supports were installed in compliance with the specification, drawings, and procedure. Attributes examined included welding, location, dimensional tolerances including pin to pin distance, material identification, welder identification, weld rod traceability, clamp and U-bolt condition, locking devices, and configuration.

7. Hydrogen Recombiner Power and Control Cabinet

The inspectors examined the installation of the Unit 1, Hydrogen Recombiner Power and Control Cabinet 0CG04J. The installation was in accordance with drawing 0-3391Y Revision G and Specification L-2790, Amendment 40, Electrical Installation Work, July 18, 1984. The inspection included verification of concrete expansion anchors, dimensional tolerances, and weld conformance with regard to quality, location, and length. The cabinet was properly marked with Serial No. 113C and Part No. N139000234-01. The Material Receiving Report, No. 7337, was reviewed and the inspector discovered that the cabinet was received on July 7, 1981, without the documentation required by Purchase Order Number 215484. However, the cabinet was not placed on hold as required by the Commonwealth Edison Company Quality Assurance Manual, Section Q.P. No. 7-1, Control of Procured Material and Equipment-Receiving and Inspection. Furthermore, the cabinet was released for installation to the electrical contractor without a material requisition as required by L. K. Comstock Procedure 4.10.3, Requisitioning for Installation CECo Stored Equipment/Material. The date of the release is unknown without a material requisition. Failure to follow procedures concerning the material requisition and hold policy is in violation of 10 CFR 50, Appendix B, Criterion V (456/84-34-04). The documentation was subsequently received on March 22, 1983, and the inspector confirmed that the cabinet was purchased and supplied in accordance with Sargent and Lundy Specification F/L-2845, Amendment 5, dated June 23, 1983, Post LOCA Hydrogen Control System. Purchase Order Number 216484 included 10 CFR 21 reporting requirements. Since the inspector determined that the cabinet was installed correctly and was not damaged, and corrective action by the licensee (documented on nonconformance report number 699) included verifying that no other equipment had been released for installation without the required documentation, no reply to this item of noncompliance is required.

8. Nonconformance Reports (NCR's)

Fifteen Commonwealth Edison nonconformance reports were randomly selected and reviewed for identification of nonconforming conditions, corrective action, and design basis disposition. The nonconformances are listed below:

NCR No.	Date	Subject
561	8/18/83	Weld Cracks in HVAC Ducts.
639	7/25/84	Removal of Piping ASME Nameplates.
637	7/10/84	Diesel Oil Storage Tank Machining.
626	6/14/84	Defective Electrical Penetration Support Bushings.
625	6/5/84	Improper Wire Connections - 480V Motor Control Center Compartments.
613	3/8/84	Rusted bolts - Electrical Penetrations.
609	5/16/84	Radiographs of ASME Section III Pipe Welds Violate Density Requirements.
602	4/17/84	Incorrect Structural Steel Material Specification and Lack of Traceability for Plate.
594	2/2/84	Concrete Block Certifications.
595	2/29/84	Incorrect Cable Grips.
593	1/24/84	Wiring Error, 125V D.C. Buses.
600	3/13/84	Incorrect Classification of ASME, NF Supports.
537	6/13/84	Flanges Not in Conformance With Heat Treatment Requirements.
543	7/12/84	Use of Incorrect Filler Metal.
631	6/18/84	Bent Flare End Plates on Spent Fuel Storage Racks.

No violations or deviations were identified.

9. Electrical Cables

Five Unit 1 installed cables were inspected in the upper cable spreading room for compliance to IEEE-384, the cable pull cards, and L.K. Comstock procedure 4.3.8, Cable Installation Inspection. Detailed below are the cables which were inspected:

Cable No.	From	To	Type
1MS659	Main Steam Junction Box V1JB2212A	Annunciator Input Cabinet 1PA31J	7/C-14
1LV051	Auxiliary Power Control System Cabinet 1PA33J	Annunciator Input Cabinet 1PA31J	12/C-14
1DG204	Diesel Generator Control Panel 1PL07J	Annunciator Input Cabinet 1PA31J	12/C-14 12/C-14
1CC026	Main Control Board - Engr. Safety Features 1PM06J	Annunciator Input Cabinet 1PA31J	7/C-14

Cable No.	From	To	Type
1CS010	Main Control Board - Engr. Safety Features 1PM06J	Annunciator Input Cabinet 1PA31J	7/C-14

Cable number 1MS659 in riser 1R255 did not have the support cable grips attached as a result of rework request No. 936. The inspector notified the L. K. Comstock quality control manager and the cable grips were immediately reattached. The inspector considers this item closed. NRC inspections of the cables included the following attributes:

- raceway free of debris
- raceway free of sharp edges
- raceway free of damage
- segregation codes correspond
- raceway corresponds to routing shown on pull card
- cable routed per pull card
- cable correct size and type
- cable free of damage
- cable correctly identified
- cables are properly supported

No violations or deviations were identified.

10. Reactor Coolant Piping

Three reactor coolant piping spools were examined in the Unit 1 containment. The spools were classified as ASME Boiler and Pressure Vessel Code, Section III, Subsection NB, Class 1 and consisted of 8" S/160 SA-376 TP304 piping material installed in accordance with design specification 1540BB. The spools were identified on drawings 1C-RC-1-4, 1C-RC-1-4P, and 1C-RC-1-5. Field examinations included the identification of welder symbols and weld numbers, weld quality, material identification markings, configuration, clearances, and line location in accordance with the as-built drawing.

After the line was walked down the NRC inspector reviewed the following associated documentation to determine compliance with regulatory requirements and agreement with the actual hardware installations.

- Piping, NPP-1 Code Data Reports
- Valve, NPV-1 Code Data Reports
- Welding Filler Metal Material Certifications including Ferrite Testing
- Piping Material Certifications
- Weld Numbers and Welder Qualification Records
- Welding Procedure Qualification Records
- Nondestructive Examination Reports, Penetrant and Radiograph
- Nondestructive Inspector Qualifications, SNT-TC-1A
- Quality Control Inspection Records including End preps, Fit-up, Root Weld, Pre-Heat, Interpass Temperature, and Final Visual Weld Examinations

. Material Requisitions
. Field Change Orders
. Penetrant Material Test Reports, ASME Section V

Three procedures were reviewed:

. VE-01, Revision 2, Section 8, Visual Examination Procedure For Butt Welded Pipe - ASME Section III, Class 1, 2, and 3

. QAP-1, Revision 5, Liquid Penetrant Examination

. QC-RT-1, Revision 16, Radiographic Examination

Procedure VE-01 was in conformance with the ASME Boiler and Pressure Vessel Code, Section III, 1974, including acceptance criteria for welds, maximum offset of aligned sections, thickness of weld reinforcement for vessels - pumps - valves, thickness of weld reinforcement for piping.

Procedure QAP-1 was in conformance with the ASME Boiler and Pressure Vessel Code, Section 5, Article 6, 1974, including: penetrant materials qualification, temperature range, surface preparation, examination method, and acceptance standards.

Procedure QC-RT-1 was in conformance with the ASME Boiler and Pressure Vessel Code, Section 5, Article 2, 1974, including: radiographic procedure qualification, location markers, and interpretation of radiographs.

No violations or deviations were identified.

11. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. An open item disclosed during the inspection is discussed in Paragraph 4.

12. Exit Interview

The inspector met with licensee and contractor representatives (denoted under Persons Contacted) during and at the conclusion of the inspection on December 18, 1984. The licensee acknowledged the information.