INDIANA & MICHIGAN ELECTRIC COMPANY

AMERICAN ELECTRIC POWER SERVICE CORPORATION

RESPONSE TO

FIRE PROTECTION SURVEY

of the

D. C. COOK NUCLEAR PLANT, UNITS 1 and 2

by

PROFESSIONAL LOSS CONTROL, INC.

REPORT DATED OCTOBER 26, 1982

Compiled by:
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12/10/82

D-1-B

The following are the responses to the Professional Loss Control fire protection survey final report dated October 26, 1982. The responses have been prepared by the D. C. Cook Nuclear Plant and by the AEP Service Corporation. The numbering of the responses corresponds to the recommendation numbers in the PLC report.

4.1.1 Administrative Procedures PMI-5040 and PMI-5045 will be amended to require a review of the potential impact of plant modifications on the fire loading and fire detection/suppression systems in the area of the change. The procedure amendments will be made no later than January 1, 1983.

A Corrective Action Request item has been initiated to expedite the above amendments.

4.1.2 Adequate procedures are already in place and enforced for review and approval of fire protection design, calculations, and drawings. These include Mechanical Engineering Division Procedures on Design Control, Specifications, Procurement, and Calculations. Deviations from referenced Fire Codes and standards will be identified and documented.

We will revise our design change procedure to include guidelines for the review of proposed changes and their impact on fire potential at the plant. The Fire Protection Section will assist the lead engineer in this assessment and either direct him to the cognizant group or take the necessary measures to mitigate the hazard in the proposed change.

A Corrective Action Request item has been initiated to expedite the above change.

4.1.3 Administrative Procedure PMI-2271, Control of Combustible Materials, will be revised to emphasize items (1), (2), and (3). The revision will be submitted to the Plant Management, Nuclear Safety Review Committee, and QA Department for review not later than January 1, 1983.

A Corrective Action Request item has been initiated to expedite the above revisions.

4.1.4 Tie-in of the door 445 magnetic release to the two control room fire detection systems is completed.

No further action is required.

4.1.5 The welding permit system described in Administrative Procedure PMI-2275 has been revised and is now in effect.

No further action is required.

4.1.6 We do not believe structural steel fireproofing is necessary in the diesel firepump rooms. These rooms are fully sprinklered and the fuel oil tank is in a sand covered pit. A fire would actuate the sprinklers, keeping the steel cool so that structural integrity is retained. The sand covering the tank will restrict free burning and a consequent high rate of heat release. These measures are adequate to prevent structural failures.

No further action is required.

4.1.7 All Plant departments have been ordered to review the Plant "No Smoking" regulations with their employees during regular safety meetings. Enforcement will be followed up during regular fire inspections.

No further action is required.

4.1.8 The electric resistance space heater and wooden ladders have been removed. The plywood stretcher boxes were repainted with another coat of intumescent fire-retardant paint as a corrective measure.

No further action is required.

4.2.1 & 4.2.2 These surveillance items are to be reviewed by the Plant Operations Department with the appropriate changes made to procedures by January 1, 1983.

A Corrective Action Request item has been initiated to expedite the procedure changes.

4.3.1 (Also Appendix G, page G-2 Areas of Concern)

1] The unique status of these systems is due to the combined use of the piping. While the NFPA standards do not include such combinations, they do not disallow it, particularly when variations could be allowed by "the authority having jurisdiction". Previous reviewers of these systems, including ANI and NRC/Gage-Babcock have accepted the unique character of the systems. The NRC, in the SER says, "We have reviewed the design criteria and basis for the Halon Fire Protection System including associated test data for this system. We have concluded that this system satisfies the provisions of Appendix A to Branch Technical Position APCSB 9.5-1 and the applicable portions of the National Fire Protection Association and is, therefore, acceptable".

2] The intent of the NFPA 12A discharge time (10 seconds) is to minimize the toxic and corrosive breakdown products of Halon 1301 when used in constantly attended areas such as an electronic data processing facility. It is not a factor in areas such as the cable vaults where fast developing fires with large flame fronts are not likely to occur. To further assure that this could not occur, we use two complete zones of ionization detection to sense an incipient fire rapidly.

3] The Halon distribution calculations were made using the exact installed piping configuration, including the CO_2 nozzle orifices. Consequently, the system performance was predicted more exactly than would be the case if the piping had not yet been installed. The nozzle orifice sizing is only one factor affecting flow characteristics. Pipe size, lengths, and change in direction are equally important and all these were taken into account in the calculations.

Nozzle discharge patterns are not critical in total flooding gas type systems. Any orifice which can properly mix the Halon with ambient air is acceptable as long as the orifice is correctly sized. Had this been a local application situation requiring direct contact of the agent and hazard, then the nozzle discharge pattern and location would have been more critical.

4] We concur as to the overpressurization of the cylinders. They should be 360 psig. The overpressure condition does not, however, affect the performance of the system. The condition will be corrected as in 5 below.

5] There is no specific requirement in NFPA 12A for either the number or placement of concentration test points. It was the judgement of the testing parties that the three sampling points in Unit 1 (two in Unit 2) and their locations, were adequate to determine the average concentration. Sample point 3 in the Unit 1 test was erratic during both the CO_2 and Halon concentration tests which were run one after the other. This was ascribed to either (1) a faulty hose, (2) a possible air pocket (CO_2 test only), or (3) open floor cable tray openings and a damper which failed to close. The witnessing parties believed Item 3 was the most likely cause of the erratic performance. The witnessing parties also believed that for the Unit 1 test, the decay in concentration between 5 and 10 minutes from above 5% to just over 4% (except for sample point 3) was attributed to these same openings and that such a decay would not occur if the openings were closed.

This was borne out by the Unit 2 tests which showed the concentration could be held in excess of 14½ minutes (Unit 2 is the same volume and configuration as Unit 1).

We will, however, test the system again while relieving the overpressurization of the cylinders mentioned in Item 4. The only method of reducing the pressure in this particular vintage Ansul Company cylinder is to discharge and then recharge to the correct level. The halon is retained by a disc which must be punctured by a gas driven cutter in order to release the contents. This test will resolve the overpressure condition as well as reconfirm the original tests for system acceptability.

A Corrective Action Request item has been initiated to expedite the above test and refilling of the cylinders to the correct pressure.

4.3.2 The installation of the additional detectors and lowering of those previously installed is complete in Unit 1. The Unit 2 modifications will be completed as soon as possible after the current outage. A test will be conducted when the procedure is finalized as to the configuration of the test assembly.

A Corrective Action Request item has been initiated to expedite the Unit 2 modifications and the performance test.

4.3.3 AEP Specification DCCFP103QCS requires approval/labeling of fire detection/suppression equipment by agencies such as Underwriters Laboratories, Factory Mutual, etc. Evidence of such labeling is part of the receipt inspection for materials as well as being one of the criteria for approval of a vendor. Individual specficiations for sprinkler systems, for example, include statements requiring use of UL listed components, conformance to codes, and requirements for ANI review and approval of the design of systems. These measures, plus the experience of our fire protection engineering staff, assure that adequate equipment, labeled when available, is installed.

Non-labeled fire detection/suppression equipment, if used, will be documented as to the reasons for its use, test reports, shipping and receipt inspection in accordance with Specification DCCFP103QCS.

The FP/HVAC Section will formally notify other Divisions or Sections of the need for other equipment or materials to bear the approval or label of nationally recognized testing laboratories such as Underwriters (UL) or Factory Mutual (FM) if used for fire protection service. The other Divisions or Sections will also be advised that, if such approved or labeled equipment is not provided, documentation of all reasons for the lack of approval or

label must be provided and reviewed by the FP/HVAC Section.

A Corrective Action Request item has been initiated to expedite notification of the other Divisions or Sections of the approval/labeling requirements.

4.3.4 & 4.3.5 The sprinklers referred to in 3.3.4a) 1 and 2 were installed to meet a specific requirement of the NRC. Their concern was to protect redundant cable divisions at or near the ceilings from an exposure fire in transients at floor level. Since sprinklers at the ceiling could not accomplish this protection due to intervening cable tray, conduit, piping, and ductwork; we proposed and the NRC accepted installing the sprinklers below the obstructions. These sprinklers are therefore not considered deficient.

A required Request for Change Package has been initiated to correct the identified, minor sprinkler deficiencies.

A Corrective Action Request item has been initiated to expedite correction of the deficiencies.

4.3.6 Several fire hose stations were provided to meet our understanding of the SER commitments. The Auditor feels that two containment cable tunnel quadrants and the switchgear cable room in each unit require additional hose stations so that hose can reach all portions of the areas without coupling extra lengths. An RFC package has been approved to add these stations. Materials are on site for the additional hose stations (Two stations per unit).

A Corrective Action Request item has been initiated to expedite installation of the additional hose stations.

4.3.7 We must retain a non-conducting break in the Reactor Coolant Pump oil collection system piping to electrically isolate the motor and pump. Induced electrical currents will decrease the life of the pump shaft bearings by electrolysis. The tygon tubing accomplishes this purpose. At every outage, this tubing will be examined and, if any deterioration is evident will be replaced. The heat sensitivity of the tygon plastic is not a factor in the operability of this system. The purpose of the system is to prevent fires by carrying the lube oil from the motor to a collection point, regardless of the type leak (gravity or pressure), without the oil contacting a hot surface or some other ignition source. The tygon tubing will have accomplished its purpose of allowing the oil to flow from the leak point to the container thus preventing the fire from occurring in the first place. The entire oil collection system is a conservative measure since the lube oil is a Class IIIB combustible liquid with a flash point of 480°F.

No further action is required.

4.3.8 & 4.3.9 The suggestion to open the Auxiliary Building fire header isolating valves ZMO-10 and ZMO-20 has been reviewed.

We have decided to leave the valve controls as they now stand. The header piping will remain filled with water but will be subject to the static pressure of the water until such time as the valves are called upon to open by either a fixed system or from a pushbutton associated with a hose station.

If the valve positions were to be changed to a normally open position, the Auxiliary Building and at least some of the safety related equipment therein could be subjected to flooding or wetting down from the large quantity of water released from a hypothetical line break at full pressure.

The placement of instruction signs at hose stations in the Auxiliary Building will be implemented. The signs have been ordered.

The two motor operated valves (ZMO-10 and ZMO-20) are incorporated into present valve surveillance procedures including operability from automatic systems and hose station pushbuttons.

No further action is required.

4.3.10 We have reviewed the recommendation to provide the two electric motor driven high demand fire pumps with controllers that are specifically intended for fire service use in accordance with NFPA 20 Chapter 7. Our pump motors are controlled from 600v, electrically operated, drawout, circuit breakers which are installed in metal clad switch gear enclosures qualified for Class I Nuclear Service. In addition, each of the supply busses can be energized from an emergency diesel generator. The code requires that the controller be located as close as practical to the motor and be within sight of the motor and yet be so located or protected that it will not be injured by water escaping from the pump or piping connections. Our pumps and controllers are completely isolated from each other, the pump being located in a separate pump room and the controller (circuit breaker) located in a separate switch gear room. This is consistent with the control of our nuclear safety related pumps. Operation of the pumps locally conflicts with the basic philosophy of operating a nuclear generating unit from a centralized continuously manned control room.

The code prohibits the use of overcurrent protective devices in the control circuit. Control power for our breakers is supplied from a Nuclear Class IE battery and fuses are used in these DC circuits. The circuit breaker current rating, interrupting current rating and all trip settings are in compliance with the code except for the time delay overcurrent trip which is set at 135% versus 300% specified in the code. This setting is consistent with the overcurrent trip settings used on all the reactor safety related pumps.

There are several other specific requirements which are not met because of the incompatability of this general code and our control philosophy for motor driven pumps for nuclear service.

The following detailed description covers the electrically driven High Demand Fire Pumps and controls ("controllers") installed at Cook Plant:

1. This installation is compatible with the central control room concept of nuclear plant operations.

2. There are 2-300 HP, 600 volt electrically driven fire pumps, one located in each of the 2 units. The installation of the 2 pumps is identical.

3. Each pump motor is supplied from a Class IE, 600 volt bus; Bus 11C for the Unit 1 pump and Bus 21C for the Unit 2 pump. Each of the buses can be energized from one of the two Class IE diesel generators in its respective unit.

4. The electric pump motors are controlled from 600 volt, electrically operated, draw out, circuit breakers. The circuit breakers are installed in metal clad switchgear enclosures and are qualified for Class IE service.

5. Control power for the fire pump motor circuit breakers is supplied from one of the two Class IE batteries in its respective unit in the same manner as all other Class IE circuit breakers connected to the same bus. Control power is required to close or open the circuit breaker.

6. The fire pump motor circuit breaker may be closed to operate the pump or opened to stop it by the operator from the Fire Protection control panel in its respective, continuously manned unit control room or by means of a pushbutton station located within the pump room. Each pump circuit breaker may be closed by

action of its dedicated fire header pressure switch through a time delay relay to sequence the starting of each of the multiple pumps. Each of the low fire header pressure starting circuits is independent of the other. The fire pump motors are also automatically started by action of the fire logic system with provision for manual stopping through the fire logic system in its respective unit.

7. During operation, the motor current is continuously indicated by an ammeter located on the Fire Protection panel in the respective unit control room.

   The circuit breakers are applied within their fault interrupting rating. The interrupting current rating of the breaker is 22,000 amps. The instantaneous overcurrent trip device is set to trip at 12 times the motor full load current. The time delay overcurrent trip devices are set for 1.35 times full load current and trip in 12 seconds at locked rotor current from the solid state trip device of the circuit breaker or in 20 seconds for the externally mounted overcurrent relay. No thermal overcurrent trip devices are used.

8. Maximum pump horsepower is 328 HP with a 300 HP motor, the pump is in a non-overloading application.

9. The circuit breaker may be serviced by tripping its contacts open, removing the control power fuses to preclude the possibility of inadvertant operation and then disconnecting the circuit breaker from the source and line connections by a screw jack assembly. The disconnecting (and subsequent reconnection to restore operability) is accomplished with all enclosure doors closed. The breaker cannot be disconnected or reconnected while its contacts are closed. The circuit breaker is located in the switchgear room separate from the pump rooms. The switchgear room is a protected environment with adequate ventilation. Pump leakage or inadvertant water spray resulting from operation will not affect operation of the switchgear.

We believe that our high demand electric fire pump controllers, being of the same type and quality as those used for safety related equipment at the Cook Plant, are adequate to meet our fire protection requirements. They are safe and have proven to be reliable. We also believe that UL listed controllers are satisfactory for general industry use but not for power plant service where the central control room concept is essential.

No further action is required.

4.3.11 A specific item has been added to the RCP water spray system test procedure to remove the blanking plate following completion of a test. An indicating valve with tamper switch annunciating in the control room is provided upstream of the temporary blanking plate and deluge valve.

No further action is required.

4.3.12 A Request for Change has been initiated to provide an independent water supply to meet the water demands of the office building air conditioning system. The Low Demand Fire Pump was used for this purpose during Unit 1 outages.

The fire system is also used to supply 100 gpm of cooling water for the Security System Emergency Diesel Generator (required in the event of a loss of the normal AC supplies for the Security System). Since the NRC requires an on-site emergency power source for the Security System, the fire system was selected as a reliable source of water for engine cooling. The demand for this purpose is small, infrequent, and will have no adverse effect on the reliability or availability of the fire system.

A Corrective Action Request item has been initiated to expedite providing a water supply for the office building air conditioning system independent of the fire water system.

4.3.13 The missing support/hanger at the Contractor Access Control has been installed. At the time of the audit, the system had not as yet been completed.

A study of hangers for the Auxiliary Building preaction sprinkler system is being conducted. A Request for Change will be prepared to add, or revise, hangers for these systems if the study so indicates. Obvious hanger omissions or replacements, as noted by the Auditor and plant personnel during a walkthrough, will be corrected.

A Corrective Action Request item has been initiated to expedite the hanger study and correction of any deficiencies.

4.3.14 Fire Protection System Description DCC-FP101 will be revised to incorporate various water systems added subsequent to the SER. The Auditors recommendations will be incorporated at that time.

A Corrective Action Request item has been initiated to expedite revisions to System Description DCC-FP101.

4.3.15 The intent of paragraph 4-2.2 of NFPA 14, based on an inquiry to a member of that code committee, is to provide pressure regulating devices at the standpipe outlets in high-rise structures such as office buildings, hotels, etc. In a high-rise building, it is necessary to provide high head pumps to assure that water at sufficient pressure is available for fire fighting at the upper floors. As a result, hose standpipes at the lower floors may see pressures high enough to rupture the fire hose and possibly cause injury to the user and damage to the contents of the building as well as the obvious disruption to fire fighting operations. The high-rise situation is not analogus to the conditions at D. C. Cook Plant.

Pressure regulating valves or devices at fire hose stations are not used at D. C. Cook Plant or any AEP System Plant because of the above and for the following reasons:

a] We purchase 600 psi rated fire hose for use on our standpipes, thereby minimizing the chances of rupture and consequent injury to personnel and equipment. Followup hydrostatic testing of the hose is performed to meet Tech Spec requirements.

b] Our plant personnel, with the exception of office staff, are trained in handling both 1½" and 2½" hose lines at the approximate 130 lbs. pressure encountered at Cook Plant.

c] 29CFR Part 1910, Section 1910.158 Standpipe and Hose Systems (OSHA), does not require pressure regulating valves or devices on standpipes. In paragraph C.3.III. of 1910.158 OSHA allows pressures in the 30 to 125 psi range.

d] We have not incurred any injury to personnel that we are aware of, due to the pressures we carry in our fire headers or hose standpipes.

e] We have never had a recommendation from any of our insurers (FM, IRI, or ANI) to provide pressure regulation on standpipes.

f] A regulating valve or flow restricting orifice or throttling device could become clogged or otherwise inoperable from water-borne debris (the supply source at Cook Plant is Lake Michigan) in spite of strainers in the system. Should this occur during fire fighting, the safety of personnel so engaged would be jeopardized as well as the effectiveness of the fire fighting operation.

g] An adjustable type device may drift out of adjustment with the same results as in (f) above.

h] An orifice type disc is usually inserted in the female coupling of the hose attached to that standpipe. The disc could be overlooked or lost when changing hoses.

i] Some regulating devices must be pre-set for a specific standpipe depending on elevation, location, and flow rate desired. An incorrect installation can negate any benefit from the device.

For the above reasons, we take exception to NFPA 14, 4-2.2 and do not plan to provide pressure regulating devices on hose standpipes.

No further action is required.

4.3.16 & 4.3.17 We agree with the Auditors findings for these items. Approvals to commence the work have been received and we expect to proceed with the installation shortly. All materials are on the site.

A Corrective Action Request item has been initiated to expedite the installation or relocation of detectors.

4.4.1 Proposals have been received and are being reviewed for evaluation and awarding of a contract to an outside consultant for development of pre-fire plans.

A Corrective Action Request item has been initiated to expedite the contract award.

4.4.2 The Plant agrees that there is a need to have one individual in a new position as Fire Brigade Training Instructor/Coordinator. The Plant Manager has requested and received a position description for a full-time fire instructor. This position description will be processed and forwarded to the appropriate AEP departments for approval for hiring a training instructor.

A Corrective Action Request item has been initiated to expedite filling the above position.

4.4.3 Following our policy to train all Fire Brigade members to the same level, brigade leader training will be included as part of the regular training schedule when a permanent training instructor is hired (See 4.4.2).

A Corrective Action Request item has been initiated (See 4.4.2).

4.4.4 The Shift Supervisor will remain as leader of the Fire Brigade. This position gives the Shift Supervisor the flexibility to remain in the Control Room and designate an on-scene Brigade Leader or to respond to the fire scene as he sees fit. The Shift Supervisor will remain responsible for the quarterly brigade training until a fire instructor is hired.

A Corrective Action Request item has been initiated (See 4.4.2).

4.4.5 New Fire Brigade members will continue to receive their initial training during the yearly session conducted by the AEPSC Canton Fire Protection Section. Some additional training will be instituted when a fire instructor is hired.

A Corrective Action Request item has been initiated (See 4.4.2).

4.4.6 Fire Brigade retraining sessions will be handled as they have been in the past, with the emphasis on covering the material in a comprehensive manner, rather than trying to fill a time slot. Quarterly retraining sessions will, however, be scheduled for 2 hours each.

No further action is required.

4.4.7 Two additional smoke ejectors, and associated equipment have been purchased. They will be located in an accessible location in the Plant.

A Corrective Action Request item has been initiated to expedite their placement in the Plant.

4.4.8 This item has been reviewed by the Plant Fire Protection Coordinator and the AEPSC Fire Protection/HVAC Section. We believe that the portable equipment and hose standpipes already in place are adequate for personnel use. A moveable cart would not be adaptable to a multilevel and divided structure like Cook Plant. It would also dilute available manpower from the fire brigade in moving it from one location to another.

No further action is required.