U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-454/84-74(DRS)

Docket No. 50-454 License No. CPPR-130

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

Facility Name: Byron Station, Unit 1

Inspection At: Byron Site, Byron, IL

Inspection Conducted: October 10-12, 1984

Inspector(s): C. Ramsey — 11/6/84 Date

J. Ulie — 11/6/84 Date

Approved By: L. A. Reyes, Acting Chief
Operational Program Section — 11/6/84 Date

Inspection Summary

Inspection on October 10-12, 1984 (Report No. 454/84-74(DRS))
Areas Inspected: Closeout inspection to verify corrective actions taken in response to findings identified in inspection reports 50-454/83-62 and 50-454/84-60. The inspection involved 52 inspector-hours onsite by two NRC inspectors, including 4 inspector hours during offshifts.
Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

Commonwealth Edison Company

R. Querio, Station Superintendent
*R. Ward, Assistant Superintendent, Administration
J. Bitel, Director, QA Operations
*W. Burkamper, QA Supervisor, Operations
*D. Sible, QA Engineer
R. Poche, Licensing Engineer
*C. Diza, Fire Protection Engineer
P. Nodzenski, QA Engineer
*R. Gruber, QA Engineer
A. Churnick, QA Supervisor
E. Falb, Shift Overview Superintendent
L. Sues, Assistant Superintendent, Maintenance
*R. Pleniewicz, Assistant Superintendent, Operations
*R. Cassidy, Assistant Fire Marshall
*R. Poche, Technical Staff Engineer
*K. Hansing, QA Superintendent
M. Graham, Technical Staff Engineer
S. Vanos, Project Construction Department
P. Wizek, Project Construction Department

Sargent and Lundy

M. Hill, Engineer

M&M Protection Consultants

R. Smith, Jr., Fire Protection Consultant
B. O'Reilly, Fire Proection Consultant

NRC

*J. Hinds, Senior Resident Inspector
*L. A. Reyes, Section Chief

*Denotes those attending the exit meeting of October 12, 1984.

2. Applicant's Actions on Previous Inspection Findings

a. (Closed) Deviation (454/83-62-01) Failure, to provide a fully operational fire protection program in the fuel handling building prior to receipt of fuel onsite.

(1) Fire Hose Stations

(Closed) Regarding the installation of pressure reducers on standpipe outlets, with the concurrence of NRR in a phone conversation on October 10, 1984, the inspectors determined the applicants proposed alternative actions to be acceptable. The following alternative actions were satisfactorily implemented by the applicant.

(a) Byron, Illinois Fire Department's letter of July 17, 1984 to the applicant verified that all fire brigade members have been trained in the use of high pressure fire hoses up to 200 psi.

(b) The fire brigade training program (LBBI-3) contains proper instruction for handling high pressure hose lines in attacking all internal structural fires. As standard practice, fire brigade members are instructed to utilize the two-man attack method which requires one fire brigade member to man the charged hose line for maneuverability and one fire brigade member to man the charged hose lines at the nozzle for the fire attack. The training program references the International Fire Service Training Association's publication entitled, "Essential of Firefighting", which considers this to be an acceptable method of handling high pressure hose lines in firefighting.

(c) The fire brigade training program (LBBI-3) contains instruction for fire brigade members to set the proper nozzle pattern prior to initiating a fire attack. According to the applicant, with exception of fire hose nozzles in the new fuel storage area of the refueling building, all fire hose nozzles in the plant have the capability of providing straight stream or fog stream patterns for firefighting.

To further resolve this concern, the applicant provided the inspectors with a purchase order (contractor material services request number 63161) which indicated that 260 Underwriters Laboratory listed class A, B, C fire hose nozzles manufactured by ELKHART Fire Equipment Company, Model No. L-205-EB, have been ordered for the purpose of upgrading existing fire hose nozzles.

(d) On a sample basis, the inspectors verified that warning signs were posted on standpipes with outlet pressures greater than 150 psi. Six (6) standpipe outlets in safety related areas were visually observed to have posted warning signs which were clearly visible and stated, "Warning - Pressures Greater than 150 PSIG."

(e) (Closed) The applicant's General Employee Training Program (GET) was revised to include the following statement on fire protection: "Fire hoses are to be used by the station fire brigade only."

(2) Fire Pumps and Water Supplies

The applicant's proposed alternatives in lieu of installing backflow check valves at crossties between the service water systems and the fire water system was determined acceptable by the inspectors with the concurrence of NRR in a telephone discussion on October 3, 1984. The applicant's alternatives actions were verified and determined satisfactory by the

inspectors. This is further discussed in the closure of unresolved item No. 454/83-62-44.

b. (Closed) Deviation (454/83-62-05) Failure to install fire hose stations in accordance with NFPA requirements.

The inspectors verified the applicant took appropriate corrective action that satisfied his commitments. The alternative actions that were taken by the applicant in lieu of installing pressure reducers in standpipe outlets are discussed in the closure of deviation No. 454/83-62-01. Therefore, Items (1), (2) and (3) of this deviations are closed.

c. (Closed) Deviation (454/83-62-06) Failure to provide qualified staffing to implement the fire protection program.

The inspectors verified that the applicant has made considerable effort to involve qualified individuals in all aspects of the Byron Fire Protection program implementation. This appears to have resulted in significant upgrading of the plant's fire protection features.

Attachment A of the applicant's August 21, 1984 submittal to J. G. Keppler of Region III concerning Byron 1 SALP IV evaluation summarized the extent of the applicant's efforts in this area. Since January 1984, qualified fire protection engineering consultants have been actively involved in updating and formulating the applicants fire protection program. In April 1984, the applicant hired a graduate fire protection engineer to provide full time onsite fire protection engineering expertise to implement all aspects of the fire protection program. Corporate support to the onsite fire protection engineer is provided by the corporate technical services nuclear department staff which includes at least one qualified fire protection engineer.

According to the applicant, updated resume's of the individuals involved in the formulation and implementation of the site fire protection program will be included in amendment No. 5 of the fire protection report as requested by NRR.

In addition, because of the concerns expressed by the NRC, the applicant formed a special task force to insure that all engineering, licensing and operating fire protection activities will be coordinated and properly implemented prior to fuel load and during plant operations as necessary.

d. (Closed) Unresolved (454/83-62-07) The applicant failed to provide the inspectors with acceptable evidence that appropriate quality assurance measures were being applied to fire protection.

The inspectors review of quality assurance audits No. 6-84-156, which was conducted on July 11-18, 1984; No. 6-84-1, which was conducted on April 24-27, 1984 and No. 6-84-29, which was conducted July 18, 1984, verified that adequate quality assurance measures are being applied to fire protection. The audits made assessments of responsibility for implementation of the fire protection program, fire brigade, plant modifications and maintenance activities, control of fire hazards, fire protection system equipment performance, inspection records,

design change procedures and evidence that discrepancy records were being properly dispositioned.

The details of identified audit deficiencies and apparent weaknesses in the program were contained in quality assurance audit followup reports. The followup audit reports indicated that appropriate corrective actions were taken to resolve identified deficiencies and to strengthen the program and its proper implementation.

e. (Closed) Unresolved (454/83-62-09) Capability of the essential and non essential service water systems to perform as a backup to the fire water system was not demonstrated.

The adequacy of the service water systems capability to perform as a backup to the fire water systems was determined acceptable by NRR in a telephone discussion with the inspectors on October 3, 1984. The inspectors review of the applicant's preoperational test results for the service water systems indicated that their design and functional requirements during preoperational testing were adequate. This is further discussed in the closure of deviation No. 454/83-62-45.

f. (Closed) Unresolved (454/83-62-10) CO_2 systems preoperational test results did not demonstrate the systems operable in accordance with NFPA and design requirements.

M&M Protection Consultant's letter of October 4, 1984 to the applicant verified that concentration tests were performed in the upper cable spreading rooms, identified as hazards 1EE1-1 and 1EE1-3, on September 25, 1984. In order to conduct the tests, unsealed penetration openings through walls, floors and ceilings were temporarily sealed.

According to the test results, the manual CO_2 systems for each upper cable spreading room maintained a 50 percent CO_2 concentration for a period of 10 minutes. These systems were designed for a 10 minute CO_2 concentration hold time in accordance with an earlier edition of NFPA Standard 12. A CO_2 concentration hold time of 10 minutes is not sufficient for extinguishment of deep seated electrical fires such as those that would be most likely to occur in the upper cable spreading rooms. The 1980 edition of NFPA Standard No. 12 specifies a 20 minute CO_2 concentration hold time for electrical cable hazards.

As presently designed, the upper cable spreading room CO_2 systems cannot provide a 50 percent CO_2 concentration, for a 20 minute period without extended discharge piping being added to the system an adequate CO_2 supply is available for extended discharge.

To achieve the 20 minute CO_2 concentration hold time specified by current NFPA standards, the applicant's fire protection consultants recommended that the the applicant actuate the manual CO_2 systems for the upper cable spreading rooms a second time after the initial actuation and 10 minute holding period. The applicant revised operating procedure NO. BOP FP-15 to specify the second actuation of these systems in the event of an upper cable spreading room fire concurrent with a failure of the primary automatic halon fire suppression system.

Since an automatic Halon system is installed in each upper cable spreading room as the primary fire suppression system, the manual CO_2 systems are used only as a backup. A third method of suppressing fires occurring in these rooms is manual firefighting. Based on the multiple redundancy of fire suppression capability for the upper cable spreading rooms, the inspectors determined the applicant's corrective actions to be acceptable.

g. (Open) Unresolved (454/83-62-11) Penetration openings in fire barriers were unsealed and membrane protection of structural steel was incomplete.

(1) (Closed) The inspectors verified that the applicant took appropriate corrective actions by sealing pipe penetrations through the wall and sealing the ceiling openings of the diesel fire pump enclosure.

(2) (Open) The applicant provided the inspectors with completed and satisfactory results of preoperational tests for fire protection systems. However, the applicant indicated remaining unsealed penetration openings through fire barriers throughout the plant would not be sealed prior to fuel load due to continuing plant modification or construction activities. For fuel load, the applicant proposed to implement the action statement of Technical Specification No. 3/4.7.12 for these areas. The applicant's proposal was accepted by NRR and will be discussed in supplement No. 5 of the SER.

(3) (Open) The applicant indicated that membrane protection of structural steel would not be completed prior to fuel load due to continuing plant modifications and construction activities. For fuel load, the applicant propose implement the action statement of Technical Specification No. 3/4.7.12 for these areas. The applicants proposal was accepted by NRR and will be discussed in supplement No. 5 of the SER.

h. (Closed) Unresolved (454/83-62-13) The applicant's safety related battery rooms were not adequately protected from fire and explosion potential.

The inspectors verified the following corrective actions taken by the applicant:

(1) 3-hour fire barriers were installed to separate the battery rooms from other areas.

(2) Since the battery room ventilation systems were determined to be adequate for maintaining hydrogen concentrations below the lower explosive limit (LEL) by the applicant, explosion proof electrical fixtures are not required. NRR will discuss its position on this matter in supplement No. 5 of the SER.

(3) As stated above, the applicant determined the battery room ventilation systems to be adequate for maintaining hydrogen concentrations below the lower explosive limit. NRR will discuss its position on this matter in supplement No. 5 of the SER.

(4) The applicant installed fire hose stations to enhance manual firefighting activities for the battery rooms. In addition, the applicant committed to revise fire hose station surveillance procedure No. BMS 7.10.5.a-1 (Revision 2) to include surveillance of fire hose stations for the battery rooms.

i. (Open) Unresolved (454/83-62-14) Plant wide fire detection system was inadequate. As stated in inspection report No. 50-454/84-60, the applicant installed 372 additional fire detectors in response to the inspector concerns, which closed out sub-sections a, b, c and f of this item. Sub-sections d and e remain open pending the applicant's completion of an evaluation of the adequacy of fire detector installations in areas where there are high ventilation air flows.

During this inspection the applicant's fire protection consultants were in the process of performing this evaluation. At the request of the inspectors, the fire protection consultants provided the applicant with a summary of the completed portions of the evaluation.

M&M Protection Consultants letter of October 12, 1984 to the applicant provided the status of the final phase of the evaluation for Byron Unit 1. Using a Davis Instrument Manufacturing Company, Inc. anemometer (serial No. 1199-T2, QA No. 217806 BY, last calibration date 2-84), the consultants took and recorded a total of four airflow velocity readings for each detector within each fire zone under evaluation to determine problem areas where airflows approach or exceed the detectors manufacturers recommended maximum air velocity. The detectors manufacturer's technical data specification for the detectors specify that the sensitivity of the detectors is reduced as air velocities increase. As a result of this reduced sensitivity, the manufacturer recommends that the detectors not be utilized in areas where air flows are equal to or greater than 300 feet per minute. In the consultant's evaluation, 200 feet per minute is being utilized as the acceptance criteria for airflow velocities.

According to the consultant's October 12, 1984 letter to the applicant, with the exception of a few detectors within given fire detection zones, recorded air velocities were considered to be low in most instances with no affect on detectors sensitivity. In the few cases where the air flows exceeded the acceptance criteria, the consultants felt that relocation of certain detectors may or may not be practical when proper consideration is given to other criteria utilized in the fire detection system design.

The evaluation was still in progress at the conclusion of this inspection. The consultants anticipated completion of the evaluation for all Byron Unit 1 safety related areas by October 15, 1984. This item remains open pending completion of the evaluation and NRC review and acceptance of the results.

j. (Closed) Unresolved (454/83-62-37) The reactor coolant pump oil collection systems had inadequate capacity to hold the entire lube oil inventory (1100 gal.) from all four reactor coolant pumps. The reactor coolant pumps are equipped with an oil collection system consisting of drip pans and one holding tank (approx. 15 gal. capacity) per two reactor coolant pumps with an overflow (approx. 2 1/2" in diameter) to an oil separator (approx. 200 gal. capacity) which overflows into the containment sump (estimated to be 750 gal. capacity). This system appears to be incapable of collecting the entire lube oil inventory from all four reactor coolant pumps.

Since plant technical specifications require that the applicant maintain the oil separator for the containment sump full at all times during plant operations in order to identify any unidentified leakage, the reactor coolant pump oil collection system overflow to the oil separator was eliminated.

To compensate for the loss of oil collection capacity provided by the oil separator, the applicants proposal to increase the set points of the containment sump pumps so that the entire lube oil inventory from all four reactor coolant pumps can be contained in the containment sump by the sump pumps removal of oil and any unidentified leakage. When the collection capacity of the sump reaches the level established by the new set points the sump pump will automatically start and remove oil from the sump continuously until the entire lube oil inventory from all four reactor coolant pumps is contained in the sump.

The applicants proposal was accepted by NRR and will be discussed in supplement No. 5 of the SER.

The applicants test report No. BIP 2000-TO (Revision 1) dated November 22, 1982 and Sargent and Lundy drawing No. L525 (Revision B) dated June 12, 1980 specified the original set points for starting of the containment sump pump when the sump reached its oil collection capacity. Sargent and Lundy drawing No. L 525 (Revision C) dated September 24, 1984, indicated that the containment sump pump set points were adjusted based on calculations that allow sufficient containment sump capacity to hold the entire inventory (980 gallons) of all four reactor coolant pumps.

k. (Closed) Open item (454/83-62-42) The applicant's proposed operating surveillance test procedures were not developed to satisfy technical specification requirements and the procedures were inconsistent with NFPA and design requirements.

The inspectors verified that surveillance procedure No. BOS 7.10.1-1a was revised to include the action and surveillance requirements of Technical Specification No. 3.7.10.1. The procedure specifies verifying provisions for alternate backup supply for fire suppression water supply using the essential and non essential service water systems. The non essential service water (WS) system is designated for use as an alternate backup to the fire water system in the event that a backup water supply is needed upon inoperability of one of the main fire pumps.

The essential service water (SX) system is designated as a backup to the fire water system in the event that both main fire pumps are inoperable as a result of a seismic event. The use of this system as a backup to the fire water system is limited due to its low discharge pressure at high elevations.

Neither of the service water systems (EWS or SX) can be considered a redundant backup that is equivalent to the fire water system. Their design and functional requirements are not consistent with those required for fire water systems in that the service water pumps will not deliver 150% of rated capacity at 65% of total rated head. However, this deviation from NFPA requirements was reviewed and accepted by NRR, and is consistent with the NRC positions that have been taken for backup requirements at other sites.

l. (Closed) Unresolved (454/83-62-44) Backflow check valves were not installed at crossties connecting the service water systems to the fire water system. The inspectors verified that the applicant took satisfactory corrective actions to procedurally address this concern in Byron station procedure numbers BVS FP-9 and BUS FP-12.

m. (Closed) Deviation (454/83-62-45) Preoperational test procedures were not developed to properly demonstrate operability of fire protection systems.

The inspectors verified the applicant took appropriate corrective actions for closure of the following inspector concerns:

(1) Preoperational Test No. 2.76.10 dated December 10, 1983, and component demonstration test Numbers C-7 and C-121 demonstrated proper operation of the essential service water (SX) system. The test results indicated that the system's design and functional requirements were met.

(2) The final evaluation of the results of preoperational test No. 2.48.20 (Revision 4) dated October 5, 1984 for emergency lighting units identified 68 deficiencies. The deficiencies included dead batteries, inability to attain full recharge, inadequate illumination, repairs to grounding neutrals and 8 hour discharge test failures of Teledyne 8 hour battery pack emergency lighting units. The deficiencies were documented in Byron Station Letter No. 84-1241 dated October 5, 1984. 48 of the identified deficiencies were required to have corrective action prior to commercial service. The applicant provided the inspectors with a detailed listing of these deficiencies and their resolution.

(3) The test results of preoperational test No. 2.104.20 and component demonstration test No. C-144 (Revision 4) dated October 5, 1984 verified proper operation of the non-essential service water system. The test results indicated that the system's design and functional requirements were met.

n. (Closed) Open item (454/84-60-01) Replacement cable, selector switches and other equipment required to make repairs to systems needed to achieve and maintain cold shutdown were not designated as such and stored onsite. The inspectors toured the applicant's storage warehouse and visually observed this equipment stored onsite and designated as "post fire emergency cable, switches, etc". 3 reels of No. 2-3 cable, 2 reels of No. 16-1 cable, 2 reels of No. 16-3 cable, 1 reel of No. 14-1 cable and 1 reel of No. 10-3 cable were observed. Several two position and three position selector switches were observed. In addition electrical contact blocks with one normally open and one normally closed contact for the selector switches were provided. Furthermore, two reels of 22 gauge cable conductor for audio communications were also observed.

o. (Closed) Open item (454/84-60-02) The control room alternative post fire safe shutdown method was not in conformance with NRC requirements in that repairs were required to achieve and maintain hot standby conditions. The inspectors verified that the applicant satisfactorily performed the necessary circuit modifications identified in open item 454/84-60-06, 07 and 08 so that repairs are no longer required to achieve and maintain hot standby conditons. In an October 10, 1984 phone conversation with NRR, the inspectors were advised that the applicants corrective actions had been reviewed by NRR and determined satisfactory. NRR will provide a discussion of their review in supplement No. 5 of the SER.

p. (Closed) Open item (454/84-60-04) Remote switch must be installed in Fire Zone 11.3. to assure the capability of remote starting the diesel driven auxiliary feedwater pump. Design change No. AF-15, dated April 12, 1984 required the installation of an additional start switch outside of the diesel driven auxiliary feedwater pump room to allow remote starting of the diesel driven auxiliary feedwater pump. Construction Work Request No. AF-0009, dated August 3, 1984 was closed out, indicating that the remote start switch was installed. The inspectors visually observed the switch installation and found it to be satisfactory.

q. (Closed) Open item (454/84-60-06) Pressurizer relief isolation valve circuit transfer switches must be modified to circumvent fire damage and resulting spurious signals due to control room fire.

The applicant's construction work request No. 7A3299 indicated that the control switches for Valves 1RY455A and 1RY456 were rewired to Drawing 1-4030 RY17, Revision P and the contacts were placed in parallel with the automatic open contacts. Alarms 662, 663, 666 and 667 were also rewired.

The applicant discussed this modification with NRR in a meeting held at NRC headquarters in Bethesda, Maryland on October 10, 1984. In a telephone discussion of October 11, 1984, with the inspectors, NRR informed the inspectors that the applicants corrective actions appeared to be satisfactory and closure of this item would be discussed in supplement No. 5 of the SER.

r. (Closed) Open item (454/84-60-07) Diesel generator, charging pumps, essential service water and motor driven auxiliary feedwater circuits must be modified in order to circumvent loss of safe shutdown functions due to a control room fire. The applicant discussed these modifications with NRR in a meeting held at NRC Headquarters in Bethesda, Maryland on October 10, 1984. In a telephone conversation of October 11, 1984 with the inspectors, NRR informed the inspectors that the applicant's corrective actions appeared to be satisfactory and closure of this item would be discussed in Supplement No. 5 of the SER.

s. (Closed) Open item (454/84-60-08) Diesel generator, charging pump, essential service water and motor driven auxiliary feedwater pump circuits must be modified in order to circumvent loss of safe shutdown functions due to a fire at the remote shutdown panel. The applicant discussed these modifications with NRR in a meeting held at NRC Headquarters in Bethesda, Maryland on October 10, 1984. In a telephone conversation of October 11, 1984 with the inspectors, NRR informed the inspectors that the applicants corrective actions appeared to be satisfactory and closure of this item would be discussed in Supplement No. 5 of the SER.

t. (Closed) Unresolved (454/84-62-03) An unsupported 2 inch fire protection water supply line was identified between Lines U13 and V13 on Elevation 364 feet of the auxiliary building. The unsupported pipe was installed approximately 10 feet above floor level. The inspectors visually observed that the identified unsupported 2 inch fire protection water supply line was properly supported by hangers and pipe supports.

3. Exit Interview

The inspectors met with the licensee's representatives (denoted in paragraph 1) on October 12, 1984 and summarized the scope and findings of the inspection. The applicant acknowledged the statements made by the inspectors and agreed to take corrective actions on all of the outstanding items of concern.