

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-295/94003(DRS); 50-304/94003(DRS)

Docket Nos. 50-295; 50-304

Licenses No. DPR-39; DPR-48

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place
Downers Grove, IL 60515

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

Inspection At: Zion, Illinois

Inspection Conducted: January 11 - 21, 1994

Inspector: D. Schrum
D. L. Schrum

2/4/94
Date

Approved By: W. Shafer
W. Shafer, Chief
Maintenance and Outage Section

2/4/94
Date

Inspection Summary

Inspection from January 11 - 21, 1994 (Reports No. 50-295/94003(DRS); 50-304/94003(DRS)).

Areas Inspected: Routine, unannounced fire protection inspection of surveillances, equipment, impairments, control of combustibles, fire brigade training and drills, and fire protection audits. The inspector utilized selected portions of NRC inspection procedures 64704 and 92702.

Results: Overall, fire protection activities were effectively implemented in meeting the safety objectives of the program.

Program strengths included an experienced and knowledgeable staff which was proactive in resolving fire protection problems. The plant contained a low number of impairments. Fire systems equipment condition, which included fire doors and dampers, appeared to be good. A fire brigade drill was well managed. There was good control of combustibles, which included transient combustibles. Good root cause evaluations were being performed for fire protection problems. Quality Assurance(QA) audits and Field Monitoring Reports(FMRs) were detailed. The surveillance program was being adequately implemented. A good supply of fire brigade equipment was available. The training program for fire protection was good. The fire watch program was a strength.

Program concerns included zebra mussels not being treated in the fire main system during the outage. There was a large backlog of VWRs for fire protection. Deactivation of an electrical bus resulted in a high failure rate in one set of batteries for emergency lights. A lack of control of oxygen breathing apparatus(OBAs) was noted.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- *E. Broccolo, Jr., Station Manager
- *R. Chrzanowski, System Engineer
- *T. Cox, Fire Marshal
- *C. Diaz, Nuclear Engineering Technical Staff
- *K. Dickerson, Regulatory Assurance
- *J. Kerkman, Fire Protection Staff
- *P. LeBlond, CER Operational Safety Vice President
- *C. Locke, System Engineering Department
- *D. Meier, Nuclear Engineering Technical Staff
- *G. Morreno, System Engineering Department
- *K. Moser, Operations Engineering
- *I. Netzel, System Engineering Electrical Group
- *G. Ponce, CECo Quality Control Supervisor
- *M. Wiesieth, Regulatory Assurance
- *M. Wiley, System Engineering Department
- *R. Whittier, Safety Quality and Verification

U. S. Nuclear Regulatory Commission (NRC)

- *J. Smith, Senior Resident Inspector

*Denotes those attending the exit interview conducted on January 21, 1994.

The inspectors also interviewed several other licensee employees.

2. Licensee Action on Previously Identified Items(92702)

- 2.1 (Closed) Followup Item 295/304/87034-12(DRS): Fire detector design not adequate with respect to electrical supervision and annunciation.

During the 1987 inspection, the audit team discovered that not all fire alarm circuits were electrically supervised. This means that a single break or ground fault condition could render a portion of the fire alarm system inoperable without warning. In addition, the fire alarm system lacked a reflash capability. This means that if the fire or trouble condition annunciator panel light in the control room was lit for any reason, a subsequent fire or trouble alarm could not be received. This was considered a followup item pending review and acceptance of the licensee's NFPA Code Deviations by NRR. The licensee did not modify its fire detection system since the current system configuration was already reviewed and approved by the NRC in a March 10, 1978, SER of Zion's Fire Protection Program which approved the design of CECo's fire detection without supervision. As this followup item had been previously accepted, this item is considered closed.

2.2 (Closed) Followup Item 295/304/87034-14(DRS): Zion's FHA not consistent with conditions in plant.

During the inspection, the audit team observed that the licensee's fire hazards analysis(FHA) was not consistent with conditions as they exist in the plant. This was considered a followup item pending receipt and acceptance of an updated FHA by NRR. On September 18, 1989, the licensee transmitted the revised FHA to the NRC in response to this followup item. In addition, beginning in 1991, Zion Station embarked on a program to update the FHA on the same frequency the UFSAR is updated. New updates to the FHA were submitted to the NRC on September 15, 1992 and August 23, 1993. This item is closed.

2.3 (Closed) Followup Item 295/304/87034-15(DRS): NFPA Code Reviews for deviations in FSAR or FHA.

In Generic Letter 86-10, the NRC staff indicated that licensees should identify and justify all National Fire Protection Association (NFPA) Code deviations in the FSAR of the Fire Hazards Analysis. The licensee had not completed this effort at the time of the inspection.

The licensee provided a review of Zion's fire protection program against the NFPA Codes as Section 5 of its September 18, 1989 Fire Hazards Analysis submittal. The code review was also included in Volume 3 of Zion's September 15, 1992 update to the Fire Protection Report. In addition, as a result of Zion's transformer fire in 1991, the station conducted another line by line code review. This NFPA Code review was conducted by fire protection contractors and consultants. The station is in the process of resolving line items which the station did not comply with at the time of the original review. The resolution of these open line items were being tracked by internal station commitments. The licensee plans to include this new NFPA Code Review in the next update to the station's Fire Protection Program. A review of completed items will be made during a future inspection. This item is closed.

3. Routine Fire Protection Program Review (64704)

This inspection consisted of observations of plant areas and reviews of fire protection surveillances, maintenance on fire protection equipment, fire brigade training and drills, fire reports, impairments, deviation reports, work requests, safety evaluations, controls to prevent bio-fouling by zebra mussels, and audits of fire protection activities.

3.1 Observation of Plant Areas

The inspector toured the areas of the auxiliary and turbine buildings and the screen house to observe the adequacy and control of combustibles, fire doors, hose stations, detection equipment, extinguishers, sprinkler systems, emergency lights, and housekeeping.

The material condition of the fire suppression and detection equipment was good. The diesel fire pump appeared to be in good condition. The diesel fire pump had been recently rebuilt to increase the reliability of this pump.

However, the electric fire pump did appear to have excessive leakage. Fire doors in the plant were in good condition. The fire marshal stated that a contractor had been hired to upgrade and repair impaired doors. Door hardware in high useage areas had been upgraded.

The fire fighting equipment was in good condition and was well organized. During the outage extra fire fighting equipment had been stationed in areas with higher fire risk in the plant. For those extinguishers inspected all had current inspection dates except one. A good supply of fire brigade equipment was being stored in convenient locations throughout the plant. Fire fighting gear was being purchased for each brigade member. One concern was that control of OBAs was weak. Some OBAs were being left in the plant near fire brigade cages after use. Some OBA cases were noted in the plant without tie-wrap seals which indicate that the OBAs had been properly cleaned and had air bottles filled. As a result plant staff could inadvertantly respond to a fire with an empty air bottle. The cases for the refilled OBAs following the crystallizer room fire were noted as not being tie-wrap sealed. In addition, OBA cases were noted not tie-wrap sealed in a fire equipment storage location near the fire brigade drill held on January 19, 1994.

The control of normal combustibles was good for a dual unit outage. This included control of transient combustibles. Combustibles in work areas were being minimized. Most wood in the plant was fire resistant, but some untreated wood was noted in the auxiliary building. This wood had been removed prior to the end of the inspection. The hercu^lite being used to protect floors and forming enclosures was fire resistant. Flammable liquids were stored in fire proof cabinets and in appropriate safety cans. However, it was noted that excessive amounts of oil had been allowed to accumulate below some plant equipment.

One area of concern noted during the walkdown was that the diesel generator cardox system was still operable with maintenance activities occurring in those spaces. The system is alarmed to alert personnel to evacuate prior to actuation but still represented a risk to personnel unable to exit the area in the required time. Adding to the risk is the fact that these alarms had experienced several failures during previous surveillances. In one diesel room a hose had been led through the door making it impossible to shut the door in a short period of time. This represented a safety concern for those persons outside of the diesel rooms from carbon dioxide. The fire marshal took immediate actions to correct this condition.

3.2 Transient Combustibles

Transient combustibles in the plant were found to be properly tagged and were being monitored for combustible fire loading by the fire protection personnel. During a plant tour some untagged transient combustibles were noted by the fire marshal who communicated with the fire marshal's office to have the condition investigated and corrected. The fire marshal stated that for those areas where transient combustibles exceeded the allowable limits appropriate fire watches had been assigned or extra extinguishers had been assigned to the area. One problem noted was that the computer program for tracking transient combustibles does not contain the latest FSAR limits for the amount of

combustible materials allowed in the plant area. The fire marshal was required to make reference to the FSAR when the area exceeded the permissible fire loading. The computer program for the transient combustibles should be updated.

3.3 Fire Brigade Drill

The inspector observed a well managed fire drill in the auxiliary boiler fuel oil storage area. The fire marshal had placed two dummies to represent injured personnel in the space. One dummy was placed on electrical equipment to represent an electrocution. The space was smoked-up using a smoke machine to inhibit visibility. The fire fighting staff appropriately used the pre-fire plans to identify risks in the area and isolated the electrical equipment in the space. Five fire brigade members responded in a timely manner to the fire drill. The brigade members responded with appropriate fire fighting gear and dressed for entering the space. Two brigade members entered the space with fire extinguishers and two members manned a fire hose at the door. The two dummies were evacuated from the space using stretchers and the fire was extinguished using the CO2 fire extinguisher. Plant staff administered first aid to the dummies and simulated a call to ensure that an ambulance was responding.

A critique was held at the end of the fire drill with all of the participants in the drill present. The participants were allowed to give their insights on what they considered problems during the drill. These problems included not having adequate hand held radios available for communications, ensuring that personnel injuries are responded to as a first priority, pulling injured personnel from the space prior to putting them on stretchers, and brigade members in the fire area should assume more leadership for determining actions for responding to immediate problems. The fire marshal stated that an adequate number of hand held radios would be ordered and stored in a fire brigade equipment cage so that they would be available during a fire. He also stated that the other concerns would be verbally communicated to the fire protection training staff to ensure that the issues are included in the quarterly training. The use of verbal communications instead of documenting the identified problems was considered a weakness.

3.4 Root Cause Evaluations

Good root cause evaluations were performed for fire protection problems. Those fire protection problems that had been categorized as significant were being investigated and evaluated for root cause. Corrective actions were implemented to prevent a repetition of those problems. No repetition of significant fire protection problems were noted during the inspection.

3.5 Audits and Field Monitoring Reports(FMRs)

Audit investigations for fire protection were detailed and thorough with adequate staff hours devoted to each audit. The FMRs were performed based on observations of conditions in the plant and were effective in identifying problems in the fire protection program. All audits performed had personnel that were independent from the site. The following audits were reviewed:

- a. Quality Assurance/Nuclear Safety Audit, 22-91-I, 3/4/91
- b. Off-site Quality Verification Audit Report, 22-93-I, 2/5/93

3.6 Surveillance Program

The surveillance program was adequately implemented. Improvements were being made to ensure that surveillances were being performed more timely. Some fire protection surveillances were being delayed using the 25 percent grace period to perform the surveillance. To resolve this problem the licensee stated that the fire protection surveillances in the future will be scheduled ahead of their due date to ensure that surveillances are performed on time if problems occur during the surveillances. The planning staff was ensuring that the surveillances were being performed by knowledgeable personnel. The completed surveillances were being reviewed to ensure that they had been performed correctly.

For those surveillances reviewed the fire systems equipment condition appeared to be good, except for one set of emergency lighting batteries as documented in paragraph 3.11. Surveillances and equipment history indicated that the fire pumps, sprinklers, detectors, and fire doors were in good condition. During the observation portion of the inspection no problems were noted with the condition of equipment. A recent surveillance performed for fire dampers in the plant indicated that very few dampers in the plant were inoperable. Inoperable dampers had been included in the corrective action system.

3.7 Training

The training program for fire protection was good. A review of brigade qualifications indicated that quarterly and annual training requirements were being met for those plant staff listed as qualified. Fire watch training was adequate to ensure that not only fire watch rounds were being made but fire watches were noting plant problems and ensuring that those problems were reported to the fire marshal or were corrected. Fire brigade drills were being held often enough to ensure plant staff met their brigade drill requirements. The fire brigade qualification records were being adequately maintained.

3.8 Staffing and Impairments

The fire protection group was adequately staffed as indicated by the fire protection program being effectively implemented in spite of the large work load increase during the dual unit outage. A review of the fire watch logs indicated that required fire watches were being made for impairments on an hourly or continuous basis. Additional impairments caused by a temporary service water systems were being monitored and additional fire fighting gear had been stationed for some of these impairments. There was a low number of non-outage impairments in the plant. The fire marshals were being vigilant in ensuring the numerous work areas were controlling combustibles, obtaining

transient combustibles tags, and ensured that workers had temporarily filled fire resistant materials in impaired fire barriers if modifications or

maintenance was terminated at the end of a work shift. There was in general good cooperation among the fire protection personnel.

The plant staff was proactive in resolving day to day problems in the plant. Examples included disposing of a work groups transient combustibles if they did not obtain a transient combustible tag after being requested to do so. Locks were put on flammable combustible cabinets to ensure that responsibility of what was in the cabinet could be assigned to the department who owned the cabinet. For areas where the limit of transient combustibles would be exceeded one work group must find another work group to move materials out so they could move their materials into the area. The department with the impairment was required to supply the fire watch for the impairment, which contributed to getting impairments repaired.

3.9 Zebra Mussels

The Zion plant has an extensive zebra mussel infestation in the water that is supplied to the plant. An inspector concern was that zebra mussels were not being treated in the fire main system during the outage. Zebra mussel shells could result in plugged sprinkler heads or strainers during a fire.

The normal supply of fire suppression water in the plant is supplied by the service water system. The service water system is chlorinated to kill zebra mussels. The electric fire pump is a backup to this system. The diesel fire pump is the final pump to run during a fire or if an electrical supply is not available to run the other pumps. The diesel and electric fire pumps do not normally run during plant operations. The licensee had also taken steps to have these pumps tagged out during surveillances to ensure that zebra mussels are not pumped into the plant.

During the outage the service water systems was taken out of service for maintenance, so the plant installed a temporary service water system to supply water. The temporary service water system was not being treated with chlorine to kill zebra mussels. However, this system does contain a strainer which would stop zebra mussel shells from entering the fire main system.

During the inspection the temporary service water system was out of service so the plant was using the electric fire pump to pump water into the fire main system. The water supplied to the plant from the electric fire pump was not being strained or treated with chlorine to kill zebra mussels. In addition, the fire main system was being used to provide water supplies in the plant, such as providing water to perform hydros on the service water system.

The inspector's concern was that zebra mussels or zebra mussel shells had been pumped into the fire main system. The plant staff stated that a fire main flush would be performed at the end of the outage and strainers would be checked for systems. The system would also be treated with chlorine.

3.10 Backlog of Nuclear Work Requests

The backlog of fire protection NWRs is high. The plant was reducing fire protection NWRs at a faster rate as a result of a new policy that required that other groups in the plant being made responsible for providing fire watches for impairments on their own systems, but the number of NWRs still open was substantial. The licensee's prioritization system ensures that the most significant NWRs are performed first. But an inspector concern is that it still takes a long time to complete work on some significant deficiencies.

3.11 Emergency Lights

Deactivation of an electrical bus resulted in a high failure rate in one set of batteries for emergency lights. The inspector noted that a surveillance performed in December 1993 contained a high failure rate for batteries. The system engineer stated this had resulted from an electrical bus being taken out of service without turning the battery packs off. He stated that a complete drain down of the batteries for an extended period of time results in batteries that can no longer meet the eight hour surveillance test. The plant staff was aware of this but had failed to notify the electrical maintenance(EM) department when an electrical bus was removed from service in December. During the inspection the system engineer stated that procedure changes would be made to add statements to require the notification of the EM department prior to taking an electrical bus out of service.

3.12 Fire Reports

There were a few insignificant fires during the assessment period and the fire brigade had responded appropriately to the fires. The low number of fires indicated good fire prevention in the plant. One fire occurred during the inspection in the crystallizer room. The fire involved an extension cord which had overheated as a result of an excessive electrical load. The extension cord had set a wooden spool containing electrical wiring on fire. The residents will address the strengths and concerns for the crystallizer room fire in inspection report 94002.

4. Exit Meeting

The inspectors met with the licensee representatives denoted in Paragraph 1 during the inspection period and at the conclusion of the inspection on January 21, 1994. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.