

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-331/84-14(DRP)

Docket No. 50-331

License No. DPR-49

Licensee: Iowa Electric Light and Power Company
IE Towers, P. O. Box 351
Cedar Rapids, Iowa 52406

Facility Name: Duane Arnold Energy Center

Inspection At: Palo, IA

Inspection Conducted: September 26 - November 21, 1984

Inspector: L. S. Clardy *RW DeZanetti*
for

Approved By: *D.C. Boyd*
D. C. Boyd, Chief
Projects Section 1B

12-10-84
Date

Inspection Summary

Inspection on September 26 - November 21, 1984 (Report No. 50-331/84-14(DRP))

Areas Inspected: Routine, unannounced inspection by the resident inspector of licensee actions on previous items; operations; maintenance; surveillance; Licensee Event Reports; IE Bulletins; TMI action items; regional requests; plant trips; and independent inspection effort. The inspection involved a total of 94 inspector-hours onsite by one NRC inspector including 15 inspector-hours onsite during off-shifts.

Results: Of the ten areas inspected no items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

- R. McGaughy, Manager, Nuclear Division
- *D. Mineck, Plant Superintendent-Nuclear
- P. Ward, Director, Nuclear Division
- R. Hannen, Assistant Plant Superintendent-Operations
- C. Mick, Operations Supervisor
- *W. Miller, Technical Support Supervisor
- A. Clason, Maintenance Supervisor
- *J. Vinquist, Assistant Plant Superintendent-Technical Support
- *K. Young, Assistant Plant Superintendent-Radiation Protection and Security
- *J. West, Quality Assurance
- *J. Probst, Technical Support

In addition, the inspector interviewed several other licensee personnel including shift supervising engineers, control room operators, engineering personnel, administrative personnel and contractor personnel (representing the licensee).

*Denotes those personnel present at the exit interviews.

2. Action on Previous Inspection Findings

- a. (Closed) Open Item (331/84-07-01(DRP)): Loctite 242 use on scram pilot solenoid valves. The licensee has added a step to Repair Procedure 5S/i.e.-1 Scram Pilot Solenoids that states "Under no circumstances use Loctite 242 thread sealant." This also closes out General Electric's Part 21 report dated April 13, 1984 and IE Information Notice 84-53: Loctite 242.
- b. (Closed) Open Item (331/84-07-02(DRP)): Anchor Darling valves with anti-rotation devices. The licensee has identified the applicable valves (High Pressure Coolant Injection minimum flow, Reactor Core Isolation Cooling minimum flow, and Reactor Water Clean-up isolation) and corrected the problem. The licensee now indents the collar and uses a pipe sealant on the collar set screws.

No items of noncompliance or deviations were identified.

3. Operational Safety Verification

The inspector observed control room operations, reviewed applicable logs and conducted discussions with control room operators during the inspection period. The inspector verified the operability of selected emergency systems, reviewed tagout records and verified proper return to service of affected components. Tours of reactor building and turbine building were conducted to observe plant

equipment conditions, including potential fire hazards, fluid leaks, and excessive vibrations and to verify that maintenance requests had been initiated for equipment in need of maintenance. The inspector by observation and direct interview verified that the physical security plan was being implemented in accordance with the station security plan.

The inspector observed plant housekeeping/cleanliness conditions and verified implementation of radiation protection controls. During the inspection period, the inspector walked down the accessible portions of the Standby Liquid Control and Diesel Generator systems to verify operability. The inspector also witnessed portions of the radioactive waste system controls associated with radwaste shipments and barreling.

These reviews and observations were conducted to verify that facility operations were in conformance with the requirements established under technical specifications, 10 CFR, and administrative procedures.

No items of noncompliance or deviations were identified.

4. Monthly Maintenance Observation

Station maintenance activities of safety related systems and components listed below were observed/reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards and in conformance with technical specifications.

The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were implemented; and, fire prevention controls were implemented.

Work requests were reviewed to determine status of outstanding jobs and to assure that priority is assigned to safety related equipment maintenance which may affect system performance.

The following maintenance activities were observed/reviewed:

- Startup Transformer 1X3 Inspection and Repair
- High Pressure Coolant Injection Logic Modification
- Fire Protection (Appendix R) Construction Activities
- IE Bulletin 79-14 Reinspection

No items of noncompliance or deviations were identified.

5. Monthly Surveillance Observation

The inspector observed technical specifications required surveillance testing on the High Pressure Coolant Injection and Reactor Core Isolation Cooling systems and verified that testing was performed in accordance with adequate procedures, that test instrumentation were calibrated, that limiting conditions for operation were met, that removal and restoration of the affected components were accomplished, that test results conformed with technical specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

No items of noncompliance or deviations were identified.

6. Licensee Event Reports Followup

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with technical specifications.

- a. (Closed) LER 84-031: Reactor Core Isolation Cooling (RCIC) inoperable. The barometric condenser pump was inoperable due to dirt and grime on the commutator of the pump motor. The commutator was cleaned and the pump and RCIC declared operable. New brushes will be installed on the motor when they are received. The frequency of cleaning and inspection of the commutator and brushes is under review for this and other similar systems.
- b. (Closed) LER 84-032: Standby Filter Unit initiations due to control building air intake radiation monitor failures. The radiation monitors photomultiplier tubes were replaced and tested satisfactorily. The radiation monitors themselves will be replaced with more reliable units.
- c. (Closed) LER 84-033: Electric Fire Pump inoperable for greater than seven days. The pump would not deliver the required flow rate during testing. Maintenance and subsequent operability test took longer than anticipated and the 7 day LCO was exceeded by approximately 30 minutes. This is allowable by Technical Specifications providing a special report is submitted to the NRC. LER 84-033 satisfies the special report criteria.
- d. (Closed) LER 84-035: Secondary containment airlock interlock malfunctions. The airlocks were repaired and access controlled. The licensee is evaluating airlock interlock design and submitting a technical specification amendment request to change the reportability of the item.

- e. (Closed) LER 84-036: Spurious Reactor Water Cleanup system isolations. The licensee is continuing to evaluate methods to correct this problem.
- f. (Closed) LER 84-037: Reactor Scram at less than 1% power during shutdown due to spurious noise on Intermediate range channels.

No items of noncompliance or deviations were identified.

7. IE Bulletin Followup

For the IE Bulletins listed below the inspector verified that the written response was within the time period stated in the bulletin, that the written response included the information required to be reported, that the written response included adequate corrective action commitments based on information presented in the bulletin and the licensee's response, that licensee management forwarded copies of the written response to the appropriate onsite management representatives, that information discussed in the licensee's written response was accurate, and that corrective action taken by the licensee was as described in the written response.

- a. (Closed) IEB 83-07: Fraudulent products sold by Ray Miller, Inc. The licensee has determined that no materials manufactured or supplied by Ray Miller, Inc. are used in safety related applications at DAEC.
- b. (Closed) IEB 84-02: HFA relay replacement. The licensee has completed changeout of all safety related, normally energized G. E. type HFA 51 relays in the Reactor Protection system, Primary Containment Isolation system, Automatic Depressurization system and High Pressure Coolant Injection system. The relays in the Residual Heat Removal System and 4 KV Switchgear will be replaced in the next refueling outage. The normally de-energized relays will also be replaced in the next refueling outage. DAEC's surveillance, and preventive and corrective programs meet the requirements of the Bulletin. This item was also inspected in Inspection Report 331/83-15(DPRP).

No items of noncompliance or deviations were identified.

8. Followup on TMI Action Items

(Closed) Item II.E.4.2.6 Containment Purge and Vent valve operability. NRR accepted the licensee response and closed this item on October 21, 1984 (D. B. Vassallo 10/21/84 letter to L. Liu). Region III closed this item in Inspection Report 331/81-21(DPRP). The licensee must still submit a technical specification change on valve opening angle limitations.

No items of noncompliance or deviations were identified.

9. Followup on Regional Requests

The Region III office requested that a review be done against IE Bulletin (IEB) 80-06 (Engineered Safety Features Reset Controls) requirements and any licensee commitments made in the Safety Evaluation Report for the bulletin. No additional licensee commitments were found during this review. IEB 80-06 was inspected in Inspection Reports (IR) 331/80-11(DPRP), 331/80-15(DPRP) and closed in IR 331/82-01(DPRP).

No items of noncompliance or deviations were identified.

10. Plant Trips

Following the plant trip on November 4, 1984 the inspector ascertained the status of the reactor and safety systems by observation of control room indicators and discussions with licensee personnel concerning plant parameters, emergency system status and reactor coolant chemistry. The inspector verified the establishment of proper communications and reviewed the corrective actions taken by the licensee. The plant was returned to operation on November 11, 1984.

The trip on November 4 was the result of an auxiliary transformer explosion which Westinghouse representatives believe to have been caused by a short between the turns on the "C" phase primary or high side of the auxiliary transformer. In addition to destroying the auxiliary transformer, the explosion damaged the insulators on the start-up transformer which sits adjacent to the auxiliary transformer (even though they are physically separated by a concrete shield wall, the 161 KV insulators are above the height of the shield wall). This caused the start-up transformer to trip off line. The start-up transformer normally supplies power to essential loads and backup power to non-essential loads. Therefore, when it tripped off-line, the essential loads shifted as designed to the stand-by transformer and non-essential power was lost. This caused a turbine control valve fast closure which resulted in the reactor trip. The diesels started as designed, but were not required to pick up load. All Emergency Core Cooling Equipment and Safe Shutdown Equipment had power and the plant had the capability to achieve cold shutdown.

The licensee took appropriate actions in classifying the event and making applicable notifications. Some notifications were delayed because the power to the Emergency Notification Systems (ENS or red phone) was lost. The resident inspector responded to the event when notified.

The licensee fire brigade responded promptly and was able to extinguish the fire; the deluge system had contained the fire. Off-site agencies responded but were not required. Control room operators were not aware of the fire immediately but only knew they had lost all essential power and that the reactor had tripped. The control room operators were quick and effective in diagnosing the problem and placing the plant in a safe

condition. The operators manually started the High Pressure Coolant Injection system and the Reactor Core Isolation Cooling system before water level reached the double-low setpoint.

The start-up transformer was inspected and repaired. The diesel generators were inspected for supercharger impeller damage (there was none), and the main generator and main transformer also were inspected for damage (there was none). The plant returned to service on November 11, 1984.

Additional items which were evident after the event were as follows:

a. Loss of ENS Capabilities

The ENS phones are powered by non-essential power at DAEC. This item was previously inspected as part of IE Bulletin 80-15 and closed in Inspection Report 50-331/80-13. At that time the ENS power was verified to be supplied such that a loss of off-site power or a loss of non-essential power would not effect operation of the ENS. Resolution and correction of this problem is an Unresolved Item (331/84-14-01).

b. Cooldown Rate

The licensee experienced a cooldown rate in excess of 100° F per hour after the event at the bottom head drain. The licensee had promptly commenced a cooldown log and maintained both loops and the reactor vessel shell and reactor bottom head within cooldown limits. However in an effort to maintain control rod drive seal cooling and prevent degradation of the seals a control rod drive pump was not secured.

This allowed the bottom head to cool down faster than the normal cooldown limit. Discussions with the licensee and General Electric indicate the cooldown is not a problem since the normal cooldown rate is based on shell to top head flange stresses and that the normal cooling rate may be exceeded during emergency conditions.

The final resolution on the priority of seal cooling or the transient cooldown rate and the dissemination of the information to the operators is an Open Item (50-331/84-14-02).

c. The licensee's corporate staff routinely receives information letters from Westinghouse similar to General Electric's Service Information Letters (SIL). After reviewing these letters, the corporate staff determines if they might be applicable to the site and if so, sends them to DAEC.

One such letter was received approximately six months prior to the event which stated that the oil pumps in the transformers be secured when the transformers were secured. This action could help prevent an insulation breakdown. The site received this letter when it was issued and instituted the policy. The corporate office has received

no other letters pertaining to the transformers. However, to preclude the possibility of the site not receiving some applicable letters in the future, the maintenance supervisor has requested that he be placed on permanent distribution for Westinghouse information letters.

- d. During the event the licensee lost lighting and power in many areas of the plant. Two areas which are of particular concern are the power to some Radiation Protection equipment (this concern has been forwarded to Region III Health Physics personnel), and power to the Technical Support Center (TSC). The licensee is evaluating methods to correct both items. The resolution of loss of non-essential power resulting in loss of power to the TSC is an Open Item (50-331/84-14-03).

- e. Transformer Shield Walls

The startup transformer is located directly beside the auxiliary transformer. As a precaution, and to prevent an event at one transformer from damaging the other transformer, the licensee had built a concrete wall between the two transformers. This wall was not required by regulations but because of it the startup transformer was not damaged by the explosion of the auxiliary transformer. The licensee now is evaluating installing similar walls at other locations for personnel and equipment protection.

- f. Transformer Testing

Based on a review of records and discussions with licensee personnel it was determined that the licensee had been performing all required preventive and corrective maintenance on the auxiliary and other transformers. The catastrophic failure experienced is not predictable or preventable by presently known or used maintenance and inspections.

The startup and operation of the plant without the auxiliary transformer was reviewed by NRR, Region III, and the licensee against 10 CFR 50 Appendix A, General Design Criteria 17. It was determined by each group that the licensee met Criteria 17 and that no unreviewed safety question existed.

No items of noncompliance or deviations were identified.

- ii. Independent Inspection Effort

- a. Use of Corn Oil in Mask Fit Testing

The inspector was questioned by the licensee if corn oil was an acceptable substitute for DOP in mask fit testing.

The inspector discussed the item with Region III specialists and determined that corn oil was an acceptable substitute. This information was passed on to the licensee.

b. T-ASCO Scram Pilot Solenoid Valve Failures

The inspector verified that the licensee does not use T-ASCO scram pilot solenoid valves. These valves use a polyurethane material which becomes adhesive above 150° F and causes the valve stem to stick. This can result in hesitation or failure of control rods to scram.

c. Site Demonstration

On November 17, 1984, a site demonstration was held by the Iowa Socialist Party as part of a Karen Silkwood demonstration against nuclear power and nuclear arms. The demonstrators were also in the Cedar Rapids area to protest local businesses. The licensee took adequate and appropriate measures to compensate for the event. The demonstration was peaceful and the local law enforcement agencies were aware of the event. The demonstrators were not allowed on the owner controlled area.

No items of noncompliance or deviations were identified.

12. Exit Interview

Due to the length of the inspection and the diversity of areas inspected, exit interviews were conducted on a weekly basis between the NRC inspector and the appropriate licensee personnel. In each case the scope and findings of the individual inspection areas were summarized.