U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-331/92015(DRS)

Docket No. 50-331

License No. DPR-49

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

Facility Name: Duane Arnold Energy Center

Inspection Conducted: June 1 - 19, 1992

Inspectors:

Salehi

Approved By:

Burgess, Chief Operational Programs Section

7/29/R Date 7/29/92

7-28-9

Date

Inspection Summary

Inspection conducted June 1 through June 19, 1992 (Report No. 50-331/92015(DRS))

<u>Areas Inspected</u>: Routine, announced safety inspection of the engineering and technical support program including modifications and design changes (IP 37700).

<u>Results</u>: Two open items, two unresolved items, three Licensee Event Reports (LER's), and one violation were closed. Two violations were identified. One of the violations related to a lack of procedural control over the control room chillers. Because the licensee's corrective actions were also reviewed and found acceptable, no response from the licensee is required for this violation. The other violation was for failure to follow procedures for updating drawings. An unresolved item was identified concerning the lack of a 10 CFR 50.59 safety evaluation for the replacement of control blades with those of a different type.

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Licensee initiatives to increase staffing in engineering, reduce the engineering backlogs, and improve training for the engineering organization were noted. Strengths were noted in the experience level of the engineers that were hired and the involvement of the engineering staff in operation of the plant. The modification and design change program was found to be adequate. Licensee reviews of deficiencies and industry notifications were found to be good. The licensee's selfassessment efforts through quality assurance and with regards to 10 CFR 50.59 safety evaluations were considered good.

DETAILS

1. <u>Persons Contacted</u>

Iowa Electric Light and Power Company

J. Franz, Vice President - Nuclear Division M. Flasch, Manager - Engineering B. Bernier, Mechanical Engineering Supervisor P. Bessette, Regulatory Communications Supervisor J. Bjorseth, Assistant Operation Supervisor C. Bleau, System Engineering Supervisor C. Bock, Group Leader - System Engineering T. Browning, Supervisor - Licensing J. Edom, Reactor & Computer Reference Supervisor J. Gushur, QA Engineer G. Hawkins, Group Leader - System Engineering J. Hennings, Systems Performance Engineer J. Kozman, Configuration Control Supervisor B. Lacy, Program Manager - Planning D. Lausar, Project Engineering Supervisor T. Lenaghan, Project Engineering J. Loehrlein, Supervisor - Engineering L. Mattes, Corrective Action Staff M. McDermott, Maintenance Superintendent G. Middlesworth, Assistant Plant Superintendent W. Miller, Supervisor - Engineering R. Peterson, Group Leader - System Engineering K. Peveler, Manager - Corporate Quality Assurance (QA) R. Potts, Procedures Supervisor K. Putnam, Technical Support Supervisor D. Robinson, Regulatory Communications Staff A. Roderick, Supervisor - Test & Surveillance R. Salmon, Nuclear Staff N. Sikka, Electrical Engineering Supervisor S. Swails, Manager - Nuclear Training J. Thorsteinson, Assistant Plant Supervisor, **Operation Supervisor** K. Young, Manager - Nuclear Licensing

U. S. Nuclear Regulatory Commission (NRC)

T. Martin, Deputy Director, Division of Reactor Safety B. Burgess, Chief, Operational Programs Section M. Parker, Senior Resident Inspector

All of the above individuals attended the exit meeting conducted on June 19, 1992. The inspectors also contacted and interviewed other licensee and contractor personnel during the course of this inspection.

Licensee Action on Previous Inspection Findings

- (Closed) Open Item (50-331/89018-01(DRS)): This item a. concerned the entry of items into the licensee's Preventive Maintenance Action Request (PMAR) database. Specifically, the Control Rod Drive (CRD) low suction trip time delay relay for each CRD pump was not periodically tested by a PMAR. The inspector verified through a computer search of PMARs that the relays had been added to the preventive maintenance program. The licensee also had revised Maintenance Department Procedure (MD) 25, "Post Maintenance Testing Program," to assign responsibilities and to clarify the requirements for PMAR identification and implementation. The appropriate system engineer has the responsibility for recommending preventive maintenance required for any equipment added or modified. This item is considered closed.
 - (Closed) Open Item (50-331/89018-02(DRS)): This item concerned the timeliness of processing documentation for modifications. It was identified that eight months were required to process the final closure of a Design Change Package (DCP) and that the controlled procedures in the plant library were not updated in a timely The timeliness problem was attributed by manner. licensee management to lack of resources. A closure group and a configuration control group had been established to reduce the backlog. A decreasing backlog trend was noted during this inspection. In addition, the licensee instituted goals of updating the controlled procedures in the control room, plant library, and simulator within one working day and other controlled procedures throughout the plant within one working week from receipt by plant operations. This item is considered closed.

(Closed) Unresolved Item (50-331/90003-14): This item concerned both control room chillers being out of service at the same time. The inspectors reviewed licensee's correspondence and actions to improve the control for having both control room chillers out of service and control room doors being open for cooling. An engineering study, dated December 31, 1990, concluded that with the Standby Filter Units (SFUs) operating in the recirculation mode, at least one chiller would be needed to maintain control room habitability. The Updated Final Safety Analysis Report describes main control room ventilation including recirculation air conditioning as part of an engineered safety features system. Based on this study, the licensee took several actions including extensive

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overhaul and improvements to the chiller units to improve their reliability. By special order No. 91-37 dated November 15, 1991, the licensee implemented administrative controls to address control room chiller operability when SFUs were required to be operable. The inspectors considered these actions effective; there have been no instances where both chillers have been out of service in the past two years. Prior to special order No. 91-37, both control room chillers could be taken out of service without consideration for their support function for the control room ventilation Technical Specification (TS) 6.8.1.1 requires system. procedures to govern the normal operation and shutdown of systems and components involving nuclear safety. The failure to have control regarding the operability of a safety related system, the control room chillers, is considered a violation of T.S. 6.8.1.1. (50-331/92015-01(DRS)).

The safety significance of both control room chillers being out of service was small. The longest period identified with both chillers out of service was 6 hours, well within the standard Technical Specifications requirement of 12 hours to shut down the The licensee had pursued resolution of this plant. issue with the NRC and implemented administrative controls where practical. Because of the actions taken and their effectiveness, no response to the violation is required and this item is closed.

(Closed) Unresolved Item (50-331/91017-01): The original licensee review of General Electric (GE) Service Information Letter (SIL) 475 did not address the issues raised by the SIL. The SIL addressed potentially nonconservative high steam flow analytic limits in the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems. The licensee reviewed the SIL again and determined that the existing setpoints were adequate. However, the licensee planned to change their setpoints to provide additional margin. The inspectors determined that, in general, licensee review of SILs was adequate. This item is considered closed.

(Closed) Licensee Event Report (LER) 90-005 (50-331/90005-LL): This item concerned failure to calibrate core flow against recirculation flow. Between initial startup and 1990, the licensee did not calibrate core flow against the recirculation flow after every refueling outage as recommended by GE. As a result, in 1990, the licensee noted that a 4.1% deviation had accumulated between these two signals.

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Comparison between these two signals is used by the computer for power distribution calculations and determinations of thermal limits. The Process computer compares this deviation with an allowable 5.0% deviation which triggers an alternative method of calculating thermal limits. Therefore, the impact of this deviation (4.1%) for determination of thermal limits is insignificant. The deviation was corrected in a special test procedure in 1990. In addition, the licensee incorporated this cross-calibration check into a refuel surveillance procedure. The inspectors found the corrective actions to be adequate. This item is considered closed.

(Closed) LER 90-018 (50-331/90018-LL) and Violation (50-331/90020-01): Operating the reactor in the restricted area of the power to flow map. This occurred in a single loop operation following a "B" pump trip on October 3, 1990. The root cause was inadequate calibration of the core flow instrumentation. Prior to the event, instrument calibration practices did not require the instrument technician to record the as-left offset from the calibration standard. Omission of this offset lead to a non-conservatively set flow instrument. Several corrective actions were implemented including procedural changes, training of technicians, and generating check-off forms that require the technicians to compare previous calibrations and to record the existing offset. The inspectors' review of the corrective actions found them to be adequate. This item is considered closed.

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g. <u>(Closed) LER 92-001 (50-331/92001-LL)</u>: This concerned a potential loss of vessel level instrumentation under high drywell temperature conditions. The licensee identified the concern while conducting design basis reconstitution work on instrument setpoints. The review determined that the reactor triple low water level trip, and the HPCI and RCIC systems automatic high water level trips may not have functioned under high drywell temperature conditions.

Short term corrective actions consisted of reducing the HPCI and RCIC high level trip setpoints, to ensure the trips would occur at the proper level. The licensee also operated with half the high level trip logic tripped until the February 1992 refueling outage. To reduce the effect of high temperatures, the licensee re-routed the Reactor Pressure Vessel (RPV) level instrumentation variable leg and reduced its total

length inside the drywell from 66'1" to 38'1". The high level trip setpoint calculation was reviewed and existing setpoints were found to have sufficient margin for instrument drift and conservatism.

The licensee subsequently re-calibrated the affected level instruments to a new setpoint which included a correction factor for the temperature conditions. Additional details were provided in the Inspection Report No. 50-331/92003(DRP). This LER is considered closed.

3. Engineering Management

The inspectors reviewed tracking system information, interviewed staff and observed work. They also discussed with licensee management a number of significant initiatives taken in the last few years. The most significant was the increased engineering staff. The increased staff decreased the engineering work backlog. Specifically, the inspectors assessed the following:

- a. <u>Backlog</u>: The engineering work backlog included closure of modification packages that dated back to 1989, some old engineering work requests (EWRs), and an increasing number of drawing revisions. Engineering managers were aware of backlog trends, hired temporary staff to revise drawings, and assigned resources to close modification packages and EWRs. The inspectors' review of the backlog work did not identify any safety-related concerns.
- b. <u>Staffing</u>: Staffing was increased and the use of overtime met NRC guidelines as indicated by only occasional approvals for deviations. Based on interviews and observations, no concerns were identified with individual workloads. The recently hired engineers had considerable experience and knowledge.
- c. <u>Trending</u>: The trending program was reviewed with the system engineering performance group. Several improvements were noted such as increased staffing, consolidation of all site trending, and refinements in information processing. Trending received management attention, however, the inspector's did not assess trending effectiveness.
- d. <u>Technical Support</u>: The engineering staff participated in daily planning meetings to discuss work status. Another important element of engineering involvement was the use of Shift Technical Advisors (STAs) as part

of the system engineering organization. The STAs served as engineering representatives in the control room providing operations staff with access to engineering assistance. The STAs also provided the engineering staff with daily reports of plant status and issues as they develop.

e. <u>Other Initiatives</u>: The licensee had taken actions to enhance the professional attitudes of the staff by clearly establishing expectations, standards, and accountability. Several other initiatives had been started including power systems analysis enhancements, formalization of introductory engineering staff training, and a top 10 priority list of issues. In an effort to improve drawing accuracy and revision timeliness, the licensee was close to implementing a computer assisted design (CAD) system for drawing revision, storage and retrieval. The licensee also had a design basis development project.

4. <u>Training</u>

This inspection examined the licensee's training program for engineers and supervisory personnel. It included a review of the following:

- development of an engineering training organization in the Design Engineering department,
- a "qualification card" system for specifying training requirements,
- a training matrix to be completed in the future,

The inspectors questioned the status of development of functional descriptions for different staff positions in the engineering organization. The licensee had not developed the functional descriptions. During inspection of the licensee's training program and the LER related to single loop operation, two problems were noted:

a. <u>Training Material for the single loop operation Issue</u>: The inspectors examined the training material used for the potential reactor power oscillation and instability issue associated with single loop operation. The training was lacking because it did not address the potential impact of a feedwater heater transient on power oscillations. The inspectors verified this



training deficiency by interviewing a reactor operator and by review of the lesson plans. The licensee acknowledged this weakness and augmented the training material during the inspection. The inspectors considered the augmented training material to be adequate.

Training on Design Change Packages: To release a b. modification for operation, prior to completion of the DCP closure, the licensee used a partial closure process that assured all revisions to procedures, drawings, and training had been completed. Inspectors noted that training update signature requirements were oriented towards procedures such that modifications that did not require a procedure revision might not be subject to appropriate training. This problem attributed to the DCP sign-off process, which excluded the training supervisor. The example noted was in regards to pressure indication on the HPCI lube oil system, however this was not considered significant. The licensee agreed to review this part of the DCP closure process.

5. <u>Modifications (37700)</u>

- The inspectors reviewed five DCPs and six temporary modifications. Based on this review, the inspectors found the licensee's program for performing and controlling modifications and design changes to be adequate.
- a. <u>DCP 1488</u>: Fire protection sensing line modifications in the HPCI and RCIC rooms (LER 89-014). The modification included an increase in the temperature initiation setpoint from 160°F to 212°F, elimination of the rate of rise detectors, and added sprinkler head detectors. The inspector reviewed the 10 CFR 50.59 safety evaluation and walked down the installed sensing lines. No technical or safety concerns were identified.
- b. <u>Control Blade Replacement:</u> Modification DCP 1490 replaced four Duralife-230 control rod blades with the B_4C blades during 1990 refueling outage. The licensee replaced an additional 32 Duralife-230 control rod blades with the B_4C blades during 1992 refueling outage. Although similar to DCP 1490, this replacement was apparently performed outside of the modification process. Another 10 CFR 50.59 safety evaluation was not performed for the replacement of the additional 32 control rod blades. The licensee's rationale for not performing a safety evaluation was that the safety evaluation performed for the four control blades under

DCP 1490 resulted in no effect and that the NRC had accepted the new type of control blade as one-for-one replacements for the old blades on a generic basis. The failure to perform a 10 CFR 50.59 safety evaluation for the replacement of the additional 32 control blades is considered an unresolved item pending further NRC review (50-331/92015-03).

c. <u>DCP 1512</u>: This modification replaced scram relays as recommended by GE SIL 508. The inspectors determined that the seismic evaluation had not been fully documented in the modification package. The licensee agreed to revise the documentation. The inspectors noted that, in a separate initiative, the licensee had already improved the seismic evaluation process by designating a structural engineer to review seismic evaluations for modifications and to document the results.

- d. <u>DCP 1526</u>: This modification affected the HPCI and RCIC steam line high flow isolation setpoints, the instrumentation for HPCI low flow indication, and the HPCI turbine lube oil tank high and low level instrumentation. The inspectors' review focused on the steam line high flow isolation setpoint changes. No concerns were identified.
- e. <u>DCP 1531</u>: This DCP rerouted RPV level instrumentation variable leg piping to reduce instrument errors for the narrow range vessel level instruments under high drywell temperature conditions (see paragraph 2.g). The level inaccuracy was created when GE recommendations were implemented by DCP 1404 in 1988. The licensee had performed appropriate and adequate post modification testing and setpoint calculations. No significant findings were noted.
- f. <u>Temporary Modifications</u>: The licensee's program for controlling Temporary Modifications (TMs) was, in general, considered adeguate based on a review of six safety-related TMs. One violation for failing to follow procedures with respect to updating drawings was identified.

TMs were controlled under Procedure 1410.6, "Temporary Modification Control," Revision 1 effective March 3, 1992. This program included lifted leads, jumpers, temporary power, mechanical modifications, and installation of test equipment. The licensee's program had special controls (i.e., written justifications and updated control room drawings), for TMs which were in place in excess of 3 months (extended TMs) or those which required 10 CFR 50.59 safety evaluations. Two positive aspects were noted in that over 1700 drawings were used as control room drawings and the effects of TMs were incorporated into updated control room drawings instead of having the drawings merely annotated.

At the time of this inspection, 58 TMs were in place, 38 of which were extended TMs. Twenty-six TMs had been in place over one year with the oldest being in place almost three years. Most of TMs were nonsafetyrelated. The licensee concentrated on closing older TMs and extended temporary modifications including actions required to close them.

Procedure 1410.6, "Temporary Modification Control," Revision 0, effective June 8, 1990, required the control room drawings to be updated for extended TMs. The updating was to be accomplished by marking up and stamping the drawings and forwarding a "Temporary Modification As-Built Notification Letter" to the Advanced Information Drawing System (AIDS) coordinator for updating drawings outside the control room. The engineering staff relied upon the AIDS updated drawings for current information on plant configuration. One violation with two examples of failure to follow this procedure was identified as follows:

1. TMs 90-664 and 90-665 lifted the leads to two differential pressure switches on November 8, The differential pressure switches were 1990. used to detect backflow from the standby gas treatment system into the turbine building and to close ventilation dampers accordingly. TM 90-664 and 90-665 were upgraded to extended TMs on June 21, 1991 and June 26, 1991, respectively. However, no "Temporary Modification As-Built Notification Letter" was transmitted to the AIDS coordinator when either TM was upgraded. Consequently, sheet 64 of drawing BECH-E-113, "Heating and Ventilation Systems," was not updated outside of the control room to show that the two differential pressure switches had been disconnected. 10 CFR 50, Appendix B, Criterion V required, in part, that activities affecting quality shall be prescribed by procedures and shall be accomplished in accordance with these The failure to follow procedure procedures. 1410.6 to update the drawing via AIDS is considered an example of a violation of 10 CFR 50, Appendix B, Criterion V (50-331/92015-04a).

Extended TM 91-314 installed orifices in the control air lines for two control valves on May 15, 1991. The orifices were installed to improve control valve reliability. However, the applicable piping and instrument drawing (P&ID), drawing BECH M-137, "Radwaste Sump System," was not updated because the responsible engineer considered the orifice to be below the level of detail necessary for the control room operators. Criterion V of 10 CFR Section 50, Appendix B, required, in part, that activities affecting quality shall be prescribed by procedures and shall be accomplished in accordance with these procedures. The failure to follow procedure 1410.6 to update the drawing via AIDS is considered another example of a violation of 10 CFR 50, Appendix B, Criterion V (50-331/92015-04b).

Based on the NRC's findings, the licensee audited their active extended TMs for proper updating of the drawings. Of the 33 extended TMs, 22 specified affected drawings. Drawings had not been properly updated for 18 extended TMs. The inspectors' review sample included three of the four safety-related TMs in which drawing update problems were identified. The licensee began to update the drawings during the inspection.

6. <u>Deficiency Evaluations and Industry Notification Reviews</u>

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Deficiency report evaluations, root cause analyses, and reviews of generic information were performed by the licensee's technical support staff. In general, the inspectors considered the reviews to be thorough.

Ten deficiency report evaluations, completed during 1991 and 1992, were reviewed and found acceptable. Root cause analysis (RCA) 91-018 was reviewed and found to be acceptable. The RCA was performed to address recurrent problems with closure times for a containment isolation control valve. The analysis traced the problem to in-line oilers which were causing the solenoid valves in the control air lines to stick. The in-line oilers were subsequently removed. No similar problems had been identified since the RCA had been performed.

The licensee's review of NRC Information Notices (IN's) 91-13 and 92-16 were evaluated and found acceptable. The inspectors noted that the licensee review of IN 92-16 addressed the pertinent issues even though the IN was not directly applicable to boiling water reactors (BWRs). Two Licensee reviews of generic information from General Electric, SIL's 536 and 062, were evaluated and found to be acceptable.

7. <u>Self Assessments</u>

a. <u>Quality Assurance</u>: The inspectors reviewed the effectiveness of the Quality Assurance (QA) activities applicable to engineering. The inspectors noted several examples of effective oversight by the QA program; although one example was found where the QA program failed to identify a problem with adherence to procedures in an area which had been audited. Safety evaluations were notably improved as a result of changes implemented because of audit findings.

The licensee's QA program included the Supplier Deviation Disposition Request (SDDR) program. This program identified several quality concerns related to vendors. An example was SDDR 90-018, generated because GE had lowered the safety classification of new control rod blade pins and rollers. The licensee and GE agreed that although the lower safety classification was inadvertent, the pins and rollers were not safetyrelated. The inspectors concluded that this issue did not have safety significance.

The annual QA audits of safety evaluations were thorough. The 1990 audit identified safety evaluations were not complying with NSAC-125, "Guidelines for 10 CFR 50.59 Safety Evaluations". The inspectors noted the 15-month delay in the design engineering response to the 1990 QA findings. The delay was the result of management decisions; however, the QA organization appropriately issued Corrective Action Request (CAR) 92-01 to end the delay. The inspectors reviewed the responses and corrective actions for the CAR 92-01 and considered them to be appropriate and adequate.

With regard to the audit findings, the licensee had implemented new procedures and training for performing 10 CFR 50.59 safety evaluations which followed the NSAC-125 guidelines. The inspectors reviewed four safety evaluations which had been performed using the new procedures and noted a significant improvement in their guality. Audit I-91-13, conducted during July and August of 1991, included temporary modifications as part of a review of design changes, modifications, and safety evaluations. The audit failed to identify the problem with drawings not being updated as specified by the temporary modifications procedure. (See paragraph 5.f.)

b. Engineering Self-Assessment

The licensee recently initiated an engineering self assessment program. A number of actions were taken including formation of the Engineering Self-Assessment Committee, assignment of responsibilities to the committee members, and scheduling of milestones. The programs effectiveness could not be measured at this time.

8. <u>Unresolved Items</u>

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during this inspection is discussed in paragraph 5.b.

9. <u>Exit Meeting</u>

The inspectors met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection on June 19, 1992. The inspectors summarized the scope and findings of the inspection. The licensee acknowledged the statements made by the inspectors. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection and the licensee did not identify any such documents or processes as proprietary.

