U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-456/85048(DRS); 50-457/85047(DRS)

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 Station, Units 1 and 2

Inspection At: Braidwood Site, Braidwood, IL

Inspection Conducted: October 9-12, 15-17, 23-24 and November 5, 1985

Inspectors: R. Mendez — 1/27/86 Date

Z. Falevits — 1/27/86 Date

Approved By: C. C. Williams, Chief, Plant Systems Section — 1/27/86 Date

Inspection Summary

Inspection on October 9 through November 5, 1985 (Reports No. 50-456/85048(DRS); No. 50-457/85047(DRS))

Areas Inspected: Routine, unannounced inspection of licensee actions on previous inspection findings, 50.55(e) Reports; MOV torque switch settings; molded case breaker testability; instrument cables and terminations; and reinspection programs. The inspection involved a total of 104 inspector-hours onsite by two NRC inspectors.

Results: Three violations were identified (failure to correctly translate design basis into specifications - paragraph 4.a; failure to follow procedures - paragraph 5.a; and failure to perform adequate inspections - paragraphs 5.b and 6.a).

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*C. W. Shroeder, Licensing Superintendent
*T. E. Quaka, QA Superintendent
*C. Mennecke, Project Construction, Lead Electrical
*E. E. Fitzpatrick, Assistant Manager, QA
*L. M. Kline, Project Licensing Supervisor
*D. L. Cecchet, Project Licensing Engineer
*C. M. Allen, Project Licensing Engineer
*E. R. Netzel, QA Supervisor
*N. Tomis, Project Operational Analysis Supervisor
*N. A. Schryer, Project Construction Engineer
*G. E. Groth, Assistant Construction Supervisor
*M. Kopp, Project Construction Engineer
*J. F. Phelan, Project Field Engineering Supervisor
K. Faber, Project OAD Engineer
J. Tai, Project OAD Engineer
E. Kramm, Project OAD Engineer
P. L. Barnes, Licensing Engineer
J. Gieseker, Project Construction Engineer

L. K. Comstock Company (LKC)

*R. Seltman, QA Manager
*I. Dewald, QC Manager

*Denotes those attending the October 16, 1985, exit interview.

The inspectors also contacted and interviewed other licensees and contractor personnel during this inspection.

2. Licensee Action on 10 CFR 50.55(e) Reports

(Open) 10 CFR 50.55(e) (457/82003-EE): "Emergency Diesel Generator Field Relay Failure." On September 3, 1982, the licensee issued its final report regarding a diesel generator relay deficiency. The licensee had determined that these relays did not have adequate DC interrupting rating for their designed use. The proposed corrective action was to replace the existing 120V AC voltage regulator (VR) relays with KU series 125V DC relays. During this inspection the VR relays were observed to have a rating of 110V DC and not 125V DC as stated in the licensee's final report. On October 10, 1985, the manufacturer of the VR relay issued a letter to the licensee addressing the acceptability of the KU series 110V DC VR relays. The letter stated that the minimum pick-up and drop out voltages determined during actual testing of the relay were

adequate to prevent a voltage transient from causing spurious tripping. Pending review of the licensee's final report on this matter, this 50.55(e) will remain open.

(Open) 10 CFR 50.55(e) (456/84001-EE; 457/84001-EE): It was previously identified that L. K. Comstock (LKC) QC inspection records were incomplete, not properly filled out and were not retrievable. Subsequently, LKC established a comprehensive document review program to include timeliness of record retrievability; accountability of production records which support the status of equipment installation; and reconciliation of the use of outdated forms. Additionally, procedure 4.3.1.1, "Turnover Document Review," established specific guidelines for the review of QC inspection documents to ensure that documents are complete, comprehensive and identifiable. The procedure also establishes training and testing of document reviewers, including a requirement for classroom training on ANSI standards and Appendix B requirements. Document reviewers are also required to attend eight hours of training related to each discipline/review; area encompassing procedural requirements; completing checklists and assurance of correct applicable drawings and revisions.

During their initial audit, LKC determined that 105,708 QC inspection documents were required to be examined as part of their review program. As of October 1, 1985, LKC had reviewed 72,451 of these documents or 63.5% of the total number. The number of records found with discrepancies totaled 14,532 or about 20% of the number of documents reviewed to date. The licensee expects to complete their review of all documents by December 1985. The scheduled completion date for the reconciliation of those documents with discrepancies is planned for March 1986.

3. Licensee Action on a Previous Inspection Finding

(Open) Unresolved Item (456/85007-07; 457/85007-07): It was previously identified that GE "Vulkene" wire was received at Braidwood without qualification to IEEE 383-1974 and was not listed as an approved switchboard wire per Commonwealth Edison specification EM-30105. Originally, an approved switchboard wire, General Electric (GE) SIS VW-1 SI 57279 (Vulkene Supreme), was specified by Commonwealth Edison specification EM-30105 and was procured by CECo Purchase Order (P.O.) 250851. Specification EM-30105 allowed other suppliers to submit wire samples to the licensee's Station Electrical Department for approval.

On February 25, 1981, P.O. No. 250851 was modified, without approval from Station Electrical, to reflect a change in the purchase of safety-related switchboard wire from GE SIS VW-1 SI 57279 (Vulkene Supreme) to GE SIS SI 57275 (Vulkene). Approximately 10,500 feet of Vulkene switchboard wire (not qualified per IEEE 383-84) was subsequently received at Braidwood, some of which was installed in safety related equipment throughout containment and the Auxiliary Building. On February 22, 1985, the licensee issued nonconformance Report (NCR) 707 that required that all GE SIS wire SI 57275 in harsh environments be removed and replaced with wire per qualified IEEE 383-84. Records indicated that Vulkene (SI 57275) switchboard wire received at Braidwood is qualified to IEEE 323, but not IEEE 383-84. The licensee is committed to IEEE 383-1974 as stated in the Braidwood FSAR, Section 8.3.

On April 11, 1985, the licensee issued an attachment to a letter titled "Qualification of Switchboard wire," stating their position on the applicability of IEEE 383. The letter stated that class IE electrical cables, splices and connections meet the requirements of IEEE 383-1974, but the standard does not apply to any other equipment. The letter further states that Vulkene Switchboard wire is acceptable for application in safety related equipment since the auxiliary building is not considered a harsh environment and Vulkene meets Underwriter's Laboratory (UL) VW-1 vertical flame test. The test verifies that the wire does not propagate a fire and that it will not emit flaming particles.

The letter also states that the question of applicability of the subject standards is referenced in question 7.1.44 of the Braidwood Preliminary Safety Analysis Report (PSAR). Amendment 10 of the Braidwood PSAR in NRC question 7.1.44, states in part, "With regard to environmental qualification of all balance of plant instrument, control and electrical equipment important to safety, we require . . . that IEEE Standard 383-1974 be included in the criteria for qualifying Class 1E equipment." The licensee's answer to question 7.1.44, states in part, "IEEE 383-1974 applies to Class 1E electric cables, splices, and connections, it does not apply to any other equipment. The applicant intends to comply with the requirements of IEEE Standard 383-1974 to the maximum extent possible. The applicant will justify any noncompliance".

The licensee's stated position on the applicability of IEEE 383-1974 is that switchboard wire is exempt from those requirements as per NRC question 7.1.44. However, the licensee does not specifically address (other than question 7.1.44) or justify exemptions in their FSAR from the requirements of IEEE 383 with regard to switchboard wire. This matter remains unresolved and will be referred to NRR for their review and resolution.

4. Review of Electrical Components and Work Activities

a. Torque Switch Setting Verification

The inspector reviewed the methodology used by the licensee to setup and test safety related Motor Operated Valve (MOV) torque and limit switches. MOV motion can be stopped by either the torque or limit switch in either the opening or closing direction. These switches must be field set to ensure proper operation of the MOV. CECo Operational Analysis Department (OAD) engineers perform the setting of these switches in the field. The inspector was informed by OAD engineers that Training Instruction T-3, dated June 13, 1984, is being used as a guide and for training of OAD personnel in setting the torque and limit switches. These training instructions appear to be very broad and lacking in specific details; for example, Training Instruction T-3 indicates that many methods can be used to set limitorque operators. Whatever method is used, the following items should be verified:

- Correct limit switch setting and operation for all switches.
- Correct torque switch setting and operation.
- Correct contactor operation at the MCC.
- Correct motor rotation and valve movement.
- Motor running current.

In addition, Training Instruction T-3 states that "The torque switch setting may also be adjusted. The acceptable range is between recommended and maximum value specified on the operator." Procedures specifically addressing this issue were not available for review during this inspection.

During this review, eight motor operated valves were examined whose torque switch settings had been previously established and finalized by the licensee. The following torque switch setting deficiencies were noted by the inspectors:

(1) Reactor Coolant Pump 1B Seal Injection Isolation Valve 1CV8355B:

(a) Valve operator vendor nameplate specified the following torque switch settings:
Normal - 2¼ Maximum - 3

(b) The valve torque switches were set by OAD on August 21, 1984 and documented on Electrical Data Form No. 1-Motors. The following settings were documented on the electrical data form:

Open:	Recommended - 2¼	Maximum - 3	Actual - 1
Close:	Recommended - 2¼	Maximum - 3	Actual - 1

(c) Torque switch settings for the open and close positions as found in the field:
Normal - 1 Maximum - 1¼

(2) Safety Injection and Charging Pump Suction Header Crosstie Valve 1SI8807B

(a) Valve operator vendor nameplate specified the following settings:
Normal - 1 Maximum - 2½

(b) The valve torque switches were set by OAD on March 15, 1983 and documented on Electrical Data Form No. 1-Motors. The following settings were documented on the electrical data form:

Open:	Recommended - 1½	Maximum - 1½	Actual - 1½
Close:	Recommended - 2½	Maximum - 2½	Actual - 2½

(c) Open and close settings as found in field:
Normal - 2½ Maximum - 1½
(Note that the normal and maximum settings appeared to have been interchanged in the field. This was confirmed by three OAD engineers who were present during this inspection).

In addition, limit switch rotors two and four on valve 1SI8807B did not operate when the valve was placed in the fully closed position. (These rotors contain four limit switch contacts which change status when the valve is fully closed or fully opened and properly functioning).

(3) Safety Injection Pump 1A Miniflow Isolation Valve 1SI8814

(a) Valve operator vendor nameplate specified the following settings:
Normal - 2¼ Maximum - 3

(b) The valve torque switches were set by OAD on April 20, 1983 and documented on Electrical Data Form No. 1-Motors. The following settings were documented on the electrical data form:

Open:	Recommended - 2	Maximum - 3	Actual - 1
Close:	Recommended - 2	Maximum - 3	Actual - 1

(c) Open and close setting as found in field:
Normal - 1 Maximum - 1

Definitions: Normal - Nominal setting to assure satisfactory operation of motor operated valves.

Maximum - Maximum setting allowed by vendor for valve protection.

(Set point values 1, 2, 3, etc. . . Correspond to the specified FT-LBS torque values).

Testing of the torque and limit switches' operability is limited to valve closing and opening under no flow or differential pressure across it in most instances. This is done by the OAD engineer relying on his experience. A specific testing program to assure that torque and limit switch settings were within the specified design ranges to verify proper valve operation was not available for review.

Based on the findings outlined above, the inspector informed the licensee that failure to assure that the design basis for systems and components are correctly translated into specifications, procedures and instructions and that deviation from such standards are controlled is a violation of 10 CFR 50, Appendix B, Criterion III (456/85048-01; 457/85047-01).

b. Testability of Molded Case Breakers

An inspection was previously conducted pertaining to breaker ratings on the 125V DC ESF distribution panels. During this inspection, discussions were held regarding the exercising and testing of molded case breakers as part of a regular maintenance program. It was determined that only those breakers that are shunted between safety and non-safety loads were to be tested. The licensee is committed to IEEE Standard 338-1975, "Periodic Testing of Nuclear Power Generating

Station Class 1E Power and Protection Systems. " Additionally Regulatory Guide 1.118 endorses IEEE 338-1975. Section 5 of IEEE 338 states in part, "The class 1E power and protection systems, . . . shall be designed to be testable during operation of the nuclear power station as well as during those intervals when the station is shut down." In addition, the manufacturer's instruction manuals established guidelines for verification field testing of molded case circuit breakers to permit the checking of breakers in accordance with the manufacturer's breaker data. The inspector's concern is that since the molded case breakers are not tested, there is no assurance that the breaker will trip within the established time ranges or will trip instantaneously at its maximum rating. Presently, the licensee does not intend to periodically test molded case circuit breakers either in the construction phase, or when the plant becomes operational. This matter is unresolved pending further review. (456/85048-02; 457/85047-02).

5. Review of Instrument Cables and Terminations

a. During the review of the butt splice corrective action program, (described in paragraph 6.a.), the inspector conducted an as-built inspection on various switchgear motor control centers and panels to ascertain whether the installed equipment conforms to the applicable design drawings and regulatory requirements. As a result of this inspection, the inspector found the as-built condition acceptable, except as follows:

Motor Control Center Connection diagram 20E-1-4663C Revision "M" compartment C3 of Motor Control Center 131X2 which contains the internal and external wiring for primary Containment Purge Supply Isolation Valve 1A (1VQ001A), indicated that relays CRVQ1AX and PSVQ1AX are internally wired to the terminal block. L. K. Comstock Revision Work Request (RWR) No. 789 dated October 27, 1981, shows that all work associated with drawing 20E-1-4663C Revision "J" was completed on August 16, 1983, this drawing was highlighted to show that the work was performed and verified to be completed. Current Revision "M" of drawing 20E-1-4663C has been highlighted to show all work was verified to have been previously completed.

During this inspection the inspector noted that the internal wiring shown on Revision "J" and Revision "M" of drawing 20E-1-4663C for compartment C-3, was not completed in the field. Internal wires were found determinated from terminal points 1, 3A, X2, 9, 15, 16, 17, and 18. Furthermore, a jumper was terminated from point 3 to 3A. This jumper is not shown on latest Revision "M" of drawing 20E-1-4663C. The licensee could not locate a RWR traveler for the removal or determination of the internal wiring in compartment C-3, nor was there proper justification given for the extra jumper between point 3 and 3A.

A review of the applicable latest schematic diagram 20E-1-4030VQ07 Revision "L" dated June 21, 1985, indicated that the previously mentioned relays are being used in the control circuitry of

safety-related valve 1VQ001A, and that the internal wiring should have been terminated as shown on the latest connection diagram Revision "M". In addition, point 3A is not shown on the schematic diagram as being jumpered to point 3.

Based on the findings outlined above, the inspector informed the licensee that failure to accomplish activities affecting quality in accordance with prescribed drawings is a violation of 10 CFR 50, Appendix B, Criterion V (456/85048-03; 457/85047-03).

b. During the review of the internal wire connections of the limit switch compartments in valve Nos. 1CC9473B, 1CV8804A, 1SI8808C, 1RC8002A and 1SI8808A, the inspector observed that in MOV 1CV8804A, unapproved Vulkene "SIS" switchboard wire connected three of the rotor contacts. On February 4, 1981, the licensee had issued NCR No. 277 that identified jumpers that were unqualified. Disposition of the NCR required that nonconforming internal jumpers be replaced utilizing Rockbestos "SIS" wiring. A subsequent LKC QC inspection performed on July 16, 1985, failed to note that the type of "SIS" wiring installed was Vulkene in lieu of the required Rockbestos. On October 11, 1985, LKC NCR 4598 was issued to document the above violation and to initiate action to reinspect the work performed by the QC inspector who failed to note the type of "SIS" wiring in MOV No. 1CV8804A. This area will be reviewed in a subsequent inspection. This failure by the licensee to assure that the inspection program was adequately implemented to verify conformance with documented instructions is a violation of 10 CFR 50, Appendix B, Criterion X (456/85048-04; 457/85047-04).

6. Reinspection Programs and L. K. Comstock Inspection Backlog

The following is a listing and the latest status of electrical and instrumented control reinspection programs in progress at Braidwood Station.

a. Electrical Butt Splices

The inspector reviewed the licensee's corrective action initiated to ensure that all potentially deficient safety related butt splices installed prior to May 1, 1984, were identified, inspected and repaired in accordance with latest LKC Braidwood Procedure 4.3.9, paragraphs 3.1.7.2, 4.8.9, and 3.4.2.

CECo NCR 598 and its disposition, supplement Revision 1, were issued to assure that the butt splices of safety related control and instrumentation cables are properly inspected and documented. The inspector examined various "conductor butt splice survey" sheets that identified butt splices on conductors of safety related cables in panels, switchgear, motor control centers, and electrical penetrations, including their final dispositions. This review also included "Q.C. Inspection checklist for Conductor Extensions," L. K. Comstock Form 36A, which listed the cable number, conductor

extended, butt splice proper size, proper crimp, crimp tool, and the acceptance or rejection criteria for the splice. The inspector conducted a visual inspection of the following field installed safety-related equipment:

Diesel Generator Panel 1PL08J
HVAC Panel 1VD01JB
6.9 KV switchgear 1AP03EA and 1AP75E (selected cubicles)
4.16 KV switchgear 1AP06E (selected cubicles)
4.16 KV switchgear 1AP05E (selected cubicles)
Motor Control Center 1AP25EA (selected cubicles)
Instrument Panel 1SI06E
480V switchgear 1AP10E
Local Panel Instrument Rack 0PL43JB
Remote Shutdown Panel 1PL05J (Selected Section)
Main Control Board Panel 1PL07J
Main Control Board Panel 1PM06J

Approximately 50 cables were inspected. Some of these splices were previously identified on the licensee's butt splice survey sheets. In addition, the LKC inspection results were documented on Form 36A indicating that the splice was inspected and properly documented. However, the following splices were identified by the NRC inspector and were apparently not identified by the LKC inspector during his original inspection:

Cable Number	Splice on Conductor	Equipment
1DG002	Black	4.16 KV Switchgear 1AP05EF
1DG002	White	4.16 KV Switchgear 1AP05EF
1DG002	Red	4.16 KV Switchgear 1AP05EF
1DG002	Green	4.16 KV Switchgear 1AP05EF
1MS525	Orange	Remote Shutdown Panel 1PL05J
1MS521	Orange/Black	Remote Shutdown Panel 1PL05J

Subsequently, during this inspection, the licensee issued NCR 4570, dated October 3, 1985, requiring the reinspection of 90 pieces of equipment previously inspected by this LKC inspector. Thirteen additional butt splices on ten cables were identified during the licensees reinspection effort that were not previously identified by the LKC inspector. Twelve of the thirteen splices did not have the required record on file and the remaining one did have a record on file. The licensee stated that the butt splice corrective action program is approximately 90% complete.

Based on the findings outlined above, the inspector informed the licensee that inadequate inspections of activities affecting quality is a violation of 10 CFR 50, Appendix B, Criterion X (456/85048-05; 457/85047-05).

During this inspection the inspector noted that cable grips for cables entering bottom of Remote Shutdown Panel 1PL05J were not installed on bars utilizing Kellum grips as cable support. This is required by LKC Procedure 4.8.8 Revision C and Sargent and Lundy Standard STD-EB200. Subsequently, the licensee issued an Inspection Correction Report (ICR) to correct this deficiency.

b. Vulkene Cable

During an NRC Construction Appraisal Team (CAT) inspection conducted by the office of Inspection and Enforcement (IE), it was determined that approximately 10,500 feet of General Electric Vulkene switchboard wire was received by the licensee without qualification to IEEE 383-1974. The licensee issued NCR 707 to document the discrepancy. The NCR evaluation and disposition of the acceptability of Vulkene wire SI57275 required that all Vulkene wire in harsh environments be removed and replaced, but did not require replacement of the switchboard wire in mild environments. To assure that action is complete, S&L personnel are performing final walkdown inspections assisted by LKC personnel. The walkdown inspections are planned to be completed by January 1, 1986. This reinspection program and its results are being tracked under violation 456/85007-07; 457/85007-07.

c. AVO Inspection Program

The licensee identified that some work activities were being directed by Avoid Verbal Orders (AVOs) without subsequent followup QC inspections to ensure that work had been properly accomplished. Currently, the AVO inspection program is being conducted per the disposition supplement to LKC NCR 1996. AVOs which affected safety related equipment are being reviewed to determine the inspection status of those installations. The necessary actions are then being implemented to ensure that the equipment is properly installed, inspected and documented. LKC Procedure 4.3.24 has been revised and requires rework reports to be issued when performing work on safety related installations which result in modifications to existing work. This procedure also requires drawing revisions to be reviewed by LKC Engineering which then ensures that the work is performed and inspected to the latest drawing revision.

The following is a brief list of the total number of AVOs and the number of closed and open AVO's in relation to those reviewed:

Total AVOs	3,457
AVOs to be Reviewed	1,887
AVOs Reviewed	1,570
Closed AVOs	681
Open AVOs	889

The planned completion date by the licensee is March 1986.

d. Interaction Analysis

During previous inspections it was observed that the licensee did not have an interaction analysis program to address Regulatory Guide 1.29 "Seismic Design Classification." Subsequently, the licensee issued NCRs 621 and 622 and Engineering Change Notices (ECN's) to the appropriate contractors delineating the acceptable clearance criteria. Contractor procedures were then revised to incorporate the requirements of the ECN's. Additionally, Sargent and Lundy has developed and approved Project Instruction PI-BD-96, "Limited Clearance Walkdown". Sargent and Lundy's final walkdown is planned to start six months prior to fuel load.

7. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of violations or deviations. An unresolved item disclosed during this inspection is discussed in Paragraph 4.b.

8. Exit Interview

The inspector met with representatives (denoted in Paragraph 1) at the conclusion of the inspection. The inspector summarized the scope and findings of the inspections noted in this report. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary.