



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 45 TO FACILITY OPERATING LICENSE NO. NPF-62

ILLINOIS POWER COMPANY, ET AL.

CLINTON POWER STATION, UNIT NO. 1

DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated July 11, 1990, Illinois Power Company, et al. (the licensee) proposed three changes to the Technical Specifications for the Clinton Power Station, Unit 1. The second of the proposed changes would modify Technical Specification 3.8.3.1 Action a.3. That Action statement currently requires that, in the event that one of the inverters associated with panels 1C71-S001A, B, C, or D becomes inoperable, the associated distribution panel must be re-energized within 8 hours and the inverter must be restored to operable status within 24 hours or the plant must be shut down. The licensee has requested that the Action requirements for the inverters associated with panels 1C71-S001C and D be revised to only require that the High Pressure Core Spray (HPCS) system be declared inoperable and the Action requirements of Technical Specification 3.5.1, Emergency Core Cooling Systems Operating, be followed.

Operability of the DC Sources and Onsite Power Distribution Systems in general relies upon the availability of necessary support systems. These support systems include the essential switchgear heat removal (VX) system and the emergency shutdown service water (SX) system. These systems are separated into divisions similar to and consistent with the Emergency Core Cooling Systems (ECCS). Each VX subsystem (Division I, II, or III) is a major support system since each is designed to provide emergency heat removal capability in areas which contain the associated diesel generator (DG) station battery, battery charger, switchgear, and electrical (NSPS) inverter associated with that division. Each divisional VX area cooler contains a safety-related cooling coil that can be supplied with emergency cooling water from the associated divisional SX subsystem. The area coolers are not normally supplied by SX cooling water, but during a loss of coolant accident (LOCA) or upon a loss of offsite power, cooling water is supplied solely by the SX system. The SX system is used to remove heat from equipment necessary to safely shut down the plant and maintain the plant in a safe shutdown condition. The loads associated with the Division III SX subsystem are the Division III SX Pump Room Coil Cabinet, Division III Diesel Generator Heat Exchanger, Division III Diesel Switchgear Heat Removal Unit, and the Division III (NSPS) Inverter Room Cooler.

On May 24, 1990, the Division III SX pump failed to rotate in an attempted startup during an operability/ISI surveillance test. The pump motor energized but tripped due to a thermal overload condition. Corrective action taken included loosening the packing gland follower, meggering the motor and replacing the thermal overload protection devices; but the pump still required an electrical "bump" to get it to freely rotate. It was then rechecked and verified to be free to rotate by hand with no evidence of binding. The pump performance data taken while subsequently performing the surveillance test was satisfactory.

During the last performance of the pump operability/in-service inspection (ISI) surveillance test for the Division III SX pump on August 17, 1990, it was again observed that the pump failed to rotate. The pump motor energized but soon tripped because of thermal overload protection. The pump was freed again and verified to rotate freely. Running indications (vibration, temperatures, motor amperage) are satisfactory, but the licensee will now consider the pump to be OPERABLE only while it remains running. Once the pump is shut down for investigation and/or repair, the current technical specification require that the Division III SX subsystem will be declared inoperable.

In accordance with the Action Statement under Technical Specification 3.7.1.1, with an SX loop inoperable, and with its associated systems or components required to be OPERABLE, the associated systems or components must be declared inoperable, and the ACTION(S) required for those inoperable systems or components must be taken. Under accident conditions, the VX system is incapable of performing its safety function without the SX system available; therefore the Division III VX cooler must be considered inoperable when the Division III SX subsystem is inoperable. In turn, with the VX cooler inoperable, the licensee currently believes that at least some of the electrical components in the area cooled by the VX cooler could not perform their intended safety function for a sufficiently long enough period of time.

The component most likely to be affected by the loss of the VX system and with which the most limiting Action Statement is associated is the NSPS inverters. If the Division III NSPS inverter is considered inoperable, Action a.3 under Technical Specification 3.8.3.1 requires that the associated distribution panel must be energized within 8 hours and the inoperable inverter must be restored to OPERABLE and energized status within 24 hours; otherwise a plant shutdown is required. Therefore, as a result of the cascading effect of the inoperability of the Division III SX pump, only a 24-hour allowed out-of-service is effectively permitted by the plant Technical Specifications before the plant must be shut down. However, the licensee estimates that at least 1 week would be required to uncouple and lift the pump motor, lift the pump itself, inspect the shaft and bearings, perform any required repairs/overhaul, reinstall the pump and motor, and perform post-maintenance testing.

Therefore, on September 12, 1990, the licensee submitted a request that the previously-described Technical Specification change request for the ACTION associated with the Divisions III and IV inverters be reviewed on an emergency basis.

2.0 EVALUATION

Part of the electrical system for the Clinton Power Station consists of four divisional Nuclear System Protection System (NSPS) power supplies. Each of these power supplies provides an uninterruptible 120 VAC bus for certain safety-related loads. Each of these busses is fed by two alternate sources--primarily through a solid-state inverter which converts 125 VDC battery power to 120 VAC NSPS power, alternately through a 480V/120V transformer with a 120V/120V isolation transformer for noise isolation. A solid-state transfer switch is provided which would sense inverter failure and automatically switch to alternate power.

As previously noted, the Action required when the inverters associated with panels 1C71-S001C or D (Divisions III and IV) become inoperable is that the associated distribution panel must be re-energized within 8 hours and the inverter must be restored to operable status within 24 hours or the plant must be shut down. However, per Technical Specifications 3.8.2.1 and 3.8.3.1, when the 125VDC busses that feed the Divisions III and IV inverters or the Divisions III and IV NSPS busses that are fed by the inverters are declared inoperable, then HPCS must be declared inoperable and the Action required by Technical Specification 3.5.1 must be followed. (The actions required by TS 3.5.1 are dependent on the operational status of all ECCS systems and not just HPCS). The Action for the Divisions III and IV inverters is clearly inconsistent with the Actions required for both the busses feeding the inverters and the busses fed by the inverters. In addition, if the Division III diesel generator is declared inoperable, Technical Specification 3.8.1.1 Action D requires the diesel generator to be restored to operable status within 72 hours or the HPCS system must be declared inoperable. In all cases, for Divisions III and IV, except for when the Divisions III or IV inverter is inoperable, the final action is to declare the HPCS inoperable.

An examination of the loads supported by the Divisions III and IV NSPS distribution panels indicates that trip units associated with the Reactor Protection System (RPS), End-of-Cycle Recirculation Pump Trip (EOC-RPT) system, and the Nuclear Steam Supply Shutoff System (NSSSS) are included in addition to HPCS. Each of the trip units in Division III or IV however, represents only one of the four total channels provided for each function since a channel is provided in each of all four NSPS divisions for these functions. In addition, unlike the Emergency Core Cooling System actuation logic, this logic is designed to trip (fail-safe) on a loss of power. The Action statements for all three of the trip systems allow up to two channels to be inoperable indefinitely as long as one channel is placed in the tripped condition. Therefore, it is sufficient to only declare the HPCS system inoperable when the associated (Division III or IV) inverter is declared inoperable since a loss of power does not adversely affect the operability of the remaining systems.

The staff has reviewed the licensee's analysis and justification for the proposed change to Technical Specification 3.8.3.1 Action a.3., to only require that the High Pressure Core Spray (HPCS) system be declared inoperable

and the Action requirements of Technical Specification 3.5.1 be followed when inverters associated with panels 1C71-S001C and D are inoperable and finds that analysis and justification acceptable. This action is consistent with the primary design basis for Divisions III and IV electrical power (support of the HPCS system) and is consistent with other Action requirements pertaining to Divisions III and IV power supplies.

3.0 CHANGED CIRCUMSTANCES

A Notice of Consideration of Issuance of Amendment, Proposed No Significant Hazards Consideration and Opportunity for Hearing was published in the Federal Register on September 5, 1990. Comments were requested by October 5, 1990. That notice provided, however, that the Commission could issue the subject amendment prior to the expiration of the thirty-day comment period if circumstances changed so that prompt action was required by the Commission, for example, to avoid a derating or shutdown.

The licensee has provided arguments with respect to the change in circumstances related to the amendment request. The licensee has stated that the shutdown of the pump to effect repairs is necessary to avoid catastrophic failure of the pump. This is in accordance with the vendor recommendations. Should the pump fail catastrophically personnel could be injured and the repairs to the pump would be greatly complicated. Therefore, the licensee planned to take the Division III SX pump out of service to effect repairs at the earliest possible date. Based on parts availability the planned date for repairs is September 17, 1990. The repairs to the pump are estimated to take 7 to 8 days. As previously explained, the shutdown of the SX pump would require plant shutdown within 24 hours due to the cascading effect of the Technical Specifications. Therefore, the plant will enter a TS Action Statement to require plant shutdown if the TS change is not approved prior to September 18, 1990. With respect to why the situation occurred and why it could not be avoided, the licensee has stated that, until the Division III SX pump failed to meet the licensee's acceptance criteria during the August 17, 1990 testing, the licensee believed that the corrective action taken in response to the May 24, 1990 test had been adequate to restore full operability. Following the May 24, 1990 test problem, the licensee recognized the cascading effect of the Technical Specifications and submitted the subject change request on July 11, 1990; however the licensee believed the corrective actions taken had resolved the problem with the SX pump. Therefore, prior to August 17, 1990, the licensee could not have foreseen the changed circumstances. The staff has evaluated the licensee's description of the change in circumstances associated with this amendment request and has determined that the need for immediate relief from the Technical Specifications under consideration could not have been avoided and that a valid need exists.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards considerations, if operation of the facility, in accordance with the proposed

amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

This amendment has been evaluated against the standards in 10 CFR 50.92. It does not involve a significant hazards consideration because :

- (1) The proposed change does not involve a significant increase in the probability or consequences of a previously evaluated accident. The proposed change to the Action Statements for inoperable inverters are bounded by the Action Statements currently specified for the associated power distribution system. Since the plant's response to an inoperable inverter would be no more limiting than its response to deenergization of the bus that the inverter supports, no change to an accident has been identified. In addition, Divisions III and IV power is primarily dedicated to the High Pressure Core Spray (HPCS) system since the remaining safety functions supported by the Divisions III and IV inverters are fail-safe on a loss of power. Therefore, since the Technical Specifications currently contain provisions to allow the HPCS system to be inoperable for reasonable periods of time, and since the HPCS system is only one of several Emergency Core Cooling Systems capable of providing the required emergency core cooling function, the consequences of a previously evaluated accident have not changed.
- (2) The proposed change does not involve any changes to the plant design, nor does it involve an introduction of any new or different modes of operation. On this basis, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.
- (3) The proposed change does not involve any changes to the operation or design of the HPCS system. The proposed change to the electrical inverter Action Statement is consistent with and bounded by the Action Statements currently specified for the uninterruptible 120 VAC bus to which the associated inverter is dedicated. Therefore, the proposed change does not involve a significant reduction in the margin of safety.

Accordingly, the Commission has determined that this amendment involves no significant hazards considerations.

5.0 STATE CONSULTATION

The staff discussed this amendment request with representatives of the State of Illinois on September 13, 1990. The State of Illinois representatives had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

7.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: September 17, 1990