

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-254/91025(DRS); No. 50-265/91021(DRS)

Docket Nos. 50-254; 50-265

Licenses No. DPR-29; No. DPR-30

Licensee: Commorwealth Edison Company  
1400 Opus Place  
Downers Grove, IL 60515

Facility Name: Quad Cities Nuclear Power Plant, Units 1 and 2

Inspection At: Quad Cities Station, Cordova, IL

Inspection Conducted: December 9-13, 18-19, 1991 and  
January 2-3, 1992

Inspector:

J. A. Holmes  
J. A. Holmes

2-5-92  
Date

Approved By:

F. J. Jablonski  
F. J. Jablonski, Chief  
Maintenance and Outages Section

2-5-92  
Date

Inspection Summary

Inspection on December 9-13, 18-19, 1991, and January 2-3, 1992  
(Reports No. 50-254/91025(DRS); No. 50-265/91025(DRS))

Areas Inspected: Routine, unannounced inspection to assess the implementation of the fire protection program, which included a review and evaluation of administrative procedures, completed surveillances, audits, and a fire drill. In addition, a walkdown was performed to assure that isolation of safe shutdown power cables and control circuits was proper. The inspector utilized NRC inspection procedure modules 30703, 64704, and 92701.

Results: Based on the items inspected, overall performance in fire protection was considered adequate. Sixteen open items were closed; no violations of NRC requirements were identified.

The following strengths were identified:

A fire watch program was implemented that enhanced the overall inspection of the plant for fire hazards. A computerized transient combustible control program was also implemented to track the placement of transient combustibles throughout the plant.

## DETAILS

### 1.0 Principle Persons Contacted

#### Commonwealth Edison Company (CECo)

- \*R. Bax, Station Manager
- \*D. Bucknell, Technical Staff
- \*J. Dierbeck, Maintenance Supervisor
- \*D. Kanakares, Regulatory Assurance
- \*A. Misak, Regulatory Assurance Supervisor
- \*J. Rolfes, Technical Staff Engineer
- \*D. Roberts, Fire Protection Engineer
- \*H. Smith, Maintenance Staff
- \*K. Sonderoth, Maintenance Staff
- \*G. Tietz, Technical Superintendent

#### U.S. Nuclear Regulatory Commission (NRC)

- \*D. Nelson, Inspector

\*Denotes those attending the exit meeting on January 3, 1992.

### 2.0 Licensee Action on Previous Inspection Findings

(Closed) Open Item 254/88021-01(DRS); 265/88021-01(DRS):  
Alternative shutdown procedures for a fire in the control room had discrepancies.

The licensee reviewed the procedure, corrected the discrepancies, and determined that pre-assignment of steps 16 through 32 would not be necessary because there is sufficient time (2-1/2 hours) before the operations would be required. Additional training was provided to the Nuclear Station Operator to address the issue of coordination of the operators during hot shutdown. The inspector reviewed a sample of the revised sections of the safe shutdown procedures and found them acceptable. The licensee agreed to walkdown and develop time lines and incorporate them in the safe shutdown procedure by August 31, 1992. This item is closed.

(Closed) Open Item 254/88021-02(DRS); 265/88021-02(DRS): A safe shutdown procedure had steps 16b and 16c reversed for breaker compartment numbers. Operators were not provided with a key for opening 206V motor (MCC) 18-1A-1. One of the operators failed to acknowledge receipt of radio instructions for the shift engineer.

The safe shutdown procedure was revised to correctly reflect the proper breaker compartment numbers, keys for the MCC were located in the safe shutdown locker for both units. The operators received annual communication training to prevent poor communications. This item is closed.

(Closed) Open Item 254/88021-03(DRS); 265/88021-03(DRS): Three valves in the reactor core isolation cooling (RCIC) system were located in an awkward position. The licensee agreed to provide a more suitable means to operate the valves.

The licensee provided a portable ladder locked to the floor. The inspector was informed that all operators were provided with a key to gain access to the ladder. In addition, the inspector verified that the operators could operate the valve from the ladder. This item is closed.

(Closed) Open Item 254/88021-04(DRS); 265/88021-04(DRS): The fuse puller in the diesel room was missing and two replacement fuses F22 and F24 were taped to a handle. The licensee agreed to provide a more suitable means for securing these items. The tools and equipment in the safe shutdown locker were to be included in the plant surveillance procedures.

Due to licensee priorities and expense of installing boxes, the fuse puller is attached by a string and fuses are taped together and attached by string to the handle of the engine control cabinet. The fuse puller and fuses are incorporated into the equipment operator turnover procedure, QOS 005-S12, "Operator Surveillance/Turnover Sheets Unit 1 Equipment Operator," Revision 31; and QOS 005-18, "Operator Surveillance/Turnover Sheets Unit 2 Equipment Operator," Revision 11. In addition, the licensee included the tools and equipment in procedure FP-05, "Safe Shutdown Cabinet Monthly Inspection." This item is considered closed.

(Closed) Violation 254/88021-05a(DRS); 265/88021-05a(DRS): Abnormal operating procedures provided guidance to restore electrical power to safe shutdown equipment in the event of a fault in associated non-safety circuits caused by a disabling fire. This was not consistent with licensee's commitments to take positive actions to prevent the loss of the safe shutdown equipment as documented in the safe shutdown methodology and accepted in an NRC Safety Evaluation Report.

The revised safe shutdown procedures directed the operators to strip safety related loads from electrical buses and then reload specific equipment onto the buses. The inspector reviewed and inspected a sample of the safe shutdown procedures; no unacceptable conditions were identified. This item is closed.

(Closed) Open Item 254/88021-06(DRS); 265/88021-06(DRS): The licensee had not incorporated test parameters such as pump speed and vibration as required by the National Fire Protection Association (NFPA) Code 20.

Procedure 4100-32, "Diesel Fire Pump Capacity Test," Revision 6, is scheduled to be issued in February 1992 and will

include parameters as correction for pump speed and vibration testing. This item is considered closed.

(Closed) Unresolved Item 254/88021-07(DRS); 265/88021-07(DRS);

The carbon dioxide concentration test had not been conducted for the diesel generator rooms nor documented as part of the basis in the fire hazards analysis. When installed in 1971, the licensee did not perform a concentration test since it was not explicitly required by the NFPA 12, "Standard on Carbon Dioxide Systems."

The licensee performed concentration tests during November 1991, for the Units 1 and 2 diesel generator room carbon dioxide fire suppression systems. Unit 2 passed the test; however, Unit 1 did not. The test results were just below the minimum theoretical concentration to extinguish a fire. A fluid flow analysis was performed for the common Unit 1/2 carbon dioxide fire suppression system. Results showed that the system would not pass a carbon dioxide concentration test; therefore the Unit 1/2 diesel was also declared inoperable. The licensee inspected the systems and determined that the nozzles were not installed as required by the installation drawings which resulted in an improper distribution of carbon dioxide. Compensatory measures were immediately taken which consisted of establishing an hourly fire watch, and providing wheeled fire extinguishers near the Unit 1 and Unit 1/2 diesel generator rooms.

The impact on safety was minimal based on the active and passive fire protection features for the diesel generator rooms. The diesel generator rooms have suppression and detection, and are located in three rooms separated by three hour fire walls. Drains are also provided to divert oil away from the area. In the event the carbon dioxide system activated, the oxygen concentration would be reduced in the diesel generator room and reduce the expected burn time. In addition, the fire brigade would respond and could manually operate the carbon dioxide system to extinguish the fire.

The licensee informed the inspector that the carbon dioxide system would be modified to deliver the design concentration of carbon dioxide as required by the later edition of NFPA 12, "Standard on Carbon Dioxide Extinguishing Systems." Based on the proposed corrective actions, this item is closed.

(Closed) Open Item (254/88021-08(DRS); 265/88021-08(DRS); The licensee did not install bags on the carbon dioxide system nozzles when conducting the puff test to verify that piping and nozzles were not obstructed. In addition, the air in rooms where the carbon dioxide is discharged was not sampled to avoid exposure of employees to hazardous levels of carbon dioxide.

The inspector reviewed surveillance procedure QIS 59-1, "Standby Diesel Generator, Cardox Fire Protection Test Procedure,"

Revision 11. Step F.9 required that bags be placed on the nozzles to verify discharge of carbon dioxide for all nozzles during the test. Step F.24 required measuring and recording oxygen level at the floor level. This item is closed.

## 2.0 Fire Protection Program Review

This inspection consisted of a review of administrative procedures, completed fire protection surveillances, and fire protection audits, observation of a fire drill, and inspection of safety related equipment to assure proper isolation of safe shutdown power equipment and control circuits.

### 2.1 Administrative Procedures

#### Control of Flammable and Combustible Materials, Welding and Cutting Permits.

Procedure QAP 1700-1, "Flammable and Combustible Materials Control," Revision 8, was developed to provide controls for the storage, use and handling of transient combustibles, including flammable/combustible liquids and gasses.

Procedure QAP 1170-20, "Fire Prevention for Welding and Cutting," Revision 2, was developed to provide instructions for cutting and welding operations.

The inspector reviewed the procedures for unacceptable storage and welding practices that would pose a significant threat to redundant safe shutdown equipment as required by 10 CFR 50 Appendix R. No unacceptable items were observed.

### 2.2 Fire Protection Surveillance

The fire protection program required equipment to be maintained and operable. The inspector reviewed and evaluated a sample of completed surveillance procedures as listed below.

QIS 61-1, "Fire Equipment Surveillance Procedure," dated June 1990 (Revision 4), December 1990 (Revision 4) and July 1991 (Revision 4).

QIS 62-1, "Fire Equipment Surveillance Procedure," Revision 4; dated March 1990, September 1990, March 1991, June 1991, and September 1991.

QIS 64-1, "Fire Equipment Surveillance Procedure,"; dated February 26, 1990, March 1990, August 30, 1990, September 4, 1990, March 2, 1991, and August 26, 1991.

QIS 66-1, "Fire Equipment Surveillance Procedure," dated May 1990, November 1990, December 1990, May 1991, October 1991, and

November 1991.

QIS 67-1, "Fire Equipment Surveillance Procedure," dated January 24, 1990, July 1990, January 26, 1991, and August 1991.

Deficiencies identified during the surveillance test were corrected or scheduled to be corrected. No unacceptable items were observed.

### 2.3 Fire Protection Audits

Technical Specification 6.1.G.B.8 required an audit of the fire protection program and implementing procedures at least once per 24 months. The biennial quality assurance audits dated May 19, 1989, and March 28, 1990, identified findings and observations that were either addressed or were scheduled to be addressed by the licensee's staff. No unacceptable resolutions were noted.

Technical Specification 6.1.H required an inspection and audit of the fire protection and loss prevention program to be performed by a qualified outside independent fire protection consultant at least once every three years. The triennial audit dated March 10, 1991, identified findings and observations that were brought to management's attention, and were resolved or scheduled to be resolved by the licensee. No unacceptable resolutions were noted.

### 2.4 Redundant Safety Related Cable

The inspector observed the power cables for the RCIC steam turbine valve and the safe shutdown makeup pump and verified that these cables were separated as required by 10 CFR 50, Appendix R. No unacceptable items were observed.

### 2.5 Fire Drill

On December 12, 1991, a fire drill was initiated. The simulated fire was located at the Unit 1 recirculating motor generator set oil cooler pump. The drill postulated a mechanical seal failure that resulted in a pressurized oil leak, which exposed other nearby oil pumps in the area.

The fire brigade responded and set up a command post. Preplans were utilized, ventilation equipment was set up and extra bottles of self contained breathing apparatus (SCBA) were brought to the scene. The ground fire was controlled by use of foam. Back up was provided to the foam team. The leak was isolated by closing an isolation valve to the suction end of the pump. The fire brigade was well coordinated due to good cooperation among the brigade members. The fire drill critique was also good that strong and weak points of the fire drill were discussed in detail. The fire brigade members also suggested improvements.

The performance of the fire brigade and the critique was good.

During discussions regarding the fire brigade, the licensee agreed to review and update the pre-fire plans as necessary (tentatively by January 31, 1993), regarding fires involving radioactive sources such as cobalt 60, and cesium in areas such as the calibration lab.

#### 2.6 Fire Reports

The inspector reviewed the fires over the last three years. In 1989 and 1990 there were several small fires resulting from cutting and welding activities and circuit breaker failures. The fires were quickly detected and extinguished. In 1991, there were no reported fires. The licensee attributes the lack of fires in part due to an improved maintenance program for the circuit breakers that were developed as result of the NRC's Electrical Distribution System Functional Inspection and the roving fire watches in the plant. Based on review of the licensee fire records no unacceptable items were identified.

#### 2.7 Fire Watch Program

A fire watch organization was established and a fire watch program implemented, which enhanced the overall inspection of the plant for fire hazards, blocked fire protection equipment, and unauthorized transient combustibles.

#### 2.8 Computerized Transient Combustible Control Program

A computerized transient combustible control program was also implemented to track the placement of transient combustibles throughout the plant. This program allowed the fire marshal to quickly identify approved transient fire loading in any fire zone in the plant and determine if additional compensatory measures were needed in the area.

#### 2.9 Fire Pump Remote Shut-off Switch in the Control Room

The Quality Assurance/Nuclear Safety Audit Report 04-91-I dated May 19, 1989, identified that hand switches are installed that would allow operators to remotely stop the fire pumps from the control room. In response to the QA finding, the corporate/station response was that the switches will not be removed and that justification will be provided in the updated Fire Hazards Analysis. The inspector was concerned that a short in the fire pump control circuit could shutdown the fire pump during fire fighting operations unnecessary exposing the brigade to severe fire conditions.

The licensee will review this concern and take appropriate corrective measures to insure that the fire pump control

circuitry would not cause an inadvertent signal to stop the fire pumps during fire fighting operations.

#### 2.10 Plant Observations

The inspector observed several hose stations, extinguishers, sprinkler valves, emergency lights, and housekeeping in several areas of the auxiliary, reactor, and turbine buildings. The inspector concluded that the equipment was well maintained. Housekeeping in these areas was good. However, on December 10, 1991, in the Unit 1 cable tunnel, a halogen light was located in a cable tray on top of electrical cables. The inspector was concerned that the light was a potential ignition source due to its proximity to the cables. The licensee immediately removed the light. The cable tunnel contains cables for safety related and safe shutdown equipment. The cable tunnel had ionization detection and is protected by an automatic (wet pipe) sprinkler system. The licensee determined that the halogen light would not have raised the cable insulation above the ignition temperature of the cable, however, the licensee agreed that placing a halogen light on top of the cables was not an acceptable practice and would evaluate the need for revising the housekeeping procedure.

#### 3.0 Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 3, 1992, and summarized the scope and findings of the inspection. The likely informational content of the inspection report was discussed with regard to documents reviewed during the inspection. The licensee did not identify any of the documents as proprietary.