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BECo. Ltr. #82-11

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Operating Reactors Branch #2
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

License No. DPR-35
Docket No. 50-293

SPECIAL REPORT - CSR CO₂ SYSTEM
CORRECTIVE ACTIONS

Dear Sir:

Pursuant to Technical Specification 3.12.D.b, the Boston Edison Company hereby submits a special report to address corrective actions for the CO₂ Fire Suppression System in the Cable Spreading Room (CSR) at Pilgrim Nuclear Power Station. It is recognized that the requirement for this report represents a dual reporting obligation, since the event was previously reported per LER #81-058/01T-0 on 11/9/81. We believed that this redundancy removed the necessity of this report, and we regret that this erroneous belief accounts for its lateness. A request for a license amendment to eliminate this dual reporting will be transmitted to the Commission at a future date.

Event

The Carbon Dioxide Gaseous Fire Extinguishing system did not perform as designed during a special Discharge Test. This system shall not be considered capable of extinguishing a fire involving any cable tray in the CSR that is higher than seven (7) feet above the floor. The system is capable of extinguishing any fire less than seven (7) feet above the floor if the fire is not located in a tightly sealed panel or enclosure.

A single shot design discharge of CO₂ into the Cable Spreading Room could affect operability and cause damage to some electrical components in the Cable Spreading Room. The components that would be subject to inoperability and damage are the components that are face mounted and components in panels with louvers that would allow CO₂ to enter the panel.

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Background

The CO₂ system was designed to extinguish a deep seated plastic insulation fire. The Chemetron Fire System Company designed this system to provide a 30 percent CO₂ concentration (by volume) within one and one half minutes, and to increase the concentration to 50% within the next one minute, for a total discharge period of 2½ minutes.

On 10/26/81, this system was discharge tested under PNPS Temporary Procedure TP 81-55. Chemetron personnel were on site to monitor the carbon dioxide concentrations obtained. The test was aborted after discharging for only one minute and forty-five seconds out of the planned two minutes and thirty seconds. (The termination was required to prevent the temperature of a safety related electrical component from dropping below its minimum OPERABILITY LIMIT). The carbon dioxide system did not develop the minimum 30% concentration above the highest fire hazard. The concentration six (6) inches below the ceiling was approximately 10%. To comply with the regulatory code (i.e., NFPA 12) in PNPS's CSR, the required concentration, 30% must be developed right up to the ceiling. The highest point the 30% was obtained was two feet below the ceiling.

The test did develop a 50% concentration through the CSR up to 7 feet above the floor. This concentration would be increased if the system continued to discharge through its designed discharge period.

Chemetron's monitors accounted for approximately all the carbon dioxide that the designed rate predicted would be expelled within 1.5 minutes. Ninety percent of the CO₂ that would have been discharged in the last minute, would have to be injected into the top half of the CSR to meet the required final concentration (50%). This probably would not occur.

Action Taken

A continuous fire watch was established when CO₂ concentrations in the CSR dropped to allowable (i.e., habitable) levels as required by Technical Specification limiting conditions of operation. The CO₂ System was returned to service (i.e., automatic/standby) just after the posting of the fire watch. Following the abort, a review of the CO₂ concentration data was made. It was determined that the CO₂ system did not achieve its initial design objective. Furthermore, extrapolation of the data indicated that the final objective would not have been reached. The system was then declared inoperable due to this inability to perform its design function. Later in the day, after it was determined that it was not desirable to permit automatic actuation of the system because of the low temperature considerations, the entire system was again disabled.

Conclusion

The present Carbon Dioxide system cannot be relied on to extinguish a fire in the CSR if the fire is over 7 feet above the floor.

The CO₂ system will extinguish a fire in the CSR if the fire is located less than 7 feet up from the floor and if the fire is not located in a tightly sealed panel or enclosure.

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Cause

The cause of declaring the system inoperable was a management decision based on an engineering evaluation which recommended that the CO₂ system not be discharged into the CSR because of the potential damage to electrical components within CSR. Further, the inability of the CO₂ system to deliver the required concentrations is the result of a design deficiency.

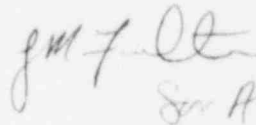
Plans For Restoring System To Operable Status

Engineering evaluations have and continue to be conducted regarding what type of modifications are required to provide full, fixed fire suppression capabilities to the CSR. Under consideration are modifications to the existing CO₂ System, or replacement of it with a Halon 1301 System, a water spray system, or a foam system. At the present time, recommendations have been made to replace the CO₂ System with a Halon-1301 System. Pending authorization to proceed with detailed design, procurement and installation, current projections indicate completion late in 1982.

Pending final decision and authorization, fire protection measures have been initiated (fire patrols). These interim measures are planned to be augmented by minor changes in the manual actuation circuitry to take advantage of limited CO₂ System capabilities which are still available, by procedure revisions to address interim fire fighting methodologies, and by supplementary training of key fire watch personnel. Boston Edison feels that these interim measures will provide the necessary fire protection coverage for the CSR until a fixed suppression system is operable.

Boston Edison believes that this report completely fulfills our reporting requirement pursuant to Technical Specification 3.12.D.b. Should you require further information after reviewing it, please contact us.

Very truly yours,


J. M. F. O.
S. A. V. M.