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REGION III

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Report No. 50-331/97012(DRP)

Licensee: IES Utilities Inc.
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Facility: Duane Arnold Energy Center

Location: Palo, Iowa

Dates: July 18 - August 21, 1997

Inspectors: C. Lipa, Senior Resident Inspector
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Approved by: Michael J. Jordan, Chief
Reactor Projects Branch 5

EXECUTIVE SUMMARY

Duane Arnold Energy Center
NRC Inspection Report No. 50-331/97012(DRP)

This inspection report included aspects of licensee operations, engineering, maintenance, and plant support. The report covered a 5-week period of resident inspection.

Operations

- The inspectors determined that the conduct of operations' personnel was professional, with appropriate focus on safety. The operations staff performed thorough turnovers and personnel were knowledgeable of plant conditions. The licensee routinely maintained the control room in a "blackboard" condition. (Section O1.1).
- The inspectors determined that licensee performance in the areas of procedure adequacy and adherence had improved over that observed several months ago. However, the inspectors identified one concern with an emergency operating procedure that was not corrected in a timely manner. This was an example of a violation. (Section O3.1).

Maintenance

- Work activities were well controlled, properly pre-planned, and effectively performed. (Section M1.1).
- The licensee identified an additional example where a surveillance test did not meet current technical specification requirements (see Inspection Report 50-331/97010 for three other examples). This issue was identified as part of the Improved Technical Specification implementation project. The identification and resolution of the problems were considered a positive effort. (Section M1.2).
- In general, the inspectors concluded that repair efforts for emergent issues were prompt and well coordinated. (Section M2.1).

Engineering

- The inspectors were concerned that the control building chillers experienced several failures. Engineering personnel provided appropriate support to resolve problems as they occurred. However, a decision by engineering personnel to delay planned preventive maintenance may have resulted in one of the failures. (Section M2.1).
- The inspectors identified that engineering personnel did not promptly correct the condition or provide an operability evaluation when loose pipe supports on emergency diesel generator fuel oil supply piping were identified in May 1996. This was an example of a violation. (Section E1.1).

Report Details

Summary of Plant Status

The plant began this inspection period at 100 percent power. On July 20, 1997, the plant was reduced to approximately 60 percent power for two shifts to repair a steam leak on the moisture separator reheater drain tank manway cover. With the exception of a power reduction for turbine valve testing, the plant was operated near full power for the remainder of the inspection period.

I. Operations

01 Conduct of Operations

01.1 General Comments (71707)

The inspectors conducted frequent reviews of plant operations. This included observing routine control room activities, attending shift turnovers, test briefings and crew briefings, and performing panel walkdowns. Plant and operations management provided good oversight of activities. The conduct of operations was professional, with appropriate focus on safety. The operations staff performed thorough turnovers and personnel were knowledgeable of plant conditions. The licensee routinely maintained the control room in a "blackboard" condition (no annunciators were lit). The inspectors noted that one procedure was not corrected in a timely manner as discussed in Section O3.1.

03 Operations Procedures and Documentation

03.1 Emergency Operating Procedure (EOP) Not Revised in a Timely Manner

a. Inspection Scope (71707)

The inspectors reviewed operations department procedures for adequacy. Operators' use of procedures was evident and procedure quality was acceptable in most cases. In general, the licensee's performance in the areas of procedure adequacy and adherence had improved from the performance noted in Inspection Reports Nos. 50-331/97011, 97009, and 97007. However, the inspectors had a concern with an emergency operating procedure.

b. Observations and Findings

On July 21, 1997, the inspectors identified that engineering department recommendations to correct deficiencies in procedure EOP-3 "Secondary Containment Control," dated November 2, 1994, had not yet been implemented. Engineering personnel had reviewed setpoints used for maximum normal operating water levels in secondary containment. The licensee determined that the setpoint values should be revised from 6 inches to 1 inch for the high pressure coolant

injection system room and corner rooms, and from 6 inches to 3 inches for the reactor core isolation cooling system room. The inspectors identified that the original values were still in use for the EOP-3 entry condition. The actual equipment setpoints and annunciator response procedures also used the original values.

The inspectors were concerned that the engineering department recommendations had not been implemented after almost 3 years. The original values were less conservative than the new values resulting in a longer time delay in the annunciator alerting the operator. Thus this could have resulted in delaying operator response to flooding in the secondary containment. A delay in the operators response could have resulted in insufficient time for the operators to take action to stop or reduce the flooding with the resulting loss of safety related equipment. The licensee explained that the changes were given low priority in 1994 and were part of a backlog of Priority 9 maintenance actions. (Priority 9 is the lowest priority assigned to maintenance actions at DAEC.) The failure to promptly correct the entry conditions for EOP-3 was an example of a violation of 10 CFR 50, Appendix B, Criterion XVI (50-331/97012-01(DRP)).

The inspectors also reviewed the remainder of items in the Priority 9 backlog to determine whether any other items may have been inappropriately prioritized. The inspectors found no other specific concerns. The Quality Assurance Department had also recently raised a similar issue and efforts had been initiated to review other Priority 9 maintenance actions in detail.

c. Conclusions

The inspectors determined that licensee performance in the areas of procedure adequacy and adherence had improved over that observed several months ago. However, the inspectors noted one concern with an emergency operating procedure that was not corrected in a timely manner.

07 **Quality Assurance in Operations**

07.1 Licensee Self-Assessment Activities

a. Inspection Scope

During the inspection period, the inspectors reviewed multiple licensee self-assessment activities, including:

- Action Request Screening Meetings
- Safety Committee Meetings
- Operations Committee Meetings

b. Observations and Findings

The inspectors observed active management participation at the meetings. Identified deficiencies were tracked by the licensee's Action Request process. As discussed in Sections O3.1 and E1.1, the inspectors did have two concerns with the timeliness of corrective actions for identified deficiencies.

c. Conclusions

The inspectors concluded that the self-assessment activities observed were generally effective; however, in two instances, corrective actions were not promptly implemented. See Sections O3.1 and E1.1 for details.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707) (61726)

The inspectors observed and/or reviewed all or portions of the following work activities. The inspectors also reviewed applicable portions of the technical specifications and the UFSAR.

- Core spray simulated automatic actuation surveillance, STP 45A002A
- Residual heat removal service water flow transmitter calibration
- Reactor water level transmitter calibration, STP 42B001-Q,M
- Standby diesel generator monthly surveillance, STP 48A001-Q
- Local power range monitor calibration, STP 41A015
- Core spray suction pressure indicator calibration
- Core spray motor operated valve test
- Reactor core isolation cooling turbine exhaust pressure indicator calibration
- High pressure coolant injection quarterly surveillance

b. Observations and Findings

Maintenance and surveillance activities were performed satisfactorily. The inspectors observed that work packages were complete, approved procedures were used, and activities were conducted using sound maintenance practices. In particular, the complex core spray and high pressure coolant injection (HPCI) surveillances were properly controlled and effectively coordinated between maintenance and operations personnel.

c. Conclusions

The inspectors concluded that work activities were properly pre-planned, effectively performed, and well controlled.

M1.2 Inadequate Technical Specification Surveillance

a. Inspection Scope (61726)

On July 24, 1997, the licensee informed the inspectors that a TS surveillance test requirement was not properly completed. The inspectors reviewed the TS requirements and verified that the licensee met the applicable TS action statement.

b. Observations and Findings

The licensee had initiated a review of the Improved Technical Specification (ITS) surveillance requirements as part of the project to implement ITS by early 1998. As discussed in Inspection Report 50-331/97010, through this effort, the licensee identified three cases where surveillance tests were inadequate. During this inspection period, the licensee identified an additional case, as discussed below.

The licensee identified that the surveillance test procedure for the channel functional test required by TS Table 4.2-A for the reactor water cleanup area differential temperature isolation did not correctly test the channel. The cause appeared to be confusion over the applicability of a special footnote in TS. The surveillance procedure did not require the standard "channel functional test" as defined by TS to be performed. When this issue was discovered, the licensee promptly entered the applicable limiting condition for operation (LCO), revised the procedure, and successfully retested the channel. Additionally, the licensee submitted Licensee Event Report 50-331/97009 to document the root cause and corrective actions. This issue will be reviewed as part of the closure of unresolved item 50-331/97010-03, which discusses the other three examples of inadequate surveillances.

c. Conclusions

The inspectors concluded that the licensee demonstrated effective self-assessment in the identification of the inadequate surveillance test. The equipment performed properly when tested and the safety consequence was minor.

M2 Maintenance and Materiel Condition of Facilities and Equipment

M2.1 Plant Materiel Condition

a. Inspection Scope

The inspectors noted that there were several emergent equipment issues during the report period. Several issues were of concern because the equipment problems resulted in distractions to operators or the need to enter an LCO. In each case, the inspectors observed appropriate licensee response in repairing the equipment and determining the root cause.

b. Observations and Findings

Emergent equipment issues that occurred during the report period are discussed below:

- On July 17, 1997, the "A" control building chiller tripped on high discharge pressure. The 30-day LCO was exited on the second day when repairs were completed. (AR 971839)
- On July 23, 1997, the "B" control building chiller tripped on high discharge pressure during a special emergency service water surveillance test. The emergency service water flow rate had been reduced to the ASME (American Society of Mechanical Engineers) reference value; however, this flow rate could not support existing chiller loads. A 30-day LCO was entered, which was exited 9 hours later. (AR 971848)
- On July 27, 1997, the "B" chiller was declared inoperable when operators identified an oil leak. The cause was determined to be a leaking fitting, which was successfully repaired. A root cause determination was expected to be completed within 90 days. (AR 971893)
- On August 1, 1997, the "A" reactor building radiation monitor (RM 7606A) failed a test and was declared inoperable. A group 3 containment isolation was inserted to meet TS requirements. The monitor was successfully repaired and the LCO was exited the following day. (AR 971916)
- On August 6, 1997, the "A" control building chiller tripped on high discharge pressure. Engineering personnel determined that maintenance was required on the three-way valve in order to resolve the problem. The plant was in an LCO for 10 days of the 30 days allowed by TS for this maintenance. As discussed below, the inspectors were concerned that this trip may have been prevented by performing preventive maintenance (PM) at the original frequency. (AR 971919)
- On August 14, 1997, a failed relay caused an engineered safety features actuation. Containment isolation valves in groups 2 and 4 received isolation signals. Also, power was lost to the drywell sump isolation valves. The operators entered a 24 hour LCO for the inoperable drywell sump system. The inspectors verified that equipment responded as expected and that TS requirements were met following the engineered safety features actuation. The event was appropriately reported to the NRC according to 10 CFR 50.72, the relay was promptly repaired, and the system was restored to normal within 8 hours. The licensee planned to submit a Licensee Event Report. (AR 972050)

- On August 17, 1997, the licensee identified increasing reactor conductivity. Subsequent testing indicated that a condenser tube leak was the likely cause. Plans were made to bring the plant to a cold shutdown condition for repair, beginning on August 22.
- On August 18, 1997 the "B" control building chiller tripped on low oil pressure. A 30-day LCO was entered. Several components were repaired and engineering personnel had determined a potential root cause of the trip. A more detailed root cause determination was expected by September 19, 1997. The LCO was exited on the 9th day after the chiller was repaired and tested satisfactorily. (AR 972058)

As discussed above, there were five instances during the report period when one of the two control building chillers was rendered inoperable. Each instance resulted in operators entering a 30-day LCO. The inspectors reviewed the licensee's investigations, repair activities, and plans to improve equipment performance. In general, the licensee appeared to be addressing the chiller problems appropriately; however, one concern was noted with PM scheduling as discussed below.

Due to historical problems with the performance of the three-way valve on the chiller, engineering personnel had established a PM task. Specifically, due to silting within the valve, a PM task was established to disassemble and clean the valve every 6 months. At the time of the "A" chiller trip on August 6, 1997, 7 months had elapsed since the last performance of the PM task and the task was not actually scheduled to be performed for another 2 months. Based on discussions with the system engineer, completion of the PM task may have prevented the August 6, 1997, trip of the "A" chiller. The inspectors were concerned that the maintenance scheduling process allowed tasks to be scheduled beyond the stated frequency based on engineering personnel direction, without documentation. This issue had recently been identified by the licensee during a self-assessment and the inspectors were informed that the process was revised to require specific documentation for extended PM tasks. The inspectors had no further concerns in this area.

c. Conclusions

In general, the inspectors concluded that repair efforts were prompt and well coordinated. The inspectors were concerned that the control building chillers experienced several failures. Engineering personnel provided effective support for emergent equipment issues as they occurred. However, the inspectors were concerned with the decision to defer a PM task on the control building chillers. The performance of the PM task may have prevented one of the failures.

M7 Quality Assurance in Maintenance Activities

M7.1 Licensee Self-Assessment of Maintenance Activities

a. Inspection Scope

During the inspection period, the inspectors reviewed multiple licensee self-assessment activities, including:

- Action Request Screening Meetings
- Safety Committee Meetings
- Operations Committee Meetings

The inspectors concluded that the self-assessment activities observed were generally effective. As discussed in Sections M1.2, M2.1, and M8.2, issues such as PM task rescheduling and inadequate surveillances were identified during licensee self-assessment efforts. Corrective actions were promptly initiated.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) Violation 50-331/95007-01(DRP): Inadequate Review of Replacement Chilled Water Pump Motor. The licensee had failed to follow the minor modification process when the motor was replaced with a motor that had slightly different characteristics. The licensee demonstrated that system operability was not affected. The licensee's corrective actions were considered appropriate. This item is closed.

M8.2 (Closed) Unresolved Item (URI) 50-331/95007-03(DRP): Incorrect Surveillance Test for End of Cycle (EOC) Recirculation Pump Trip Logic. On July 19, 1995, the licensee identified that the surveillance test did not completely test the logic as required. The cause was a procedure change error in 1989. Subsequent to identifying the incorrect test, the licensee determined that test data was available from other tests, which supported system operability. Other corrective actions included 1) a TS amendment to revise surveillance testing requirements to match more closely the assumptions applicable to the turbine trip events for which the EOC recirculation pump trip logic was installed and 2) revision of the test procedure. The inspectors considered the corrective actions to be appropriate. This item is closed.

M8.3 (Closed) Licensee Event Report (LER) 50-331/95-12-00: HPCI System Manually Tripped When Low Flow Alarm Received. The licensee determined that the likely cause was a relay problem. The licensee installed monitoring equipment and later installed a permanent modification to the circuit to correct the problem. A yearly preventive maintenance task was initiated to burnish the relay contacts. There have been no additional low flow conditions during testing or operation of the HPCI system. This item is closed.

- M8.4 (Closed) Violation 50-331/96004-02(DRP): Failure to Enter LCO During Maintenance Activity. The inspectors verified that corrective actions were appropriate. This item is closed.
- M8.5 (Closed) Violation 50-331/96006-02(DRP): Failure to Implement Fire Protection Impairment Requirements. As discussed in Inspection Report (IR) 50-331/96006, the corrective actions were reviewed and determined to be appropriate. This item is closed.
- M8.6 (Closed) Violation 50-331/97010-04(DRP): Maintenance on Emergency Diesel Generator Renders Equipment Inoperable. As discussed in IR 50-331/97010, corrective actions were reviewed and determined to be appropriate. This item is closed.

III Engineering

E1 Conduct of Engineering

a. Inspection Scope (37551)

The inspectors evaluated engineering involvement in the resolution of emergent material condition problems and other routine activities. The inspectors reviewed areas such as operability evaluations, root cause analyses, and self-assessments. The effectiveness of the licensee's controls for the identification, resolution, and prevention of problems was also examined.

E1.1 Inadequate Resolution of Loose Emergency Diesel Generator Fuel Oil Piping Supports

a. Inspection Scope (37551)

During a plant tour on August 6, 1997, the inspectors had questions regarding a disassembled piping support in the "A" emergency diesel generator day tank room. The support was on the diesel fuel oil piping and had been disassembled by maintenance personnel because it was loose. The maintenance required additional planning because the new anchor bolts could not be installed due to interferences. The inspectors followed up to review the potential effect on diesel operability and the circumstances surrounding the original identification of the loose hanger.

b. Observations and Findings

The licensee had originally identified two loose pipe supports on diesel fuel oil piping, one in each of the diesel day tank rooms, on May 14, 1996. Although the supports were located on the non safety-related cross connect pipe between the two day tanks, the supports were part of the seismic boundary for the safety-related fuel oil piping. The inspectors were concerned that the deficiencies were not properly addressed at the time of discovery.

Based on interviews with engineering personnel during the inspection period, at the time the loose supports were identified on May 14, 1996, the system engineer had contacted the structural engineers to evaluate the condition. The structural engineers stated that, based on engineering judgement, the piping appeared to be adequately supported without the two loose supports. However, there was no documentation to provide the basis for the determination. There was no operability evaluation and the wording on the maintenance action request (MAR) simply stated that there was no operability concern because the loose supports were located in the non-seismic portion of the piping. This statement was incorrect. The inspectors determined that the licensee's failure to correct the loose hangers or document the basis for an operability evaluation was an example of a violation of 10 CFR Part 50, Appendix B, Criterion XVI (50-331/97012-02(DRP)).

The inspectors were also concerned that the incorrect statement on the MAR led to the Operations Shift Supervisor (OSS) being misinformed when authorizing the work. When the inspectors questioned the OSS on August 6, 1997, the inspectors were informed that the OSS believed this to be a non-seismic support.

On August 25, 1997, after further discussions between the inspectors and the engineering manager, the licensee initiated an Action Request and completed an analysis that supported the operability determination. The licensee also indicated that more detailed analyses would be performed to justify permanent removal of the two supports. Therefore, the plan was revised to remove the supports rather than repairing them. The inspectors had no further concerns with operability. Additionally, the licensee initiated an Action Request to review and clarify the guidance to plant staff on when an Action Request and operability evaluation are required.

c. Conclusions

The inspectors were concerned that the licensee did not correct the loose supports or provide an operability evaluation in a timely manner. The licensee's planned corrective actions for this issue appeared appropriate.

E7 Quality Assurance in Engineering Activities

E7.1 Licensee Self-Assessment Activities

a. Inspection Scope

During the inspection period, the inspectors reviewed several licensee self-assessment activities, including:

- Action Request Screening Meetings
- Safety Committee Meetings
- Operations Committee Meetings

The inspectors determined that the self-assessment activities were generally effective; however, in the example of the diesel fuel oil pipe supports, corrective actions were not promptly implemented. See Sections E1.1 for details.

E8 Miscellaneous Engineering Issues (92902)

- E8.1 (Closed) URI 50-331/95007-02(DRP): Water in Standby Gas Treatment (SBGT) System. The licensee identified this condition during testing on July 26, 1995, and determined that both SBGT trains may have been inoperable at the same time on July 25, 1995. The inspectors verified that no TS LCO was exceeded. The cause was determined to be leaking balance of plant drain valves that created a high humidity condition in part of the turbine building ventilation system that communicated with the SBGT system. Corrective actions included: 1) operability of the SBGT system was restored, 2) drain valves were installed on SBGT fans to detect any further condensation build-up, 3) the leaking balance of plant drain valves were replaced, and 4) part of the turbine building ventilation system was modified to prevent recurrence. The monthly tests of the SBGT system have not identified water in the system since the corrective actions were completed. This item is closed.
- E8.2 (Closed) LER 50-331/95-08-00: Potential Loss of Both Trains of Standby Gas Treatment Due to Leaking Valves. As discussed in Section E8.1, above, this item has been reviewed and is considered closed.
- E8.3 (Closed) URI 50-331/97004-09(DRP): Concerns With the Licensee's 10 CFR 50.59 Screening Process. The inspectors identified several concerns with the licensee's 10 CFR 50.59 screening process and procedures. Examples included: 1) vague definition of "minor" changes, 2) no requirement to apply 10 CFR 50.59 when making changes to piping and instrumentation drawings contained in the UFSAR, and 3) "corrections" to the UFSAR were not treated as potential "changes" that would require a 10 CFR 50.59 safety evaluation. The licensee began corrective actions by the end of the inspection period and documented the actions in response to inspection report 50-331/97004. The inspectors identified only one example where the licensee's 10 CFR 50.59 screening process incorrectly determined that no safety evaluation was required. The example was the subject of a violation in Inspection Report No. 50-331/97004. This item is closed.

IV Plant Support

There were no concerns identified in the plant support area.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on August 21, 1997. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Franz, Vice President Nuclear
R. Anderson, Manager, Outage and Support
J. Bjorseth, Maintenance Superintendent
L. Curtland, Operations Manager
R. Hite, Manager, Radiation Protection
M. McDermot, Manager, Engineering
K. Pavelev, Manager, Regulatory Performance
G. Van Middlesworth, Plant Manager

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observation
IP 62707: Maintenance Observation
IP 71707: Plant Operations
IP 71750: Plant Support
IP 92700: Onsite Followup of Written Reports of Nonroutine Events at Power
Reactor Facilities
IP 92901: Followup - Operations
IP 92902: Followup - Engineering
IP 92903: Followup - Maintenance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-331/97012-01 NOV Inadequate Corrective Actions when EOP Not Promptly
Updated
50-331/97012-02 NOV Inadequate Corrective Actions for Loose Emergency Diesel
Generator Fuel Oil Piping Supports

Closed

50-331/95007-01 VIO Inadequate Review of Replacement Chilled Water Pump
Motor
50-331/95007-02 URI Water in SBT System
50-331/95007-03 URI Incorrect Surveillance Test for EOC Recirculation Pump Trip
Logic
50-331/95-08-00 LER Potential Loss of Both Trains of SBT Due to Leaking Valves
50-331/95-12-00 LER HPCI System Manually Tripped
50-331/96004-02 VIO Failure to Enter LCO During Maintenance Activity
50-331/96006-02 VIO Failure to Implement Fire Protection Impairment
Requirements
50-331/97004-09 URI Concerns With the Licensee's 10 CFR 50.59 Screening
Process
50-331/97010-04 VIO Maintenance on Emergency Diesel Generator Renders
Equipment Inoperable.

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
DAEC	Duane Arnold Energy Center
EOC	End of cycle
EOP	Emergency Operating Procedure
HPCI	High Pressure Coolant Injection
IP	Inspection Procedure
IR	Inspection Report
ITS	Improved Technical Specifications
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MAR	Maintenance action request
NCV	Non-cited violation
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
OSS	Operations Shift Supervisor
PDR	Public document room
PM	Preventive maintenance
SBGT	Standby gas treatment system
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item