

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/94005(DRS)

Docket No. 50-461

License No. NPF-62

Licensee: Illinois Power Company
Clinton Power Station
Mail Code V-275
P. O. Box 678
Clinton, IL 61727

Facility Name: Clinton Power Station

Inspection At: Clinton, IL

Inspection Conducted: March 7 through 25, 1994

Inspectors: R. Winter for 4/12/94
D. Butler Date

R. Winter 4/12/94
R. Winter Date

Approved By: R. N. Gardner, Jr. 4/12/94
R. N. Gardner, Chief Date
Plant Systems Section

Inspection Summary

Inspection on March 7-25, 1994 (Report No. 50-461/94005 (DRS))

Area's Inspected: Announced followup inspection of previously identified EDSFI findings according to Temporary Instruction (TI) 2515/111 and a review of design changes and modifications according to Inspection Procedure (IP) 37700.

Results: The inspection determined that the licensee made good progress in resolving EDSFI issues. EDSFI followup item closure packages were thorough and complete. Performance in engineering and technical support was considered good and the control of temporary modifications was considered a strength.

DETAILS

1.0 Principal Persons Contacted

Illinois Power Company

- * J. Miller, Manager - NSED
- * R. Phares, Director - Licensing
- * J. Sipek, Supervisor, Regional Regulatory Interface
- * S. Guron, Staff Engineer
- * T. Wiggins, Supervising Engineer - Electrical Design
- * T. Parrent, Project Engineer - Engineering Assurance
- * J. Langley, Director - Design and Analysis
- * D. Korneman, Director - Systems and Reliability
- * K. Graf, Director - Engineering Projects
- * D. Morris, Director - Nuclear Assessment
- * R. Wyatt, Manager - Nuclear Assessment
- * D. Thompson, Manager - Nuclear Training
- * P. Thompson, Supervisor - Electrical System Engineering
- * D. Tockstein, Project Engineer - Electrical Design
- * W. Shurlow, Project Specialist - C & I Design
- * A. Haumann, Project Engineer - Electrical Design
- * J. Lewis, Supervising Specialist - NPAG
- * C. Huttes, Executive Staff
- * J. Palchak, Manager - Nuclear Support Services
- * F. Spangenberg, Nuclear Strategic Change Leader
- * J. Scott, Supervising Engineer - Electrical Systems
- * J. Emmert, Supervisor - Electrical Design and Analysis
- * G. Bhayana, Project Manager - Engineering Projects
- * P. Walberg, Supervisor - IPE
- * E. Turner, Nuclear Program Controller
- * R. Neeb, Supervisor - Mechanical Design
- * D. Waddell, Director - Program Administration
- * R. Bedford, Supervisor - System Engineering - NSSF
- * E. Schweitzer, Supervisor - Nuclear Fuels

U. S. Nuclear Regulatory Commission (U.S. NRC)

- * P. Brochman, Senior Resident Inspector
- * Denotes those present during the exit meeting on March 25, 1994.

2.0 Action on Previously Identified Inspection Findings

- a. (Open) Unresolved Item (461/93003-01): The EDSFI team identified voltage calculation inconsistencies that had the potential to affect the degraded voltage setpoint.

The licensee was developing control power calculation No. 19-AJ-70 to determine the voltage required to maintain the minimum pick-up and drop-out voltages at motor control center (MCC) contactors.

Calculation results would set the basis for the degraded voltage setpoint determination. The draft calculation was very detailed and contained verifiable assumptions. The licensee indicated that once all calculations were completed, the degraded voltage protection design would be reviewed for any improvements. The inspectors concluded the licensee was adequately addressing this item and it will remain open pending further NRC review.

- b. (Closed) Unresolved Item (461/93003-02A): The EDSFI team was concerned that during a decaying voltage transient between the degraded voltage setpoint and the loss of offsite power (LOOP) setpoint that energized contactors would begin to "chatter" (contact bounce). In addition, the contactor chatter could cause excessive operating equipment jogging and could cause pulsating contactor in-rush currents with the potential to blow control power fuses.

The licensee produced documentation that the NRC had reviewed and approved their LOOP and degraded voltage designs. In addition, the licensee was developing a control power calculation (19-AJ-70) to identify any contactors that may have insufficient operating voltage. The inspectors concluded the calculation would address the EDSFI concerns. This calculation will be reviewed during the followup of Unresolved Item 461/93003-01. This item is considered closed.

- c. (Closed) Unresolved Item (461/93003-02B): The EDSFI team was concerned that insufficient operating voltage would be available following the block loading of LOCA loads. The team postulated that this could occur upon degraded voltage (second level) relay reset concurrent with a continuing degraded voltage condition that decreased to just above the minimum degraded voltage setpoint.

NRC Safety Evaluation Report (SER), September 1986, Supplement 7, Section 8.4.4, stated, in part, that for voltage just above the second level undervoltage setpoint, the safety loads would transfer to the EDG because of the relays reset band or, if the voltage was higher than the reset, the safety loads would satisfactorily start on the offsite system. The inspectors reviewed Clinton's LOOP and degraded voltage designs. The onsite electrical distribution system is designed to recover voltage above the degraded voltage relay reset value following a LOCA block start, if the offsite voltage maintains the safety related 4kV buses above the reset value before the event. If offsite voltage results in the 4kV buses dropping below the reset value, voltage will not recover above the reset value and the safety buses will be transferred to the emergency diesel generators. The inspectors concluded Clinton was meeting their licensing bases. This item is considered closed.

- d. (Closed) Violation (461/94003-04): The EDSFI team identified that Modification No. DGF024, "Emergency Diesel Generator (EDG) 1A and 1B Run/Idle Switch," would prevent the EDG from performing its

automatic safety function, with the switch in "idle," upon reset of the EDG automatic start signal.

The licensee issued condition report No. 1-93-02-015 to address this item. The following corrective actions were taken by the licensee:

- o Modification DG-071 was implemented to correct the design deficiency;
- o all applicable procedures were updated;
- o lessons learned were discussed with NSED Design and Analysis group, emphasizing the need for incorporating all aspects of the design function into the design inputs;
- o a lessons learned advisory to contractors was issued; and,
- o a quality engineering overview of critical refueling outage modifications was performed.

The inspectors reviewed all of the corrective actions including a field walkdown of modification DG-071. The actions were completed in a timely manner and appeared effective. The modification was satisfactorily installed and tested. This item is considered closed.

- e. (Closed) Inspection Followup Item (461/93010-01): EGS electrical connectors environmental qualification (EQ) package was not completed.

The licensee satisfactorily completed the connectors EQ package and added the connectors to the master EQ list. This item is considered closed.

3.0 Engineering and Technical Support (E&TS)

The EDSFI closure packages were thorough and complete. The inspectors noted that items identified as weaknesses and commitments in the EDSFI report had been addressed, and recent calculations were of good quality.

This inspection, the EDSFI inspection (February 19, 1993) and the E&TS inspection (August 3, 1993) have reviewed about 50 permanent modifications. The three inspections concluded that E&TS performance was good and noted a continuing effort toward improvement. Responses to inspector questions were timely and complete. Typically, additional questions were not required. Management was involved with all aspects of the modification process and was committed to good engineering support. During field walkdowns, the inspectors observed good engineering interface with the operating staff and maintenance. The project and system engineers were experienced and knowledgeable about the modifications reviewed. Material condition was good in the areas walked down.

3.1 Permanent Modifications

Sixteen electrical and control & instrumentation permanent modification packages were reviewed and six were walked down. The packages were complete and contained interdisciplinary engineering reviews. When reviewers raised questions about the modifications, the responsible project engineer resolved any identified concerns before implementing the modification. The 10 CFR 50.59 screening and/or safety evaluations were completed satisfactorily. Appropriate documents were referenced such that an independent review could be completed without recourse to the originator. Post modification testing was completed satisfactorily and the testing overlapped into untested portions of the modification. The configuration control process at Clinton was notably good. Station documentation, such as data sheets, critical drawings, equipment specifications, field installations, and design basis documentation reflected current station design.

The following modifications were reviewed:

- o RRF026 Move the reactor recirculation pump 5A/5B auxiliary contacts for the automatic down shift circuit out of the present circuit into auxiliary controls 2A/2B permissive circuit;
- o DOF002 revise the fuel oil transfer pump low level start setting to prevent the level from being reduced below the EDG fuel oil pump inlet;
- o DOF004 recalibrate fuel oil level transmitter with specific gravity which is closer to average specific gravity and to provide accurate fuel oil indication in the MCR;
- o PR034 modify radiation monitors to preclude automatic isolation on a power failure and detector downscale;
- o SCF003 change standby liquid control (SC) tank level indication and alarm to provide adequate SC pump NPSH;
- o C-019 replace nuclear boiler cross around piping pressure switches B21-N538 and N539 per FECN 27223;
- o CX-027 revise computer software and drawings to show scram discharge volume RCIS rod block computer point functional description was associated with ATM C11-N602B;

- o ESF010 replace the extraction steam exhaust hood high temperature trip switch H with two dual element thermocouples;
- o HP-026 revise GE high pressure core spray data sheet 22A313AL to add the calculated equivalent value for the HPCS waterleg pump discharge pressure low alarm;
- o OG-040 remove all setpoints from the offgas EDDL, correct the design specifications and drawing OS-1084 to include only the actual setpoint value;
- o E-F028 install new model Agastat relay with gold plated contacts to improve various systems reliability;
- o E-031 permit use of an alternate GE transformer;
- o FP-F018 install fire protection alarm test switch to prevent main power transformers cooling fans from tripping during fire system testing;
- o VO-011 rewire the offgas compressors trouble alarms to reflect the electrical drawings; and,
- o AN-011 replacement radioactive waste Topaz inverter has a higher inrush current resulting in blown fuses.

During the review of modification DOF004, the inspectors noted the following discrepancy. On July 15, 1993, technical specification (TS) amendment No. 80 changed subparagraph 4.8.1.1.2.d.1.c by adding a statement defining the fuel oil absolute specific gravity at 60/60°F (greater than or equal to 0.83 but less than or equal to 0.89). The TS specific gravity values should have been 0.825 to 0.8762 as determined by the American Society for Testing and Materials (ASTM) API to specific gravity equivalency equation. The original TS requirement remained unchanged, specifying the fuel oil API gravity at 60°F (greater than or equal to 30 degrees but less than or equal to 40 degrees). The licensee continues to sample new fuel oil using the API gravity. However, the specific gravity values could be used in determining fuel oil storage tank capacity and fuel oil level instrumentation calibration values. The inspectors did not identify any operational concerns. The licensee issued a condition report and will be revising TSs. The inspectors have no further questions on this item.

3.2 Temporary Modifications

The inspectors considered the licensee's temporary modification program to be a strength. Temporary modifications were well documented, minor in scope, and were assigned definite installation time limits. Each temporary modification was screened to reduce the potential for creating an unreviewed safety question. The licensee focused on reducing the number of temporary modifications. There were 33 installed temporary modifications at the time of the EDSFI, presently there are 14.

The following temporary modifications were reviewed:

- o 91-030 - Install temperature sensing equipment in "B" waterbox at tube outlets;
- o 92-007 - RR Pump Vibration sensors;
- o 92-097 - MWPB Clearwell Setpoint; and,
- o 94-002 - lift lead FG3 to disable pressure switch IPS-T0009.

The four temporary modifications reviewed were acceptable.

3.3 Fuse Control

The EDSFI team noted that Clinton did not have a formal fuse control program. Fuse replacement was controlled by Plant Manager's Standing Order (PMSO) 52, "Fuse Replacement Program." Any fuse could be replaced once without evoking requirements to evaluate the fuse failure. The PMSO did delineate a like-for-like replacement and that a Maintenance Work Request (MWR) be written to evaluate a second fuse failure. The PMSO did not cover fuse dedication, inspection criteria, selection of fuse types or characteristics, and quality requirements. However, the EDSFI team did not identify any incorrectly installed fuses during field walkdowns.

The inspectors reviewed the fuse control program. Twice per year, Reliability Engineering reviewed the fuse replacement logs to identify repeat failures. For example, MWR D32695 was written to investigate control fuse failures in the HPCS Petter diesel air compressor. The failures occurred on December 7, 1993 and January 18, 1993. The system engineer determined that the Petter diesel had run out of fuel and required fuel line venting. As a result, excessive cranking caused the control fuses to fail. The inspectors concluded this was an acceptable root cause determination. (The Petter diesel has been replaced.)

The licensee procures most fuses as class 1E. Their two main suppliers qualify the fuses for safety related applications. Procurement Engineering will qualify fuses purchased directly from a manufacturer. Commercial grade dedication was covered in procedure FE-5, "Procurement/Materials Engineering (P/ME) Review of Purchase Requisitions." Critical fuse characteristics were verified according to

commercial grade fuse evaluation document "ANSI/UL 198G-1988 Clearing Times." In addition, the station has a strong configuration control program. Based on the above and field walkdowns, the inspectors concluded the licensee had an adequate fuse control program.

4.0 Exit Interview

The inspectors conducted an exit meeting on March 25, 1994, at the Clinton Power Station to discuss the major areas reviewed during the inspection and the inspection findings. NRC personnel and licensee representatives who attended this meeting are documented in Section 1.0 of this report. The licensee did not identify any documents or processes as proprietary.