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Docket No. 50-461

10CFR50.90

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station Proposed Amendment of Facility Operating License No. NPF-62 (LS-94-001)

Dear Sir:

Pursuant to 10CFR50.90, Illinois Power (IP) hereby applies for amendment of Facility Operating License No. NPF-62, Appendix A - Technical Specifications, for Clinton Power Station (CPS). This request consists of a proposed change to Technical Specifications 3/4.3.1, "Reactor Protection System Instrumentation"; 3/4.3.2, "Containment and Reactor Vessel Isolation Control System"; 3/4.3.3, "Emergency Core Cooling System Actuation Instrumentation"; 3/4.3.4.2, "End-of-Cycle Recirculation Pump Trip System Instrumentation"; 3/4.3.5, "Reactor Core Isolation Cooling System Actuation Instrumentation"; 3/4.4.2.1, "Safety/Relief Valves"; and 3/4.4.2.2, "Safety/Relief Valves Low-Low Set Function." These Technical Specifications contain requirements to perform manual testing of the associated solid-state logic at least once every four fuel cycles. This testing is in addition to the automatic testing performed by the self-test system. Due to the negative impact on plant safety caused by the need to remove systems from service to prevent unwanted actuations and the increased potential for unintended equipment actuation during manual testing, IP is proposing that the requirement to perform manual testing of the solid-state logic independently from the self-test system be eliminated. This request is supported by successful performance of these tests during the plant preoperational test program and during the last four refueling outages. IP believes that this change will result in a net increase in overall plant safety.

A description of the proposed change and the associated justification (including a Basis For No Significant Hazards Consideration) are provided in Attachment 2. A marked-up copy of the affected pages from the current Technical Specifications are provided in Attachment 3. In addition, associated changes to IP's previous request to

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adopt the Improved Standard Technical Specifications (reference IP letter U-602196 dated October 26, 1993) are provided in Attachment 4. Further, an affidavit supporting the facts set forth in this letter and its attachments is provided in Attachment 1.

IP has reviewed the proposed change against the criteria of 10CFR51.22 for categorical exclusion from environmental impact considerations. The proposed change does not involve a significant hazards consideration, or significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, IP concludes the proposed change meets the criteria given in 10CFR51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

Due to the significant refueling outage safety improvement and resource savings that can be realized by implementation of this proposed change, IP is requesting that this application be reviewed on a schedule sufficient to support the fifth refueling outage currently scheduled to begin March 12, 1995.

Sincerely yours,

J. G. Cook
Vice President

DAS/csm

Attachments

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

Attachment 1
to U-602297

J. G. Cook, being first duly sworn, deposes and says: That he is Vice President of Illinois Power Company; that the application for amendment of Facility Operating License NPF-62 has been prepared under his supervision and direction; that he knows the contents thereof; and that to the best of his knowledge and belief said letter and the facts contained therein are true and correct.

DATED: This 12 day of August 1994.

Signed: J. G. Cook

STATE OF ILLINOIS) SS.
DeWitt COUNTY)

Subscribed and sworn to before me this 12th day of August 1994.

"OFFICIAL SEAL"
Jacqueline S. Matthias
Notary Public, State of Illinois
My Commission Expires 11/24/97

Jacqueline S. Matthias
(Notary Public)

Background

The Clinton Power Station (CPS) solid-state logic design includes a self-test system (STS). The STS is a testing and surveillance system that is designed to continuously monitor the nuclear systems protection system (NSPS) functional circuitry. The NSPS consists of four independent and redundant divisions of safety-related solid-state circuitry used to scram the reactor and initiate engineered safety features systems. The NSPS is made up of the following systems, all of which are tested by the STS: reactor protection system (RPS), nuclear steam supply shutoff system (NSSSS), automatic depressurization system (ADS), high pressure core spray (HPCS) system, low pressure core spray (LPCS) system, residual heat removal system (RHR) [including the low pressure coolant injection (LPCI), shutdown cooling, and containment spray modes of operation], the reactor core isolation cooling (RCIC) system, the end-of-cycle recirculation pump trip (EOC-RPT) system, and the relief and low-low set modes of operation of the safety/relief valves (SRVs).

The STS is an overlay testing and surveillance subsystem that provides the capability to continuously and automatically perform testing of the circuitry within the NSPS panels. The primary purpose of the STS is to improve the availability of the NSPS by optimizing the time to detect and determine the location of a failure in the system. Failure locations can then be traced to the module or printed circuit card level, which is the established increment of field replacement.

As described in Section 7.2.3.3 of Supplement No. 2 to the CPS Safety Evaluation Report (SSER 2), the NRC found the STS acceptable for use in performing surveillance testing required by the CPS Technical Specifications. The specific tests capable of being performed by the STS include logic system functional tests (LSFTs) and Response Time tests of the NSPS logic. In addition, the STS is used to augment conventional testing methods to perform channel checks, channel functional tests (CFTs), and channel calibrations. The STS tests the functional operability and response time of the NSPS logic from the analog trip modules (ATMs) to the actuated device load driver.

As stated above, the NRC concluded in SSER 2 that the use of the STS to perform certain surveillance testing required by the plant Technical Specifications is acceptable. However, The NRC noted, it was not intended the STS eliminate the need for other surveillance testing. The SSER concluded that although the STS utilizes advanced technology for performing various tests on the NSPS circuitry, it is not capable of replacing conventional testing methods in some areas. A combination of STS and conventional tests are necessary to accomplish complete end-to-end overlap testing of the NSPS circuitry to verify its operability. For example, special tests are performed to verify the response time and functional operability of sensors, transmitters, timers, and portions of the functional NSPS logic not tested by the STS. Special tests are also conducted during plant operation

to verify the setpoints of the ATMs and to verify the operability of the control room annunciators and vertical indicators. These tests are outside the scope of testing that the STS is designed to perform.

As noted above, the STS is capable of performing LSFTs of the NSPS logic. However, as noted in SSER 6, portions of the NSPS logic must also be manually tested during each refueling outage independently from the STS such that all NSPS trip/actuation functions are tested independently of the STS at least once every four fuel cycles. As identified in SSER 6, the purpose of these tests is to provide a means to verify operability of the NSPS functional circuits independent of the STS, and thereby (1) detect any failures undetected by the STS and take corrective action to restore proper operation of the NSPS and STS and (2) assuming that no additional failures beyond those identified by the STS are detected during independent logic testing, confirm the validity of the STS test results. The SSER 6 goes on to state that this independent testing, in conjunction with rigorous preoperational testing of the STS, is sufficient to verify that the STS is capable of performing its intended function to detect NSPS circuit failure conditions.

As stated above, the NSPS logic includes actuation logic for RPS, ECCS, RCIC, ADS, NSSSS, and the RHR system, including the shutdown cooling mode of operation. Due to the need to isolate these systems to prevent unwanted system actuations, these systems are rendered inoperable during this testing. This results in hanging system tagouts and extensive temporary reconfiguration of systems and actuation instrumentation, including logic card removal, installation of signal simulators, disconnecting load drivers, etc. In addition, removal of systems from service results in reduced availability of these systems during this testing. Also, these tests have in the past lead to unintentional equipment actuations, licensee event reports, and equipment damage due to bending pin connectors and burning circuit cards out due to electrical shorting. Thus, it has been concluded that testing of the NSPS logic independently from the STS has a negative impact on overall plant safety.

In addition, the currently required manual testing of the NSPS logic independently from the STS is very time consuming and difficult to schedule during refueling outages. It is estimated that a significant amount of man-hours and approximately two days of critical path outage time can be saved each refueling outage by eliminating the requirement to perform testing of the NSPS logic independently from the STS.

Based on the net improvement in overall plant safety and the reduction in outage time and resources, IP proposes that testing of the NSPS logic independently from the STS be eliminated. The requirement to perform a LSFT (which may utilize the STS) every 18 months would still be retained. In addition, it should be noted that complete performance of LSFTs necessitates continued testing by conventional methods for non-NSPS logic components such as pressure transmitters and certain operator controls and switches, and

output devices. Also, those portions of the solid-state logic required for system actuation that are not tested by the STS will continue to be tested by conventional methods at the frequencies recommended by the manufacturer (which in some cases may be as long as once every six years).

Description of Proposed Changes

In accordance with 10CFR50.90, Illinois Power (IP) proposes to revise the LSFT Technical Specification surveillance requirements to read as follows:

> LOGIC SYSTEM FUNCTIONAL TESTS shall be performed at least once per 18 months.

The above proposed change applies to Technical Specification surveillance requirements 4.3.1.2, 4.3.2.2, 4.3.3.2, 4.3.4.2.2, 4.3.5.2, and 4.3.9.2.

In addition, IP proposes to revise Technical Specification surveillance requirements 4.4.2.1.2.b and 4.4.2.2.b to read as follows:

> . . . CHANNEL CALIBRATION and LOGIC SYSTEM FUNCTIONAL TEST at least once per 18 months.

Further, as the NRC staff is currently reviewing IP's request to adopt the Improved Standard Technical Specifications (ITS) (reference IP letter U-602196 dated October 26, 1993), IP proposes changes to that submittal to reflect this request. The necessary changes are reflected on marked-up copies from the CPS ITS submittal contained in Attachment 4.

Justification for the Proposed Changes

As stated above, performance of the currently required manual testing of the NSPS logic independently from the STS system involves testing of the actuation logic for RPS, ECCS, RCIC, ADS, NSSSS, and the RHR system, including the shutdown cooling mode of operation. Performance of these tests requires these systems to be isolated to prevent unwanted system actuations. Thus, these systems are rendered inoperable during this testing. This also results in extensive temporary reconfiguration of systems and actuation instrumentation, including logic card removal, installation of signal simulators, disconnecting load drivers, etc. The removal of these safety systems from service to perform this testing results in reduced availability of RPS, ECCS, and RHR shutdown cooling systems during the plant outage. In addition to the intentional disabling of equipment to perform this testing, safety systems have become unavailable by this testing due to equipment damage caused by bending pin connectors and burning circuit cards out

due to electrical shorting. Further, CPS has experienced unintentional equipment actuations resulting in unnecessary challenges to safety systems and the need to file licensee event reports with the NRC. Thus, it can be seen that performance of this currently required manual testing of the NSPS logic does have a negative impact on plant safety.

As identified in SSER 6, the purposes for manually testing the NSPS logic independently from the STS is to provide a means to verify operability of the NSPS functional circuits independent of the STS and thereby (1) detect any failures undetected by the STS and take corrective action to restore proper operation of the NSPS and STS and (2) assuming that no additional failures beyond those identified by the STS are detected during independent logic testing, confirm the validity of the STS test results. As discussed below, IP believes that these objectives have been accomplished.

As identified in Section 7.2.3.3 of SSER 2, the software for the NSPS STS has been verified in accordance with General Electric's procedure for independent design verification. Independent design verification is the process of substantiating a design, whether hardware or software, to provide controlled, independent, documented confirmation that the design meets the applicable requirements. This provides the first level of assurance that the STS detects those failures it was intended to detect.

Secondly, rigorous preoperational testing was performed on the NSPS logic and the STS. This testing is described in USAR Section 14.2.12.1.62 and confirmed that failures in the functional NSPS logic were properly identified by the STS. A review of these test results and the results of extensive manual tests performed during the preoperational test program at CPS confirmed that no functional failures existed which are expected to be detected by the STS.

Thirdly, manual testing of the NSPS logic was performed independently from the STS during each of the first four refueling outages in accordance with the current Technical Specification requirements. The combination of these tests encompassed all of the functional NSPS logic which is automatically tested by the STS. A review of these test results also confirmed that no functional failures were identified by manual testing which would be expected to be detected by the STS.

As identified in USAR Section 7.2.1.1.4.8 and SSER 6, NSPS logic circuits which are not capable of being tested by the STS are identified as Untested Islands (UTIs). General Electric and IP have identified, via analysis and manual testing, all UTIs in the functional NSPS logic and have established procedures for testing these UTIs. Periodic verification of the operability of these UTIs will continue to be performed at the frequencies recommended by the manufacturer (as documented by the NRC staff in SSER 6) rather

than at a fixed 18-month frequency. The UTI testing frequencies were established by the manufacturer based on mean time between failure analyses for the components in the associated circuits and may be as long as six years.

Based on the above-noted independent design verification and the manual testing performed during the last four operating cycles, IP has concluded that the objectives of the currently required manual testing of the NSPS logic independently from the STS have been satisfied and continued manual testing provides no significant safety benefit or additional assurance of NSPS functional capabilities. Manual testing of those components required for system actuation that are not capable of being tested by the STS, in conjunction with the automatic testing performed by the STS, is sufficient to ensure adequate operability and reliability of the NSPS logic and instrumentation. Further, based on the negative safety impact of removing safety systems associated with the NSPS from service to perform this testing and the increased potential for inadvertent safety system actuations and component failures created during this testing, IP has concluded that elimination of these manual tests results in an overall increase in plant safety.

Basis For No Significant Hazards Consideration

In accordance with 10CFR50.92, a proposed change to the operating license (Technical Specifications) involves no significant hazards consideration if operation of the facility in accordance with the proposed change would not (1) involve a significant increase in the probability or consequences of any 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 request is evaluated against each of these criteria below.

(1) The proposed change does not involve a change to the plant design. The proposed change involves only testing of the solid-state Nuclear Systems Protection System (NSPS) utilizing the self-test system (STS). As identified in Supplement No. 2 to the Clinton Power Station (CPS) Safety Evaluation Report (SSER 2), use of the STS to perform certain surveillance testing required by the plant Technical Specifications is acceptable. However, as noted in SSER 6, portions of the NSPS logic must also be manually tested during each refueling outage independently from the STS such that all NSPS trip/actuation functions are tested independently of the STS at least once every four fuel cycles. The change proposed in this request consists of the elimination of this manual testing of the NSPS logic independently from the STS.

As identified in SSER 6, the purpose of the currently required manual tests is to provide a means to verify operability of the NSPS functional circuits independent of the STS, and thereby (1) detect any failures undetected by the STS and take corrective action to restore proper operation of the NSPS and STS and (2)

assuming that no additional failures beyond those identified by the STS are detected during independent logic testing, confirm the validity of the STS test results. The ability of the STS to detect functional failures of the NSPS logic as designed was verified as part of General Electric's independent design verification. In addition, this capability was also verified by testing as part of the preoperational test program as described in Section 14.2.12.1.62 of the CPS Updated Safety Analysis Report (USAR) and during testing performed during the first four refueling outages in accordance with the current Technical Specification testing requirements. Thus, Illinois Power (IP) has concluded that all functional failures undetectable by the STS have been identified and the aforementioned objectives have been satisfied.

Since the proposed change does not alter the plant design or operation, it cannot increase the probability of any accident previously evaluated. This proposed change does involve the NSPS logic which is utilized to actuate systems needed to mitigate the consequences of accidents previously evaluated, however, the proposed change merely eliminates the currently required manual testing independently from the STS once every four fuel cycles. Since the proposed change does not alter the NSPS logic, does not impact operation of the STS, and continues to require adequate testing of the NSPS logic on a frequency sufficient to maintain the operability of the associated NSPS logic, the proposed change cannot impact the reliability of the associated actuation instrumentation and therefore cannot increase the consequences of any accident previously evaluated.

(2) Adequate testing of the NSPS logic will continue to be required. The proposed change continues to allow use of the STS in performing surveillance tests as documented by the NRC in SSER 2. However, additional manual tests independently from the STS will no longer be required. Since the proposed change does not add additional testing configurations or operating modes nor does it alter the plant design, it will not introduce any new failure modes. Thus, this proposed change cannot create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Performance of the currently required manual testing of the NSPS logic independently from the STS system involves actuation logic for the reactor protection system, emergency core cooling systems (ECCS), reactor core isolation cooling system, automatic depressurization system, nuclear steam supply shutoff system, and the residual heat removal (RHR) system, including the shutdown cooling mode of operation. Performance of these tests requires these systems to be disabled to prevent unwanted system actuations. Thus, these systems are rendered inoperable during this testing. This also results in extensive temporary reconfiguration of systems and actuation instrumentation, including logic card

removal, installation of signal simulators, disconnecting load drivers, etc. The removal of these safety systems from service to perform this testing results in reduced availability of RPS, ECCS, and RHR shutdown cooling systems during the plant outage. In addition to the intentional disabling of equipment to perform this testing, this testing has in the past lead to safety system unavailability due to equipment damage caused by bending pin connectors and burning circuit cards out due to electrical shorting. Further, CPS has experienced unintentional equipment actuations resulting in unnecessary challenges to safety systems and the need to file licensee event reports with the NRC. IP has concluded that elimination of this currently required manual testing of the NSPS will have a positive impact on overall plant safety.

The only margin of safety that could be negatively impacted by this proposed change is the potential for a functional failure in the NSPS logic going undetected. The manual tests proposed for deletion are only required to be performed at least once every four fuel cycles. In addition, the ability of the STS to detect functional failures of the NSPS logic as designed was verified as part of General Electric's independent design verification. Further, this capability was also verified as part of the preoperational test program as described in Section 14.2.12.1.62 of the CPS Updated Safety Analysis Report (USAR) and subsequently during testing performed during the first four refueling outages. These manual tests did not identify any functional failures of the NSPS logic which would be expected to be detected by the STS per its design. All other functional failures undetectable by the STS have been identified as Untested Islands (UTIs). Thus, the original objectives of this testing have been satisfied.

The proposed change will continue to require testing at refueling outage intervals. As identified in USAR Section 7.2.1.1.4.8 and SSER 6, circuits which are not capable of being tested by the STS are identified as UTIs. General Electric and IP have identified, via analysis and manual testing, all UTIs in the functional NSPS logic and have established procedures for testing these UTIs. Periodic verification of the operability of these UTIs will continue to be performed at the frequencies recommended by the manufacturer as accepted by the NRC in SSER 6. These frequencies were established by the manufacturer based on mean time between failure analyses for the components in the associated circuits and may be as long as six years. Based on the above, the functional operability of the NSPS logic is adequately assured.

From the above, IP has concluded that the proposed change will result in a net increase in the overall margin of safety.

Based on the foregoing, IP concludes that this request does not involve a significant hazards consideration.