

U. S. NUCLEAR REGULATORY COMMISSION  
REGION III

Reports No. 50-440/92016(DRS); No. 50-441/92004(DRS)

Docket Nos. 50-440; 50-441

License No: NPF-48

Construction Permit No: CPPR-149

Licensee: The Cleveland Electric Illuminating Company  
10 Center Road  
Perry, OH 44081

Facility Name: Perry Nuclear Power Plant - Units 1 and 2

Inspection At: Perry, OH

Inspection Conducted: August 17 through August 21, 1992

Inspectors: Rolf A. Westberg 9/15/92  
R. Westberg Date

Rolf A. Westberg for 9/15/92  
J. Neisler Date

Approved By: Rolf A. Westberg for 9/15/92  
R. N. Gardner, Chief Date  
Plant Systems Section

Inspection Summary:

Inspection on August 17-21, 1992 (Report Nos. 50-440/92016(DRS);  
50-441-92004(DRS)).

Area Inspected: Announced followup inspection of previously identified EDSFI findings conducted in accordance with Temporary Instruction (TI) 2515/111.

Results: Seven previously identified inspection findings were closed. During the course of the inspection, the following was noted:

- o The items in the EDSFI report that were categorized as weaknesses had been addressed by the licensee with good results.

## DETAILS

### 1.0 Personnel Contacted

#### Cleveland Electric Illuminating Company

E. M. Root, Manager, Engineering Projects Support Section  
D. W. Conran, Compliance Engineer  
H. R. Reppert, Senior Project Engineer  
W. D. Dervay, Senior Design Engineer  
G. T. Cad, Supervisor Contract Maintenance Unit  
F. Von Ahn, Senior Design Engineer  
S. P. Morreale, Senior Project Engineer  
E. C. William, Senior Project Engineer  
S. Litchfield, Acting Chief Engineering Projects Support Manager  
T. A. Boss, Supervisor, C&V  
H. L. Hegrat, Supervisor Compliance

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

P. Hiland, Senior Resident Inspector

### 2.0 (Closed) Temporary Instruction (2515/111)

The primary objective of this inspection was to assess the adequacy of the licensee's corrective actions for safety-significant findings identified during the EDSFI. The secondary objective was to assess the engineering and technical support (ETS) function with respect to the EDSFI findings.

#### a. Corrective action

The inspectors determined that the licensee had taken adequate corrective action for the previous inspection findings. The documentation presented for close out of the findings was auditable, complete, and thorough. The items inspected and the inspectors' comments are contained in Section 3 of this report.

#### b. Engineering and Technical Support

The inspectors noted that items identified as weaknesses in the EDSFI report had been addressed by the licensee. The following was observed:

- (1) A design guide for cable sizing has been initiated with completion scheduled for 1993.
- (2) Programmatic controls were added to the procedures relative to testing of AC inverters in their operating range.
- (3) Jumper, lifted leads and temporary electrical device usage was audited and the total numbers were reduced.
- (4) Training for electrical engineers was assessed and those requiring training have been scheduled.

- (5) Computer software for system modeling and load growth control was being assessed.

### 3.0 Licensee Action on Previously Identified Inspection Findings

- a. (Closed) Open Item (440/91005-01): Cable impedances identified in calculations were based on a conductor operating temperature of 50°C. The EDSFI team's calculations showed that power circuits would operate at temperatures greater than 50°C. Calculation 431-85-1 applied the conductor temperature correction factor to both the resistive and reactive components of cable impedance.

The inspectors reviewed the December 17, 1991 revision of calculation 431-85-1. The calculation included both low (.95 PU) and high (1.02 PU) voltage profiles. These PU values represent the lowest and highest postulated voltages at the Perry transmission yard. Cable impedances were based on a conductor operating temperature of 90°C except underground duct banks where ambient temperatures are lower. Motor terminal voltage at Class 1E 4kV and 480V in this calculation was at least 75% for motor starting and at least 97% of rated during steady state conditions. Impedances were corrected to reflect their 90°C resistance value and the correction factor eliminated for reactance values included in Revision 0 of 431-85-1. This item is considered closed.

- b. (Open) Open Item (440/91005-02): Degraded Grid Voltage Relay Time Delay

The inspectors reviewed calculation No. PSTG-0026, Revision 0, "Motor Voltage Analysis with 2859 Volts on the "EH" Buses" dated August 18, 1992. This calculation analyzed degraded voltage relay scheme scenarios for the following: 1) Degraded voltage relay scheme activated and no LOCA, 2) LOCA occurs 15 seconds to 5 minutes past degraded voltage, 3) Degraded voltage occurs post-LOCA. The calculation showed acceptable results with all essential motors receiving greater than 70% voltage, except for 3 motors and these three did not have to start during a degraded condition or a LOCA. Pending revision of the Branch Technical Position on degraded voltage relay timers, this item remains open.

- c. (Closed) Open Item (440/91005-03): Short circuit calculation No. 686-85-100, Revision 1, "Perry Nuclear Plant Short Circuit Studies," which was performed assuming nominal system voltages, was nonconservative since actual system voltages may be higher than nominal.

The inspectors reviewed Revision 2 to Calculation No. 686-85-100 and verified that the calculation was performed at various voltage levels, including the maximum expected system voltage. This item is considered closed.

- d. (Closed) Open Item (440/91005-04): Starting voltage drop Calculation No. 431-85-2 did not evaluate starting voltage drop for all Class 1E motors. The EDSFI team was concerned that the calculation did not evaluate the starting voltage drop for all 460V motors powered from motor control centers (MCCs).

The inspectors reviewed calculation No. PSTG-0024, dated April 30, 1992, "460V Safety Related Motor Starting Voltage Drop." This calculation was performed to evaluate the voltage drop to the those safety related motors not included in calculation No. 431-85-2. This item is considered closed.

- e. (Closed) Open Item (440/91005-05): Steady state voltage drop Calculation No. 431-85-2 did not evaluate steady state voltage drop for all Class IE motors. The EDSFI team was concerned that the calculation did not evaluate the steady state voltage drop under degraded grid conditions for all 460V motors powered from motor control centers (MCCs).

The inspectors reviewed Calculation No. PSTG-0024, dated April 30, 1992, and verified that the licensee had evaluated the steady state voltage drop for those safety related 460V motors not evaluated in Calculation No. 431-85-3. This item is considered closed.

- f. (Closed) Open Item (440/91005-06): Inconsistencies in Calculation No. PRDC-0005. Analysis of the inrush currents associated with spring charging motors on the 4kV and 480V switchgear was inconsistent with vendor supplied documentation, analysis of battery load for the first minute did not address the latest version of USAR Table 8.3-1, and the choice of 60A as the peak charging motor current was less conservative than the IEEE standard.

The inspectors reviewed Revisions 1 and 2 of calculation No. PRDC-0005 and verified that the breaker spring charging motor actuation criteria had been corrected, that the calculation utilized the more conservative 80A inrush current for actuations, as recommended by IEEE 485, and that the one minute portion of the load profile had been updated for the RCIC valves based on RCIC automatic initiation. This item is considered closed.

- g. (Closed) Open Item (440/91005-07): Voltage drop calculation and low voltage transfer for ATWS power supply. The setpoint of the low voltage transfer from the ATWS uninterruptable power supply (UPS) to the backup power source was  $108 \pm 2\text{Vac}$ . This could allow a transfer as low as 106Vac. The ATWS DC power supplies powered by this UPS have a minimum design input voltage of 103.5Vdc.

The inspectors reviewed Calculation No. PSTG-0022, Revision 0, "ATWS UPS Distribution Voltage Drop" for panels EV-1-A and EV-1-B. Each panel receives power from its 7.5kVA solid state inverter. The vendor specifications states that the inverter will maintain 120Vac  $\pm 2\%$  up to and including 100% load. Beyond 100%, the inverter enters the current limit mode which rapidly reduces inverter output voltage. At Perry, when the inverter exceeds 62.5 AMPS load, an inverter trouble alarm is annunciated in the control room, per Procedure No. ARI-H13-P680-6 to take action to prevent the inverter from exceeding its rated load that would result in supply of degraded voltage. Calculation No. PSTG-0022 shows that voltage available to the power Range Neutron Monitoring System power supply is at least 110.93Vac, well above the ATWS dc power supply minimum design input of 103.5Vdc. The licensee measured the inverter's connected load and determined that it was less than 10A. This item is considered closed.



- h. (Closed) Open Item (440/91005-08): Degradation of diesel fuel oil storage tank internal coating. The licensee's inspection during refueling outage No. 2 determined that the tank's internal coating was failing. The licensee initiated a monitoring program to determine whether the coating, deemed not suitable for use with that particular fuel, should be replaced. Subsequent to the second refueling outage, the catalytically cracked diesel fuel was replaced with straight run diesel fuel and the old additive package replaced with new additives containing a biocide only. The licensee has continued the fuel condition monitoring.

The inspectors reviewed the results of the fuel monitoring. Particulate levels have remained below 0.5 parts per million (PPM). The diesel engine manufacturer specifies a particulate contamination level not to exceed 10 PPM. Metals contamination, specifically lead from the coating, has remained constant at about 0.01 PPM indicating that the change of fuel reduced or stopped the coating deterioration. The inspectors concurred with the licensee's position that the storage tank coating does not need to be replaced at this time, unless the licensee returns to the old type fuel and additives. This item is considered closed.

#### 4.0 Inspection of Unit 2 Preservation Activities (92050)

The inspector reviewed the current program for maintaining stored-in-place plant structures, systems and components; material in the outside (laydown) areas and components and materials stored within the warehouse complex. During the walk through of the plant and storage areas, the inspector observed the following deficiencies:

- a. At the Parmly Road laydown areas safety related HVAC duct sections were off dunnage and laying in the dirt. Pipe end covers needed repair and numerous pipe spools were beginning to corrode. The licensee initiated work orders to place the HVAC duct back on dunnage, repair pipe end covers and repaint the corrosion areas on the pipe spools.
- b. In the cable yard near the training center, the inspector noted that several wood cable reels had deteriorated and needed to be replaced to protect the cable. The licensee initiated a work order to inspect and re-spool the cable as necessary.
- c. In the turbine building, the inspector observed a contractor construction shack in which there were many boxes of records stored along with solvents and paints containing flammable petroleum distillates. Site fire protection personnel immediately initiated clean up activities to remove the combustible materials and to store the flammable solvents and paints in approved storage cabinets.
- d. The inspector observed numerous cracks in the concrete walls of the service water wire structure. These were through wall cracks with water leaking through as evidenced by the large mineral deposit below each crack and in some cases wet outer walls around the crack. Subsequent to the inspector's observation, the

licensee issued nonconformance report (NR) 92-N-265 to track, evaluate and effect necessary corrective action.

- e. The inspector observed several reels of electrical cable in the trailer areas behind Unit 1. The reels were not stored off the ground. Class 1E and non class 1E cables were not segregated. Some reels were not identified as to their safety related status. The licensee moved the safety related cable to the warehouse and stored the remaining cable on dunnage before the inspectors left the site.

#### 5.0 Exit Interview

The inspectors conducted an exit meeting on August 21, 1992, at Perry 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 of this report. The licensee did not identify any documents or processes as proprietary.