U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/86013(DRS)

Docket No. 50-461 License No. CPPR-137

Licensee: Illinois Power Company
500 South 27th Street
Decatur, IL 62525

Facility Name: Clinton Nuclear Power Station, Unit 1

Inspection At: Clinton Site, Clinton, IL

Inspection Conducted: February 24 through March 13, 1986

Inspectors: S. G. DuPont — Date: 4/11/86

G. O'Dwyer — Date: 4/11/86

Approved By: M. A. Ring, Chief
Test Programs Section — Date: 4/11/86

Inspection Summary

Inspection on February 24 through March 13, 1986 (Report No. 50-461/86013(DRS))
Areas Inspected: Actions on previous inspection findings, preoperational test procedure review (70304; 70306), preoperational test witnessing (70442; 70457), preoperational test result review (70322; 70541), preoperational test result verification (70329), startup test phase procedure review (72500; 72512), preventive maintenance of station batteries (62705; 61700), startup test phase procedure verification and modification control (37701).
Results: Of the nine areas inspected, no violations or deviations were identified in eight areas. Within the remaining area, two violations and one deviation were identified (deviation from Standard Paragraph 9.a.(7); failure to promptly correct deficiency -Paragraph 9.b.(2); failure to preserve safety-related equipment - Paragraph 9.a.(8)).

DETAILS

1. Persons Contacted

*H. E. Daniels, Project Manager
*J. S. Perry, Manager, Nuclear Programs Coordinator
*J. Greene, Manager, Startup
*J. W. Wilson, Plant Manager
*W. Connell, Manager, Quality Assurance
*J. Greenwood, Manager, Power Supply (Soyland/WIPCo)
*J. E. Loomis, Construction Manager
*D. E. Shelton, Manager, Nuclear Station Engineering
*G. W. Bell, Special Assistant
*R. F. Schaller, Director, Nuclear Training
*J. D. Palmer, Director, Configuration Management
*J. A. Brownell, Licensing Specialist
D. Holesinger, Director, Startup Testing

The inspector also interviewed other licensee employees, including members of the quality assurance, startup, maintenance, and operating staffs.

*Denotes those attending the exit interview on March 13, 1986.

2. Actions on Previous Inspection Findings

(Closed) Open Item (461/85005-13): The Clinton Safety Evaluation Report (SER), Paragraph 8.3.1, required review of the division 3 diesel generator preoperational test results. The inspector reviewed the test results for preoperational test PTP-DG/DO-03 and found that the results demonstrated reliable starting and operation of the High Pressure Core Spray (HPCS) diesel generator. The inspector verified that the preoperational testing was similar to prototype qualification testing and that the requirements of Regulatory Guide 1.108 were met. The inspector also verified that the diesel generator will automatically revert from the test mode to the emergency mode given a Loss of Coolant Accident (LOCA) or a loss-of-offsite power signal.

(Closed) Unresolved Item (461/85036-04): The licensee was to implement a program to ensure that the startup test engineer (STE) for a given preoperational test was aware of temporary alterations made by another STE authorized by a second preoperational test to avoid invalidation of completed testing. The inspector reviewed the revision to startup administrative Procedure SAP-8, "Control of Temporary Alterations," and verified that the following requirements had been implemented: (1) A retest evaluation is required for each alteration, to consider potential effects on interfacing systems. (2) The testing engineer is required to contact the System Engineer for the interfacing systems and determine the need for retesting. The inspector also verified that Procedure SAP-5, "Test Procedure Results Review and Approval," incorporated these requirements. The inspector has no further concerns.

3. Preoperational Test Procedure Review

The inspector reviewed the following preoperational procedures for compliance with the SER, Regulatory Guide 1.68, and the Startup Manual. The inspector determined that the procedures were satisfactory and that the acceptance criteria were in compliance with the required design documents.

PTP-LE-01, "Loss of Offsite Power"
PTP-VP-01, "Drywell Cooling"

No violations, deviations or unresolved items were identified.

4. Preoperational Test Witnessing

The inspector witnessed the following preoperational testing to ascertain through observation and record review that testing was conducted in accordance with approved procedures and the requirements of the Startup Manual. The tests were found to be satisfactory.

PTP-RI-01, "Reactor Core Isolation Cooling (RCIC)"
PTP-HI-01, "Hydrogen Ignition"

a. The inspector witnessed Sections 7.2.4, "RCIC Storage Tank Suction Valve 1E51-F010," and 7.2.8, "Suppression Pool Suction Valve 1E51-F031," and verified by direct observation the valve logic between the valves 1E51-F010 and 1E51-F031 functioned as designed. The design requires that with the suppression pool suction valve open (F031), the RCIC storage tank suction valve (F010) will close and will not operate open while F031 is open. The valve interlock logic is to prevent inadvertent loss of suppression pool inventory to the RCIC storage tank after the storage tank inventory has been used and the RCIC suction lineup has been redirected to the suppression pool. The inspector also verified the automatic suction switchover from the RCIC storage tank to the suppression pool on a low storage tank level signal. Preoperational Test PTP-RI-01 demonstrated that the RCIC suction valves' logic meets the requirements of NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.K.3.22 for automatic switchover of RCIC suction.

b. The inspector witnessed Sections 7.2.1 through 7.2.40, "Division 2 Hydrogen Ignitors," of preoperational test procedure PTP-HI-01. The inspector verified by direct observation that all Division 2 hydrogen ignitor glow plugs met the acceptance criteria. The acceptance criteria requires that the glow plugs attain a temperature of 1700° F or greater after a one minute warmup period. The temperatures were measured by Tempilstiks which are certified at a given temperature plus or minus one percent (± 1%). The test engineer utilized a 1750° F ± 1% Tempilstik. All glow plugs indicated greater, than 1750° F which met the 1700° F acceptance. The inspector also reviewed the Tempilstik certifications and found them satisfactory.

No violations, deviations or unresolved items were identified.

5. Preoperational Test Result Review

The inspector reviewed the following preoperational test results for acceptance and completion of test objectives in accordance with the FSAR and SER. The licensee's test result evaluations were also reviewed for adequacy and found satisfactory.

PTP-AX/AY-01, "Auxiliary Power"
PTP-DG/DO-03, "Division III Diesel Generator"
PTP-SX-02, "Service Water Vortex Test"

No violations, deviations or unresolved items were identified.

6. Preoperational Test Results Verification

The inspector verified that the following acceptance (ATP) and preoperational (PTP) test results were reviewed and accepted by the licensee in accordance with the Startup Manual and were found to be satisfactory:

ATP-CP-01, "Condensate Polishing"
ATP-DM-01, "Screenhouse and Makeup Water"
ATP-PS-01, "Process Sampling"
PTP-EM-01, "Environmental Monitoring"
PTP-RE-01, "Auxiliary and Fuel Building Equipment"
PTP-SV-01, "Safety Relief Valve Monitoring"
PTP-VD-01, "Diesel Generator Room HVAC"
PTP-WE-01, "Radwaste Reprocessing"

No violations, deviations or unresolved items were identified.

7. Startup Test Phase Procedure Review

The inspector reviewed the following startup test phase procedures for compliance with the FSAR, Regulatory Guide 1.68, Draft Technical Specifications, and the Startup Manual:

STP-03-0, "Fuel Loading"
STP-30A-3, "Trip of One Recirculation Pump"
STP-30B-3, "RPT Trip of Two Pumps
STP-30C-1 through STP-30C-6, "Recirculation Performance"

The inspector determined that the procedures were technically adequate; however, the prerequisites for fuel loading, as contained in Regulatory Guide 1.68, were not clearly defined in procedure STP-03-0. The inspector was unable to locate the following Regulatory Guide 1.68, Appendix C prerequisites:

> 2.a(1), "The composition, duties, and emergency procedure responsibilities of the fuel handling crew should be specified." The procedure STP-03-0 only specified the responsibilities of the SRO/fuel handling SRO and did not reference the minimum crew

composition. The licensee stated that the crew composition and duties should be contained in the Technical Specifications and that emergency responsiblities are specified in the emergency procedures.

2.a(3), "The status of all systems required for fuel loading should be specified." The licensee stated that the system status will be contained in either the letter from the Manager-CPS on system readiness or the Mode 5/4 check lists.

However, STP-03-0 does not reference the Technical Specifications or any of the other documents that may contain these prerequisites. Additionally, the inspector did not find all of the limitations and actions prescribed by the regulatory guide. STP-03-0 appears not to contain Paragraph 2.c(2), "Criteria for emergency boron injection (Standby Liquid Control)," or 2.c(5), "actions to be followed or approvals to be obtained before routine loading may resume . . . should be listed." STP-03-0 did contain the actions required to resume fuel loading, but did not prescribe any requirements for approval. Since these requirements of the regulatory guide were not clearly contained in the fuel loading procedure and their location may be found within various other procedures or documents, this is an unresolved inspection item (461/86013-01) until the licensee's startup test phase program establishes the requirements of the regulatory guide.

No violations, deviations or other unresolved items were identified.

8. Startup Test Phase Procedure Verification

The inspector verified that the following startup test phase procedures were approved as required by the FSAR and the Startup Manual:

STP-14-H, "RCIC System Startup Test"
STP-14-1, "RCIC System Startup Test"
STP-14-2, "RCIC System Startup Test"
STP-31-1, "Loss of Auxiliary Power"
STP-33A-1, "Steady State Vibration Test"
STP-33A-2, "Steady State Vibration Test"
STP-33A-3, "Steady State Vibration Test"
STP-33A-5, "Steady State Vibration Test"
STP-33A-6, "Steady State Vibration Test"
STP-33B-H, "Transient Vibration Test"
STP-33B-1, "Transient Vibration Test"
STP-33B-2, "Transient Vibration Test"
STP-33B-3, "Transient Vibration Test"
STP-33B-5, "Transient Vibration Test"
STP-33B-6, "Transient Vibration Test"

No violations, deviations or unresolved items were identified.

9. Preventive Maintenance of Station Batteries

The inspector toured the battery rooms to ascertain the conditions of the batteries maintained by plant staff after turnover. The inspector found

that in all cases, the licensee was not maintaining the batteries as recommended by the vendor manual 12-800, "C and D Stationary Battery Installation" or as required by the Institute of Electrical and Electronics Engineers (IEEE) Standard 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations." The inspector also reviewed the documentation of battery surveillances maintained by Plant Staff Maintenance Department. The inspector's findings are listed as follows:

a. General Maintenance

(1) Division 1, safety related battery (1DC01E). The inspector found free standing electrolyte on cells and between interconnecting terminals. This condition can cause trace electrical shorts between the current carrying components such as, interconnecting terminals and terminal plates. Additionally, the inspector found evidence of corrosion on terminals to cells 24, 49, 51 and 58.

(2) Division 2, safety related battery (1DC02E). The inspector found, in addition to electrolyte spills and excessive dust on the cells, the terminal plate for cell 4 had evidence of abuse. The terminal plate was warped with a gap of 1/8 inches. Since the plate is a current carrying component and the licensee, as a practice, does not clean electrolyte spills or terminal corrosion, this plate could have corroded and limited the cell's capacity. This deficiency had not been identified by the licensee as required by procedure CPS 1016.01.

(3) Division 3, safety-related battery (1DC03E). The inspector found electrolyte spills and residue. Additionally, a large plastic sheet was found in the battery room. This sheet had apparently been used to cover the cells. The location of the plastic sheet as either debris or a cover is a fire hazard that could result in the loss of the safety-related battery.

(4) Division 4, safety-related battery (1DC04E). The inspector found excessive electrolyte residue, even on the room's floor and storage racks, and crystallization of sulfuric acid from the electrolyte. Terminals for cells 11 and 53 had evidence of corrosion while cells 33 and 56 had excessive crystallization on the terminal plates. Additionally, the battery room was being used to store equipment, tools and debris for other maintenance activities.

The inspector also finds that the physical conditions noted in Paragraph 9.a(1) through 9.a(4) for safety-related batteries constitute a violation (461/86013-02) of 10CFR50, Appendix B, Criteria XIII, which requires that measures shall be established to control cleaning and preservation of safety-related equipment

to prevent damage or deterioration. Additionally, these conditions violate the American National Standards Institute (ANSI) N45.2.3 and IEEE Standard 450-1975 which states, "when excessive dirt is noted on cells or connectors, wipe with water-moistened clean wiper. Remove electrolyte spillage on cell covers and containers."

(5) Balance of plant, non safety-related battery (1DC05E). In addition to evidence of electrolyte spills and crystallization, two fill caps were missing for cells 14 and 40.

(6) Security battery. The inspector found that the battery was, in general, maintained with only minimal electrolyte spillage. However, one of interconnecting terminals showed unusual abuse. The terminal had inadvertently been struck by a welding rod resulting in damage and the loss of the upper quarter of the post.

(a) The inspector reviewed the licensee's letter B76-83(06-06)6, June 6, 1983, which contained a disposition supplied by the Nuclear Station Engineering Department (NSED) for continued use as follows:

- "The present damage to the cell does not appear to be of significant concern at this time."
- "While the vendor does recommend replacement, this recommendation was based upon the new exposed surfaces accumulating corrosion and subsequent failures; thus, it will not be a sudden development, but rather a slow process."
- "Current maintenance procedures require periodic inspection of all battery cells and any visual degradation can be found at that time."
- ". . . the present condition of the cell will be determined by the startup test procedure."
- "NSED thus recommends that unless the cell is unable to perform per specifications, that it be left in service."
- "If failure should occur at a later date, the cell can be replaced at that time. This will delay the expenditure of money till absolutely necessary and allow for the use of whatever the life of the cell is before its replacement."

(b) The inspector finds this disposition inadequate as follows:

- NSED's evaluation that the failure "will not be sudden, but, rather a slow process" is generally true. However, the assumption that current maintenance procedures will

detect and identify "any visual degradation" is not supported by IP Plant Staff's actual practices as documented in Paragraphs 9.a(1) through 9.a(5) of this report. The vendor manual stresses in Section 6.11, "Checking Connections," that "maintenance of connections is one of the most important tasks for which the user is responsible. A loose or corroded connection can often develop a high resistance circuit. If a high current load is suddenly required from the battery an extremely large amount of power can be dissipated at the connection, often leading to a melt-down of the post and possible ignition of the cover of the cell or other neighboring parts." A failure of this type could render the battery unable to perform its intended function.

- The NSED's assumption that "the present condition of the cell will be determined by the startup test procedure" is not valid as follows. The acceptance test procedure for this battery required a discharge test to be performed by procedure STP-SS-04. However, this test did not determine the capacity of the battery as required by IEEE Standard 450-1980. The Standard requires that a capacity test is initially performed to determine whether the battery meets its specification and periodically reperformed to determine degrading of its rating. Acceptance is based upon the percentage of the design rating. The initial capacity acceptance is 90 percent. Degradation is also indicated by a capacity drop of more than 10 percent from previous capacity tests or 85 percent of the rated capacity. For the security battery, the initial capacity was not determined and periodic testing is not scheduled by plant staff to be performed. The vendor manual also addresses capacity testing in Section 9.1 and endorses the standard. This is a deviation from the IEEE Standard 450-1980 (461/86013-03) in that requirements for capacity tests had not been met for the security battery.

- The NSED's assumption that "if failure should occur at a later date, the cell can be replaced at that time", does not consider delay times for availability of a replacement or the impact on the system of a failed cell. Since an initial determination of the battery capacity has not been made and periodic capacity verifications were not planned, the failure could not be detected as a slow development.

- Finally, NSED's consideration for delaying "the expenditure of money till whatever the life of the cell" does not indicate that the intended function of the battery was evaluated as follows:

The security battery function is to provide electrical power to various security systems during a loss-of-offsite power (LOOP), including electrical interlocks to security doors throughout the station. During the LOOP, access to safety-related equipment and remote operating stations is vital. Without timely access through security doors, operation of this equipment will be hindered and will add inadvertent complications to the event. Because the disposition is inadequate in addressing the intended function of the battery, this is an unresolved item (461/86013-04) until an adequate disposition is made and reviewed.

Safeguards aspects of the security battery issues are treated in Inspection Report No. 50-461/86020.

(b) Maintenance Procedures and Documentation

The inspector reviewed the recorded data for weekly and monthly surveillances. The inspector found the following:

(1) The inspector had previously identified to the licensee, in Inspection Report No. 85061, the inadequacies of procedure CPS 8433.01, "Generic Procedure for Battery Maintenance," Section 8.2, "Battery Equalizing," for meeting the requirements of IEEE Standard 450-1975. Specifically, the procedure was inadequate in the areas of acceptance criteria for the equalizing charge and the failure to compensate specific gravities for electrolyte levels. During the review of surveillance data for the batteries, the inspector noted a significant drop in recorded specific gravities followed by an equalizing charge. The change in specific gravity data was attributed to compensating for electrolyte levels and the charge was required to restore the gravities to specifications. The inspector also noted that after compensating for level, all of the batteries required an equalizing charge to restore the batteries to specifications. The inspector was not able to determine if the batteries were out of specification throughout the duration that gravities were not being compensated for level because of a lack of data. However, the need for an equalizing charge immediately after compensating for level does indicate that the batteries were being maintained out of specifications.

(2) In addition to not being able to determine the condition of the batteries before compensating for levels, the inspector also noted that plant staff had not corrected the inadequate practice of not compensating for levels in a timely manner. One battery's gravities were corrected after the inspector had identified the inadequacy to the licensee while the other batteries were corrected at later dates. In one case, the licensee continued to record uncompensated data four weeks after correcting for levels on the first battery. Since the battery specific gravities were corrected

on an individual case basis at intervals of one or more weeks following identification of the improper practice and all batteries were out of specifications after compensating, the inspector finds the licensee's corrective action inadequate. This is a violation (461/86013-05) of 10 CFR 50, Appendix B, Criterion XVI in that prompt actions were not taken to preclude repetition of conditions adverse to quality after identification of improper practice.

(3) During the review of documentation, the inspector identified that procedure CPS 8433.01 had a note in Section 8.2, "Battery Equalizing," stating that electrolyte level should be adjusted to the full level prior to starting the equalize charge. The inspector determined by interviewing Plant Staff Maintenance Department personnel and visual inspection of the batteries that the licensee does adjust the level to the full mark prior to commencing the charge. This practice is not in agreement with the vendor manual "caution" in Section 4.9, "Adjusting Electrolyte Level and Watering of Battery," which states, "adjust electrolyte levels AFTER complete recharge and while on charge, never before recharge or when a battery is discharged." The reason for the caution is that had the level been adjusted to the high level mark before charging, it is conceivable that upon charging the electrolyte may rise to a point where it could overflow through the vent or be forced up into the flame arrestors thereby causing an additional problem requiring maintenance. The inspector's tour of the battery rooms revealed that electrolyte had overflowed through the vents as evidenced by electrolyte stains on the vents, racks, room floors, and electrolyte residue on the sides of the cells. It was also apparent that no additional maintenance had been performed as a result of electrolyte overflow. Plant staff stated that these requirements for water additions were only in the newly distributed 1983 revision of the vendor manual and were not located in the 1976 revision that was used to prepare procedure CPS 8433.01. However, the above stated cautions are also contained in the 1981 revision. The inspector's review of the 1976 revision does not agree with the licensee's statement in that the "Condensed Instructions for Standby Battery Service, Full Float Operation," does contain as Caution 4, "Watering, add approved or distilled water after charging and as required to keep electrolyte level between high and low level lines." It is apparent that plant staff had not familiarized themselves with the reference documents (IEEE Standard 450 or the vendor manual) prior to preparing and approving the battery maintenance procedure. Both of the inspector's concerns, water addition and specific gravity compensation for electrolyte level, were found to be contained in the 1976 vendor manual as Caution 4 and in Section 6.3.5. This is an open inspection item (461/86013-06) pending licensee review of the plant staff's battery maintenance program (preventive and corrective), all related plant staff procedures, and performance of adequate corrections.

(c) Battery Inspection Summary

Because of the failure to establish adequate measures to assure that the preoperationally tested and accepted batteries (both safety-related and non safety-related) are preserved and because damage or deterioration may exist, the inspector has no confidence that the preoperational test data collected, evaluated and approved is valid. Pending Nuclear Station Engineering Department evaluation of the the completed test data against the current condition of the batteries, the validity of the completed preoperational testing is considered an unresolved inspection item (461/86013-07).

No other violations or deviations were identified.

10. Modification Control

During the inspection, the inspector found that the CQ, "Public Address System," had been modified prior to turnover to startup for preoperational testing. Before the system turnover was completed, the Manager, CPS, requested Baldwin Associates (BA) to not build the CQ system as designed. BA disabled the page function of the system with the exception of the control room unit. The disposition stated that the modification was to "improve the effectiveness of the P.A. system for the emergency plan drill." The improvement was to prevent unwanted paging during the drill. Since the system was turned over to Startup with the paging modified, startup wrote a condition report, CR 1-85-12-023, as required by the Startup Manual. As a result, a Plant Staff Field Problem Report (FPR 200064) was written to NSED to initiate a permanent plant modification. Two Field Engineering Change Notices (FECN 22705 and 22812) modified the CQ System from the Sargent and Lundy (S&L) design criteria, DC-CQ-01-CP and the FSAR Section 9.5.2.2.1. Additionally, a Plant Staff Modification Control Package (CQ-12) was approved to disable the plant paging capability with the exception of the following:

- Main Control Room
- Technical Support Center
- Operational Support Center
- Emergency Operations Facility
- Central Alarm Station
- Shift Supervisors Office
- Radwaste Operations Center
- Remote Shutdown Panel
- Service Building Office Areas
- Maintenance Office Areas
- Chemistry Office Areas
- Various Security Stations

In total, only 36 of 158 CQ stations listed in the FSAR will have the ability to page throughout the plant. The control room unit will also have the ability to monitor the party line function of the CQ system.

The affect of the current modification, with all paging disabled except the control room, has caused certain problems. IP Quality Assurance noted in a surveillance (Q-02652) that the paging system did not function properly on February 6, 1986, thus delaying the fire brigade response. Additionally, a previous quality finding (O-085-172) noted the inadequacies of the CQ system.

Since the modification of the CQ system was performed during construction and a permanent plant modification has been written, this is not a violation. However, plant staff including the Manager, CPS, did not demonstrate adequate control or good engineering practice in not initiating a permanent modification. The modification CQ-12 was written over two months after the system was changed and turned over to startup. Also, the plant staff had not evaluated the impact on security and fire brigade response, as noted by IP Quality Assurance, prior to disabling the paging function.

In addition to the above, the inspector reviewed the completed 10 CFR 50.59 Safety Evaluation Reports for Modification CQ-12. The 10 CFR 50.59 Reports are not required to be performed until after the plant receives an Operating License (OL); however, plant staff has initiated 10 CFR 50.59 reports prior to OL as a policy. The inspector found four reports attached to Modification CQ-12. In general, these reports state that no testing as described in the FSAR and that no procedures are affected. However, there is no evidence that the evaluator considered the preoperational test as an FSAR described test or that the Plant Staff operating, emergency or security procedures were reviewed. In one case, the evaluation's description of the modification does not appear to agree with the summary contained in modification CQ-12. Additionally, the latest evaluation (Log 109 dated February 20, 1986), concluded that the modification "will not change any FSAR descriptions" of the CQ system. This evaluation is inadequate because the change does affect the FSAR description.

Since the 10 CFR 50.59 reports are not required, this is not a violation. However, this modification activity did not demonstrate adequate control, evaluation and technical understanding of the impact of modifications on the part of Plant Staff.

11. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. An open item disclosed during the inspection is discussed in Paragraph 9.b.(3).

12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of violation or deviations. An unresolved item disclosed during the inspection is discussed in Paragraphs 7, 9.a.(6) and 9.c.

13. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) on March 13, 1986. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary. The licensee acknowledged the statements made by the inspector with respect to the findings.