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REGION III

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Report No: 50-331/98016(DRS)

Licensee: Alliant, IES Utilities Inc.

Facility: Duane Arnold Energy Center

Location: Palo, Iowa

Dates: October 20-23, 1998

Inspectors: J. Foster, Sr. Emergency Preparedness Analyst  
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Division of Reactor Safety

## EXECUTIVE SUMMARY

Duane Arnold Energy Center  
NRC Inspection Report 50-331/98016

This inspection consisted of evaluation of the licensee's performance during the plant's biennial exercise of the Emergency Plan. It was conducted by regional emergency preparedness inspectors and two resident inspectors. No violations of NRC requirements were identified.

### Plant Support

- Overall performance during the 1998 Emergency Preparedness exercise was effective and demonstrated that emergency plan implementation activities met regulatory requirements. (Section P4.1.c)
- Staff performance in the Control Room Simulator was excellent. Emergency event classification was accurate and notifications were promptly made. (Section P4.1.c)
- The Technical Support Center staff's performance was very good. Plant event analysis, event classification, notifications, briefings, and communications with other facilities were competently performed by the staff. (Section P4.1.c)
- Performance in the Operational Support Center(OSC) was very good. Coordination activities and maintaining control and status of inplant response teams were effectively demonstrated by the OSC staff. Facility staff and team members were professional and maintained focus on emergency response throughout the exercise. (Section P4.1.c)
- Overall performance of the Emergency Operations Facility's responders was very effective. Teamwork among EOF staff and their coordination with State and county officials were strengths. Communications with onsite emergency responders and offsite agencies were frequent and the protective measures team properly monitored plant conditions. (Section P4.1.c)
- Self-critiques following termination of the exercise were self-critical. Controllers effectively solicited verbal and written inputs from exercise participants. (Section P4.1.c)

## Report Details

### IV. Plant Support

#### **P3 Emergency Preparedness Procedures and Documentation**

##### **P3.1 Review of Exercise Objectives and Scenario (82302)**

The inspectors reviewed the 1998 exercise objectives and appropriately challenging scenario and determined that they would acceptably support testing major elements of the licensee's Emergency Plan. The scenario provided a challenging framework to support demonstration of the licensee's capabilities to implement its Emergency Plan. The scenario included a radiological release and several equipment failures.

#### **P4 Staff Knowledge and Performance in Emergency Preparedness**

##### **P4.1 1998 Evaluated Biennial Emergency Preparedness Exercise**

###### **a. Inspection Scope (82301)**

On October 21, 1998, the licensee conducted a biennial exercise involving full participation by the State of Iowa and the counties of Linn and Benton. This exercise was conducted to test major portions of the licensee's onsite and offsite emergency response capabilities. Onsite and offsite emergency response organizations and emergency response facilities were activated.

The inspectors evaluated performance in the following emergency response facilities:

- Control Room Simulator (CRS)
- Technical Support Center (TSC)
- Operations Support Center (OSC)
- Emergency Operations Facility (EOF)

The inspectors assessed the licensee's recognition of abnormal plant conditions, classification of emergency conditions, notification of offsite agencies, development of protective action recommendations, command-and-control, transfer of emergency responsibilities between facilities, communications, and overall implementation of the emergency plan. In addition, the inspectors attended the post-exercise critiques in each of the above facilities to evaluate the licensee's initial self-assessment of exercise performance.

###### **b. Emergency Response Facility Observations and Findings**

###### **b. 1 Control Room Simulator (CRS)**

Control Room Simulator crew performance was excellent. Appropriate procedures, including emergency operating procedures, Technical Specifications, and off normal procedures were used. Emergency Operating Procedure (EOP) flowcharts were

properly utilized. The crew was professional and proactive in discussing potential problems and options.

The Shift Supervisor (SS) demonstrated good command and control of the emergency response efforts. Teamwork and communications were very good, especially during periods when high crew activity resulted from changing plant conditions. The SS held frequent and concise crew briefings. Three-way communications were used by CRS personnel on many occasions, but usage was not always consistent. Three way communications among the crew was not used at times. This was self-identified by the crew during the critique after the exercise.

The identification and declaration of the emergency classification for the Alert (AA3) was correct and notifications were completed well within the regulatory time requirements. However, the Emergency Action Level (EAL) Notification Form contained the incorrect EAL number (AA2) due to a personal error. This information was then communicated to State and local agencies and the NRC. The safety significance of this error was low because the significant point was that an Alert was declared. Any Alert declaration would have resulted in the same activation of State and county emergency response facilities. The error was identified at 8:31 a.m. by personnel in the EOF, and was corrected prior to 9:10 a.m. by personnel in the TSC by faxing a corrected EAL Notification Form to State and local agencies and verbally notifying the Joint Public Information Center.

b. Technical Support Center (TSC)

Overall, the TSC's staff's performance was very good. Personnel were professional. Teamwork and appropriate communications were evident. The Emergency Coordinator (EC), TSC Operations Supervisor, and OSC/TSC Operations Liaison were effective in reviewing at the EALs to verify the current classification was appropriate. They were proactive in tracking plant conditions and identifying EALs for possible conditions which could lead to higher emergency classifications.

Activation of the facility was rapid. The staff started arriving within minutes of the Alert announcement, signed in the staffing status board, and proceeded to their stations to activate communications, data information, and dose assessment equipment. The facility was declared operational within 31 minutes of the Alert declaration.

The Site Area Emergency was properly classified by personnel in the TSC and offsite notifications to the State and County officials were timely, within four minutes, and the notification to the NRC was within 12 minutes. The offsite notifications were well within the required notification times of 15 minutes for State and local agencies and 60 minutes for NRC notification. The TSC staff was notified by the EOF staff of an error on the Alert Notification Form sent to the State and Counties regarding the specific EAL used for the classification. The TSC staff appropriately refaxed the corrected notification form to the State and counties and then followed up with telephone calls to ensure the offsite agencies had the correct information.

Plant personnel accountability was completed and the results reported within 22 minutes, which was within the required time of 30 minutes, to the EC. The Emergency Response Data System (ERDS) was rapidly activated approximately 12 minutes after the Alert declaration. This, also, was well within the one hour requirement.

Command and control by the EC was very good. Frequent staff briefings were clear and concise with current emergency priorities identified prior to ending the briefings. As plant emergency conditions changed, the EC would make brief announcements to ensure facility personnel were apprized. Transfers of command and control from the Shift Supervisor (SS) in the CRS and to the EOF's Emergency Response and Recovery Director (ERRD) was smooth and seamless. The EC appropriately ensured the staff were aware of the current notifications and other emergency communications' status and which staff was responsible for the next notification or communication.

Facility status boards were effectively maintained and continuously updated. The electronic status board was effective in displaying the TSC and EOF staff's actions and emergency conditions. The electronic status board displayed emergency classifications, protective action recommendations, emergency priorities, and other key information. Equipment problems and other emergency issues were proactively tracked on the Recovery Status Board in preparation for review during the Recovery phase of event response.

Good effort was demonstrated by the staff for the dose assessment software's inability to use automated input from the Control Room Simulator's computer. After several attempts to manually input data for dose projections, the staff was successful in initiating calculations prior to any radiation release. Later during the exercise, the staff was able to return the dose assessment computer to automated operation.

### b.3 Operational Support Center (OSC)

Performance in the OSC was very good. The OSC was relocated since the last evaluated exercise, and was directly adjacent to the TSC. The new location allowed direct communication between the OSC Supervisor and TSC personnel, while TSC status boards are easily visible from the OSC. A single team tracking board was located in the TSC, eliminating the need for an OSC team tracking board. A single priorities board was likewise located in the TSC. OSC personnel were well aware of plant conditions, as status boards were visible and briefings were audible in the OSC and Health Physics access point.

A total of eighteen teams were formed. Some of these teams were canceled prior to dispatch due to rapidly changing plant conditions. Teams were well briefed on their expected tasks and inplant radiological conditions. Returning inplant team personnel were well debriefed. An individual maintained an emergency event log. The OSC staff and team members were professional and maintained their focus on emergency response throughout the exercise.

The amount of available resources, in terms of number or discipline, of available personnel was not tracked in the OSC. To expedite their deployment, technicians waiting in the OSC's waiting area donned protective clothing.

Priorities were clearly visible on the TSC priorities status board. Early in the exercise, listed priorities were not characterized as to level of importance, and the priority board was not designed to allow such characterization. Later, priorities were differentiated by placing a number besides the priority listing. When an inplant action was characterized as the "most urgent priority", a team was assembled and briefed in the normal manner. Procedures did not provide for more rapidly forming, briefing, and dispatching of such an "urgent" OSC team. The licensee's determination as to whether a procedure for urgent team dispatch was necessary was an Inspection Followup Item (50-331/98016-01).

b.4 Emergency Operations Facility (EOF)

Performance in the EOF was very good. In accordance with the Emergency Plan, the licensee placed the EOF, which was located at the licensee's corporate office, in a standby status following the Alert declaration. This decision resulted in the bulk of the EOF staff commuting from their normal duty stations at the plant to the EOF. Meanwhile, the Emergency Response and Recovery Director (ERRD), whose normal work station was at the corporate office, entered the EOF to determine the relevant EAL and to interpret it to a member of the licensee's public affairs staff who planned to issue a press release. The ERRD rapidly determined that the relevant EAL had been miscommunicated. The ERRD ensured that public affairs staff and incoming EOF staff received corrected information on the basis for the Alert declaration.

The EOF remained in a standby status prior to the Site Area Emergency declaration. Incoming EOF staff efficiently prepared to perform their duties. The ERRD, the Radiological and EOF Manager (REM), and the Shift Technical Advisor-Operations Liaison (STA-OL) frequently contacted TSC counterparts. Their briefings kept EOF staff well informed of degraded plant conditions, onsite priorities, and onsite protective actions, so that EOF staff could support TSC counterparts as needed and be ready to assume more responsibilities if plant conditions worsened.

Shortly after the TSC's EC declared a Site Area Emergency, the ERRD assumed overall command and control of the licensee's emergency response in a well-coordinated manner. Associated transfers of specific responsibilities from TSC staff to their EOF counterparts were smooth and clear. EOF communicators ensured that counterparts in the State's and counties' Emergency Operations Centers were accurately informed of what lead responsibilities were being assumed by EOF personnel.

Teamwork among the ERRD, Assistant ERRD, REM, and STA-OL was a strength. The STA-OL effectively utilized the Safety Parameter Display System and Emergency Operating Procedure (EOP) flowcharts to monitor, assess, and brief key EOF staff on changing plant conditions and the EOPs' bases of associated reactor operator actions. The REM effectively directed his protective measures staff to perform assessments of abnormal onsite and offsite radiological conditions, which he promptly discussed with

other key EOF staff. Other noteworthy examples of effective discussions among key EOF staff included: potential airborne contamination following the resin spill; some State officials' interest in implementing a precautionary evacuation of Subarea Number 1; the procedural bases of the General Emergency declaration; the pros and cons of activating a reactor building exhaust fan after the release began; and potential ways to determine whether the release included an unfiltered, ground-level component.

Coordination with State and county responders was also a strength. The REM discussed the bases of the initial and upgraded Protective Action Recommendations (PARs) with his State counterpart shortly before each recommendation was communicated. PAR notifications occurred within five minutes of their approval by the ERRM. PARs were procedurally correct, based on current understandings of degraded plant conditions. The REM remained well aware of what PARs were chosen for implementation by offsite officials. A dedicated communicator kept licensee liaisons in the counties' Emergency Operations Centers accurately updated following key EOF staffs' concise and frequent briefings to other EOF staff. EOF staff were responsive to questions raised by the two State liaisons within the EOF. These liaisons provided valuable updates on county officials' progress in implementing offsite protective actions.

Protective measures staff effectively deployed the licensee's two offsite radiological survey teams. The temporary loss of one survey team due to a simulated vehicle accident was overcome. The licensee's ability to coordinate movements of its offsite survey teams with those of the State's survey teams, as well as sharing of measurements reported by all offsite survey teams, was enhanced by having State personnel within the EOF who were directing the activities of the State's survey teams.

b.6 Scenario and Exercise Control

The inspectors assessed the challenge of the scenario and evaluated the licensee's control of the exercise. The scenario was appropriate, with challenging aspects. One challenge was initiating the emergency with a resin spill and then escalating to a Site Emergency with a totally unrelated event. The scenario exercised the majority of the licensee's emergency response capabilities. The scenario was appropriate to test basic emergency capabilities and to demonstrate the licensee's exercise objectives.

b.7 Licensee Self-Critiques

The inspectors attended the licensee's self-critiques in the CRS, TSC, OSC, and EOF which occurred immediately after the exercise. Exercise controllers solicited verbal and written inputs from the participants, in addition to providing the participants with the controllers' initial assessments of personnel performance. The inspectors concluded that these initial self-critiques were thorough and in close agreement with the majority of inspectors' observations.

c. Overall Conclusions

The exercise was a competent demonstration of the licensee's capabilities to implement its emergency plans and procedures.

- Overall performance during the 1998 Emergency Preparedness exercise was effective and demonstrated that emergency plan implementation activities met regulatory requirements. (Section P4.1.b)
- Overall performance in the Control Room Simulator was excellent. Emergency event classification was accurate and notifications were promptly made. (Section P4.1.b.1)
- The Technical Support Center staff's performance was very good. Plant event analysis, event classification, notifications, briefings, and communications with other facilities' staffs were competently performed. (Section P4.1.b.2)
- Performance in the Operational Support Center (OSC) was very good. Coordination activities and maintaining control and status of inplant response teams were effectively demonstrated by the OSC's staff. Facility staff and team members were professional and maintained focus on emergency response throughout the exercise. (Section P4.1.b.3)
- Overall performance of the Emergency Operations Facility responders was very effective. Communications with onsite emergency response facilities' staffs and offsite agencies were frequent. The protective measures team properly monitored plant conditions. (Section P4.1.b.4)
- Self-critiques following termination of the exercise were self-critical and included inputs from controllers and exercise participants. Controllers effectively solicited verbal and written inputs from exercise participants. (Section P4.1.b.7)

**P8 Miscellaneous EP Issues**

- P8.1 (Closed) Inspection Follow up Item No. 50- 331/97003-01: Some out of qualification personnel were listed in the emergency telephone book. The licensee changed the frequency of issue of sections A & B of the emergency telephone book to as often as once per month if changes were identified that would impact its accuracy. The remainder of the book would continue to be updated quarterly as necessary. This item is closed.

**V. Management Meetings**

**X.1 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on October 23, 1998. 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.

On October 23, 1998, the Federal Emergency Management Agency (FEMA) held a media briefing at the Alliant Towers Building. FEMA and NRC personnel presented the preliminary results of their evaluation of the exercise.



## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

D. Curtland, Operations Manager  
K. Dunlap, Emergency Planning  
J. Franz, Vice President - Nuclear  
D. Johnson, Emergency Planning  
R. Johnson, Emergency Planning  
J. Karrick, Licensing Engineer  
B. Lindley, Quality Assurance  
K. Morgan, Quality Assurance  
K. Peveler, Manager, Regulatory Performance  
K. Putnam, Licensing Manager  
P. Sullivan, Manager, Emergency Planning  
G. VanMiddleworth, Plant Manager  
W. Wertr...n, Quality Assurance Engineer  
K. Young, Manager, Nuclear Training

### NRC

M. Kurth, Resident Inspector  
P. Prescott, Senior Resident Inspector

## INSPECTION PROCEDURES USED

IP 82301 Evaluation of Exercises for Power Reactors  
IP 82302 Review of Exercise Objectives and Scenarios for Power Reactors

## ITEMS OPENED AND CLOSED

### Opened

50-331/98016-01 IFI Determination as to whether a procedure for urgent team dispatch was necessary.

### Closed

50-331/97003-01 IFI Out of qualification personnel being listed in the emergency telephone book.

## LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CRS	Control Room Simulator
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
EAL	Emergency Action Level
EC	Emergency Coordinator
EOF	Emergency Operations Facility
EOP	Emergency Operating Procedure
EP	Emergency Preparedness
EPZ	Emergency Planning Zone
ERDS	Emergency Response Data System
ERF	Emergency Response Facilities
ERO	Emergency Response Organization
ERRD	Emergency Response and Recovery Director
IFI	Inspection Follow up Item
IP	Inspection Procedure
MIDAS	Meteorological Interactive Dose Assessment System
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OSC	Operations Support Center
PAR	Protective Action Recommendation
PDR	NRC Public Document Room
RIII	NRC Region III
REM	Radiological and EOF Manager
RPT	Radiation Protection Technician
SAE	Site Area Emergency
SPDS	Safety Parameter Display System
SS	Shift Supervisor
STA-OL	Shift Technical Advisor-Operations Liaison
TSC	Technical Support Center