December 1, 2000

Mr. Gary Van Middlesworth
Site General Manager
Duane Arnold Energy Center
Nuclear Management Company, LLC
3277 DAEC Road
Palo, IA 52324

SUBJECT: DUANE ARNOLD INSPECTION REPORT 50-331/00-12(DRP)

Dear Mr. Van Middlesworth:

On November 12, 2000, the NRC completed an inspection at your Duane Arnold Energy Center facility. The enclosed report documents the inspection findings which were discussed on November 13, 2000, with Mr. R. Anderson and other members of your staff.

This inspection examined activities conducted under your license as they relate to reactor safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the *Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS* is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Bruce Burgess, Chief
Reactor Projects Branch 2

Docket No. 50-331
License No. DPR-49

Enclosure: Inspection Report 50-331/00-12(DRP);

See Attached Distribution

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cc w/encl: E. Protsch, Executive Vice President -
Energy Delivery, Alliant;
President, IES Utilities, Inc.
Robert G. Anderson, Plant Manager
K. Peveler, Manager, Regulatory Performance
State Liaison Officer
Chairperson, Iowa Utilities Board
The Honorable Charles W. Larson, Jr.
Iowa State Representative

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REGION III

Docket No:	50-331
License No:	DPR-49
Report No:	50-331/00-12(DRP)
Licensee:	Alliant, IES Utilities Inc.
Facility:	Duane Arnold Energy Center
Location:	3277 DAEC Road Palo, Iowa 52324-9785
Dates:	October 1 through November 12, 2000
Inspectors:	P. Prescott, Senior Resident Inspector M. Kurth, Resident Inspector G. Pirtle, Physical Security Inspector
Approved by:	Bruce Burgess, Chief Reactor Projects Branch 2 Division of Reactor Projects

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
● Initiating Events	● Occupational	● Physical Protection
● Mitigating Systems	● Public	
● Barrier Integrity		
● Emergency Preparedness		

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW, or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.

SUMMARY OF FINDINGS

IR 050-331/00-12, on 10/1-11/12/2000; IES Utilities, Inc, Duane Arnold Energy Center, Unit 1. Adverse weather, equipment alignment, fire protection, licensed operator requalification, maintenance rule implementation, maintenance risk assessment, operability evaluations, operator workarounds, post maintenance testing, surveillance testing, temporary plant modifications, security plan changes and performance indicator verification.

The inspection was conducted by resident inspectors and a regional security inspector. The report covers a 6-week period.

No findings were identified in any cornerstones.

Report Details

Summary of Plant Status: The licensee operated the plant at or near full power at the beginning of the inspection period. On October 20, 2000, at 9:09 p.m., operators initiated a controlled power reduction in order to perform a control rod sequence exchange, enter single loop operation, and remove the "A" recirculation motor-generator set from service to replace the generator and exciter brushes. Minimum reactor power, while in single loop operation, was 35 percent. The "A" recirculation motor-generator was re-started on October 21, at 3:32 p.m., after brush replacement was completed. Operators immediately commenced a return to full power. Full power was achieved on October 22, at 10:04 a.m. The plant was at essentially full power for the remainder of the inspection report period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed the licensee's preparations for cold weather conditions. The inspectors performed walkdowns of the reactor building, pump house, and river intake structure. Also, the inspectors reviewed the following documents:

- Integrated Plant Operating Instruction (IPOI) 6, "Cold Weather Operations," Revisions 16 and 17
- Administrative Control Procedure (ACP) 106.1, "Procedure Preparation, Revision, and Approval," Revision 13
- Updated Final Safety Analysis Report (UFSAR) Section 2.3.1, "Regional Climatology"

The inspectors determined that operations personnel were using an outdated version of IPOI 6 to complete cold weather preparations. The licensee took corrective actions by implementing the current version of IPOI 6. The safety significance was very low based on the minor differences between revisions.

b. Findings

No findings were identified.

1R04 Equipment Alignment

a. Inspection Scope

The inspectors performed a partial walkdown of accessible portions of the following systems listed below to verify system operability. The inspectors verified the correct valve position of all the valves in the primary system flowpath using the system piping and instrumentation

drawings (P&IDs), system mechanical checklist, and verified breaker alignments using the system electrical checklist. The inspectors observed instrumentation valve configurations and appropriate meter indications. The inspectors verified lubrication and cooling of major components by direct observation of the components. The inspectors observed proper installation of hangers and supports during the walkdown and verified operational status of support systems by direct observation of various parameters. Control room switch positions were also reviewed for each system selected for a walkdown. The inspectors also evaluated other conditions such as adequacy of housekeeping, the absence of ignition sources, and proper component labeling. The walkdowns were performed while maintenance was being performed on the corresponding train or following a surveillance test to ensure the system was properly restored to standby readiness. The following systems were selected for a walkdown:

- "B" emergency diesel generator (EDG) ("A" EDG out of service for preventive maintenance during equipment alignment walkdown)

- "B" standby gas treatment (SBGT) system ("A" SBGT out of service for unplanned maintenance during equipment alignment walkdown)

The following documents were reviewed and used to conduct the system walkdown:

- P&IDs: BECH-M132(3), BECH-M158
- Procedure Checklist: Operating Instruction (OI) 324, Revision 48
- Procedure Checklist: OI 170, Revision 36

b. Findings

There were no findings identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors walked down the following risk significant areas looking for any fire protection degraded conditions. The inspectors reviewed open fire protection impairment requests to prioritize the plant area fire plan (AFP) zones and conducted discussions with the fire protection program engineer. The inspectors placed emphasis on control of transient combustibles and ignition sources; area material condition; operational lineup, and operational effectiveness of the fire protection systems, equipment, and features; and the material condition and operational status of fire barriers used to prevent fire damage or fire propagation.

In particular, the inspectors verified that all observed transient combustibles were being controlled in accordance with the licensee's administrative control procedures. In addition, the inspectors observed the physical condition of fire mitigation devices, such as overhead sprinklers, and verified that any observed deficiencies did not impact the operational effectiveness of the system. The inspectors also observed the physical condition of portable fire fighting equipment, such as fire extinguishers. The inspectors verified the

equipment was located appropriately and that access to the extinguishers was unobstructed. The inspectors verified that fire hoses were installed at their designated locations and the physical condition of the hoses was satisfactory and access unobstructed. The inspectors observed and verified the physical condition of passive fire protection features such as fire doors, ventilation system fire dampers, fire barriers, and fire zone penetration seals and verified the items were properly installed and in good physical condition. The areas inspected were:

- Reactor building closed loop cooling water heat exchanger area, equipment hatch area, and jungle room area, using Fire Plan Volume II, "Fire Brigade Organization," AFP-9, Revision 23

- Reactor building refueling floor area using Fire Plan Volume II, "Fire Brigade Organization," AFP-13, Revision 22

- South turbine building basement condensate pump area using Fire Plan Volume II, "Fire Brigade Organization," AFP-16, Revision 23

b. Findings

There were no findings identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed the emergency preparedness "White Team" operator performance in the simulator during the evaluated emergency preparedness exercise. The exercise was conducted on October 18, 2000.

The exercise scenario included high temperatures on several control rod drives and a dropped bundle in the spent fuel pool that initiated a Group III isolation, causing an alert to be declared. A subsequent loss of feedwater heating, due to a dump valve failure, increased reactor power and turbine generator load. In response to the increase in power, the operators ran back the recirculating water pumps. Operators then attempted to insert control rods; however, the rod select matrix failed after nine rods were fully inserted, causing the rest of the rods to be in an intermediate or full out position. Subsequently, power oscillations occurred in the core. A site area emergency was declared. Operators entered the emergency operating procedures for an anticipated transient without a scram. Attempts to re-scram or vent the control rod drives were unsuccessful. Fuel cladding was damaged. Attempts to inject boron to shutdown the reactor were hindered due to equipment problems. Containment pressure increased and operators were forced to vent containment.

The inspectors observed communications, procedure adherence, and implementation of emergency operating procedures. Supervisors from the onsite training department indicated that two areas that operations staff needed to improve were the areas of annunciator response and communications. These areas were noted in previous exercises

as needing improvement. The inspectors verified that training evaluators addressed these problems when operators made errors in these areas. In addition, event classification and reporting actions were observed. The classifications were included as part of the performance indicator data for this scenario.

b. Findings

There were no findings identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the maintenance rule requirements for the systems or components listed below. Documentation reviewed in performance of the inspection is also listed below. The systems or components were selected based upon recent performance problems and the risk significance classification of the systems in the maintenance rule program. The inspectors independently verified the licensee's implementation of the maintenance rule for these systems by verifying that these systems were properly scoped within the maintenance rule; that all failed structures, systems, or components (SSCs) were properly categorized and classified as (a)(1) or (a)(2); that the performance criteria was appropriate for SSCs classified as (a)(2); and that acceptable goals and corrective actions were established for SSCs classified as (a)(1). The inspectors also verified that maintenance rule issues were identified at an appropriate threshold and entered in the corrective action program.

- 250 volt direct current system
- Standby gas treatment system
- River water supply system

The following documentation was also reviewed:

- Duane Arnold Energy Center (DAEC) Performance Criteria Document, "250 VDC," Revision 3
- DAEC Performance Criteria Document, "Secondary Containment/Standby Gas Treatment," Revision 1
- DAEC Performance Criteria Document, "River Water Supply," Revision 2

b. Findings

There were no findings identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of plant risk, scheduling, configuration control, and performance of planned maintenance and emergent work activities. The inspectors reviewed the risk assessment of scheduled maintenance activities associated with work week 43 for work on the continuous air dilution system that included emergent work on the "A" standby gas treatment system, and work week 44 that included emergent work on the "C" general service water pump. Also, the inspectors reviewed work week 45 for work on the "B" control room heating ventilation and air conditioning chiller with emergent work on the post accident sampling system. The inspectors verified that scheduled and emergent work activities were adequately managed. In particular, the inspectors reviewed the licensee's program for conducting maintenance risk safety assessments including the licensee's planning and risk management tools and methodologies for assessing and managing online risk. The inspectors also reviewed licensee plans for addressing increased online risk during these periods, such as establishing compensatory actions, minimizing the duration of the activity, obtaining appropriate management approval, and informing appropriate plant staff. The inspectors verified that these activities were accomplished when online risk was increased due to maintenance on risk-significant SSCs. The inspectors also observed portions of the maintenance activities to ensure proper management oversight and return to service of the SSCs in a timely manner.

b. Findings

There were no findings identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the technical adequacy of operability evaluations to ensure that the system operability was properly justified and the system remained available, such that no unrecognized increase in risk occurred. The inspectors reviewed the following operability evaluations:

- Action Request (AR), "Air Supply to River Water System Lost When Air Compressor 1K16B Line Air Dryer Failed"
- AR 22439, "24 Hour Operability Determination for "A" SBGT" (Variable heater input controls not functioning properly)
- AR 22748, "Operability Determination for High Energy Line Break Issue - HPCI [High Pressure Coolant Injection] and RCIC [Reactor Coolant Isolation Cooling] Equipment Hatch Seals"

b. Findings

There were no findings identified.

1R16 Operator Workarounds (OWAs)

a. Inspection Scope

The inspectors reviewed operator workarounds to identify any potential effect on the function of mitigating systems, or the operators' ability to respond to an event and implement abnormal and emergency operating procedures.

The inspectors reviewed the following OWAs during the inspection period:

- AR 21797, "Received Multiple Division 1 125VDC System Trouble Alarms While Cycling MO2404 (RCIC Turbine Steam Supply Isolation)"
- AR 3864, "Single Fuse Failure Could Cause Both RBMs [Rod Block Monitors] to be Inoperable"

b. Findings

There were no findings identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors observed the post-maintenance tests and reviewed test data for the following activities:

- Preventive Maintenance Order (PWO) 1115081, "A" EDG - Inspect Vertical Drive Coupling"
- PWO 1115530, MO4320B-O, "Containment Air Dilution Nitrogen Flow Valve VOTES [Valve Operation and Testing Evaluation System] Diagnostic Test"
- Corrective Maintenance Work Order A47389, "Replace 'B' Control Building Chiller Compressor"
- Corrective Work Order (CWO) A52075, "Troubleshoot and Collect Data on 4160 Breakers"

The inspectors verified for each post-maintenance test observed that the systems and components were capable of performing their intended safety function. Also, the inspectors reviewed the applicable sections of Technical Specifications (TS) requirements, the UFSAR, and the following plant procedures:

- TS 3.8, “Electrical Power Systems”
- UFSAR Section 8.3.1.2, “Standby AC Power System”
- OI 324, “Standby Diesel Generator System,” Revision 48
- UFSAR Section 9.4.4, “Control Room Ventilation System”
- TS 3.7.5, “Control Building Chillers System”

Following the completion of the tests, the inspectors verified that the test equipment was removed and that the equipment was returned to a condition in which it could perform its safety function.

b. Findings

There were no findings identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed surveillance testing on risk-significant equipment and verified that the SSCs selected were capable of performing their intended safety function. The inspectors verified that the surveillance tests satisfied the requirements contained in TS, the UFSAR, and licensee procedures. During surveillance testing observations, the inspectors verified that the test was adequate to demonstrate operational readiness consistent with the design and licensing basis documents, and that the testing acceptance criteria were clear. The inspectors also verified that the impact of the testing had been properly characterized during the pre-job briefing; the test was performed as written and all testing prerequisites were satisfied; and that the test data was complete, appropriately verified, and met the requirements of the testing procedure. Following the completion of the test, the inspectors verified that the test equipment was removed and that the equipment was returned to a condition in which it could perform its safety function.

The following surveillance testing activities were observed:

- Surveillance Test Procedure (STP) 3.4.1-02, “Single Loop Operation,” Revision 4
- STP 3.5.1-01, “Core Spray System Operability Test,” Revision 6
- STP 3.8.1-04, “Standby Diesel Generators Operability Test (Slow Start From Normal Start),” Revision 7 (“A” EDG)
- STP 3.8.1-06, “Standby Diesel Generators Operability Test (Fast Start),” Revision 11 (“B” EDG)
- STP NS100102, “River Water Supply and Screen Wash System Vibration Measurement and Operability Test,” Revision 2

b. Findings

There were no findings identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification package, safety evaluation, and installation work order associated with the integrity of secondary containment. The inspectors attended the pre-job brief for installation of the temporary modification. The temporary modification was discussed with the system engineer.

- Temporary Modification Permit 00-044, "Lifted Lead to De-Energize Solenoid for CV1804A ["A" Recirculation Pump Seal Mini-purge Isolation] in Support of LCO"

Documents reviewed during the inspection included:

- CWO A55885, "While Attempting to Close CV1804A (STP 3.6.1.3-02) it Failed to Close"

- Technical Specifications

b. Findings

There were no findings identified.

3. SAFEGUARDS

Cornerstone: Physical Protection

PP4. Security Plan Changes (IP 71130.04)

a. Inspection Scope

The inspector reviewed Revision 42 of the Duane Arnold Energy Center Physical Security Plan which was submitted by licensee letter, dated August 11, 2000, to verify that the change did not decrease the effectiveness of the security plan. The security plan was submitted in accordance with 10 CFR 50.54(p).

b. Findings

Section 2.1 of the submitted Revision 42 of the security plan contains what appears to be a conflict regarding the level of management that can suspend safeguards measures in accordance with 10 CFR 50.54(x). The security plan authorizes the security manager to suspend safeguards in an emergency condition. 10 CFR 50.54(y) requires prior approval by at least a licensed senior operator. When brought to the licensee's attention on November 1, 2000, this issue was entered into the corrective action program

(AR No. 20246) and the security manager agreed to revise the security plan to make it consistent with 10 CFR 50.54(y). The licensee had not implemented the provisions of the change.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

Cornerstone: Mitigating Systems

a. Inspection Scope

The inspectors reviewed control room operator logs, monthly operating reports, and performance indicator data packages for the first and second quarter of the year 2000 for the residual heat removal system to verify that performance indicators reported to the NRC were accurate. The inspectors also interviewed appropriate engineering personnel responsible for data collection.

b. Findings

There were no findings identified.

4OA6 Management Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. R. Anderson and other members of licensee management at the conclusion of the inspection on November 12, 2000. 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

R. Anderson, Plant Manager
W. Simmons, Maintenance Superintendent
D. Curtland, Operations Manager
R. Hite, Manager, Radiation Protection
J. Bjorseth, Manager, Engineering
K. Peveler, Manager, Regulatory Performance
G. Van Middlesworth, Site General Manager
D. Wilson, Vice President Nuclear

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ACP	Administrative Control Procedure
AFP	Area Fire Plan
AR	Action Request
CFR	Code of Federal Regulations
CWO	Corrective Work Order
DAEC	Duane Arnold Energy Center
DRP	Division of Reactor Projects
EDG	Emergency Diesel Generator
IR	Inspection Report
NRC	Nuclear Regulatory Commission
OI	Operating Instruction
OWA	Operator Workaround
P&IDs	Piping and Instrumentation Drawings
PAR	Protective Action Recommendations
PWO	Preventive Maintenance Order
RCIC	Reactor Coolant Isolation Cooling
SBGT	Standby Gas Treatment
SSCs	Structure, System, or Components
STP	Surveillance Test Procedure
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report

LIST OF BASELINE INSPECTIONS PERFORMED

The following inspectable-area procedures were used to perform inspections during the report period. Documented findings are contained in the body of the report.

Inspection Procedure		Report Section
Number	Title	
71111-01	Adverse Weather Protection	1R01
71111-04	Equipment Alignment	1R04
71111-05	Fire Protection	1R05
71111-11	Licensed Operator Requalification	1R11
71111-12	Maintenance Rule Implementation	1R12
71111-13	Maintenance Risk Assessment and Emergent Work Evaluation	1R13
71111-15	Operability Evaluations	1R15
71111-16	Operator Workarounds	1R16
71111-19	Post Maintenance Testing	1R19
71111-22	Surveillance Testing	1R22
71111-23	Temporary Plant Modifications	1R23
71114-01	Exercise Evaluation	1EP1
71130.04	Security Plan Changes	3PP4
71151	Performance Indicator Verification	40A1
(none)	Meetings, Including Exit	4OA6