



IES Utilities Inc.
200 First Street S.E.
P.O. Box 351
Cedar Rapids, IA 52406-0351
Telephone 319 398 8162
Fax 319 398 8192

John F. Franz, Jr.
Vice President, Nuclear

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Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
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Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DFR-49
Response to NRC Request for Additional
Information on Resolution of USI A-46

References: 1) Letter, J. Franz (IES) to W. Russell (NRC), dated
November 15, 1995, NG-95-3072, Summary Report
for Resolution of USI A-46
2) Letter, G. Kelly (NRC) to L. Liu (IES), dated
October 21, 1996 Request for Additional
Information on Resolution of USI A-46

File: A-18, A-101b

Dear Sirs:

In Reference 1, IES Utilities submitted the results of the Unresolved Safety Issue (USI) A-46 evaluation for the Duane Arnold Energy Center (DAEC). The Staff has reviewed that evaluation and requested additional information (Reference 2).

We have reviewed the Staff's questions and provided our responses in the attached document.

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Should you have any questions regarding this submittal, please contact this office.

This letter is true and accurate to the best of my knowledge and belief.

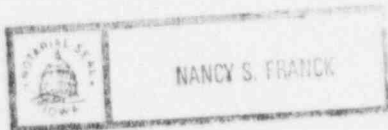
IES UTILITIES INC.

By *John F. Franz*
John F. Franz
Vice President, Nuclear

State of Iowa
(County) of Linn

Signed and sworn to before me on this 20th day of December,
1996,

by John F. Franz



Nancy S. Franck
Notary Public in and for the State of Iowa

9-28-98
Commission Expires

Attachment

JFF/CJR/mbm
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cc: C. Rushworth
L. Root
G. Kelly (NRC-NRR)
A. B. Beach (Region III)
NRC Resident Office
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**IES Utilities Response to the NRC
Request for Additional Information (RAI) on Resolution of USI A-46
at the Duane Arnold Energy Center (DAEC)**

NRC Request 1:

Section 4, "Safe Shutdown Equipment List (SSEL)," of the Seismic Evaluation Report, dated November 15, 1995, states in part the following:

"The formal Operations Department review of the SSEL was conducted by an Operations Shift Supervisor at DAEC. The method of this review was a "desk top" review, per Section 3.7 of the GIP [Reference 1], using normal and emergency procedures shown in table 4-1."

"This review indicated that the shutdown path selected for USI A-46 and included in the SSEL is a legitimate safe shutdown path consistent with DAEC procedures and operator training. The present level of operator training is sufficient to assure that the operators are proficient on the procedures to assure the selected success path will be used."

"In reviewing the procedures against the Safe Shutdown Equipment list, no major equipment (pumps, valves, fans) that was required by plant procedures to meet the safe shutdown path were missing. Support equipment such as relays, handswitches, instrumentation, and heat exchangers were not verified by this review."

Based on this review, (a) describe what, if any, reviews were performed to determine if any local operator actions required to safely shutdown the reactor could be affected by potentially harsh environmental conditions resulting from the design basis earthquake (DBE)? (b) Are there any other environmental conditions (such as loss of lighting, excessive heat or humidity, or in-plant barriers) as a result of the DBE and loss of off-site power which could negatively affect operator's ability to respond to the transient? If so, describe the reviews that were conducted to ensure operators had adequate time and resources to respond to such events? (c) Describe how you ensured that sufficient operator resources were available, including consideration of environmental factors, to carry out any required operator actions associated with the additional support equipment not specifically verified by this review.

IES Utilities Response:

(a) Section 3.2.5 of the Generic Implementation Procedure (GIP)-2 states that "No concurrent or sequential potential events are postulated to occur other than a design basis safe shutdown earthquake (SSE) and a loss of offsite power. For example, no loss of coolant accidents (LOCAs), high energy line breaks (HELBs), fires, flooding, extreme winds and tornados, lightning, sabotage, etc., are postulated to occur." Therefore, these other events which could cause harsh environmental conditions do not have to be considered for the USI A-46 program.

The only "harsh environmental conditions" required to be considered are those associated with the safe shutdown earthquake and loss of offsite power.

The equipment items requiring operator actions at the DAEC are three Battery Room Exhaust Fans (1VEF030A, B, and C; only one is required) and two Control Building Chillers (1VCH001A and B; only one is required). The acceptability of these five equipment items was determined as follows:

- (1) During preparation of the Safe Shutdown Equipment List for the DAEC, special consideration was given to the following criteria:
 - the operators are provided with indications of the status of the affected components,
 - the controls necessary to reset the affected components are easily accessible to the operators, and
 - sufficient time for operator action is available.
- (2) The responsible System Engineer for each affected system was consulted to evaluate the feasibility of the Operator Actions list.
- (3) The finalized list of required Operator Actions was formally transmitted to the Operations Department for their review, comments, and concurrence.

(b) As discussed above, the equipment items requiring operator actions at the DAEC are three Battery Room Exhaust Fans and two Control Building Chillers. These five equipment items are located in Seismic Category I structures (the Control and Reactor Buildings). These items were reviewed for environmental considerations, as discussed below.

The resolution and implementation of the USI A-46 program at the DAEC included, in part, the seismic portion of the Individual Plant Examination of External Events (IPEEE), Reduced Scope. As part of the resolution of these issues, the plant areas containing or affecting the program components were also walked down for such concerns as credible and significant seismic induced flood, spray, and fire as required by NUREG 1407, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities." The results of these walkdowns, as documented in the DAEC IPEEE submittal (transmitted by letter, NG-95-3073, dated November 15, 1995), indicate that there are no credible sources of seismic-induced flood or fire in the areas of concern. Therefore, it is reasonable to consider that this portion of the implementation program at the DAEC eliminated concerns with potential sources of the harsh environment due to the seismic-induced conditions stated above.

The restart of any one of the three Battery Room Exhaust Fans can be achieved by manipulating the associated fan control switch, or by resetting the lockout relays. The switches and the lockout relays are located on control panel 1C026, which is in the Control Room back panel area. These operator actions are considered reasonable since the Control Room will not be a harsh environment and the operator is not required to leave the Control Room area to perform these actions.

The required operator action for the Control Building Chillers is to reset and restart the chillers at the local control panels which are located in the vicinity of the north wall on the third floor of the Reactor Building at elevation 812' (which is not classified as a harsh environment). The chillers and their supporting equipment, as required by the rules of the GIP, were all walked down for both seismic adequacy and seismic interaction concerns during the implementation of the program. The performed seismic interaction reviews eliminated any concerns with the plant components and structures located in the immediate vicinity of these components. Furthermore, all the masonry block walls located either directly in close proximity to the chillers or in the operator path for performing the required actions were reviewed for seismic adequacy during the implementation of NRC IE Bulletin 80-11, "Masonry Wall Design."

Should lighting be lost, the DAEC is equipped with emergency lighting and flashlights are available for use by Operations personnel.

(c) During the "desktop" review of operator actions required for a DBE, consideration was given to the number and type of actions required. It was determined that with our minimum required control room staffing level, the operators could perform these actions. See also response to Request 1a.

NRC Request 2:

Section 2.1, "Summary of Results," of the Relay Evaluation Report states that a total of five SSEL equipment items would require operator actions to reset the associated contacts or contact groups. Three of those were associated with the CRHVAC/Battery room exhaust fans and two others were associated with the CRHVAC/Control Building Chillers. In both cases it appears that ample indications of system abnormality would be available to the operators as well as procedural guidance necessary to reset the effected equipment. (a) Based on your analysis, approximately how much time would the operators have to reset the affected equipment assuming contact chatter? (b) Describe the review conducted to ensure that no adverse environmental conditions posulated to exist following the DBE would prevent the local operator actions required to reset the Control Building Chillers.

IES Utilities Response:

a) Operations personnel would have sufficient time available to reset the affected equipment, as discussed below.

Battery Room Exhaust Fans

The maximum allowable Hydrogen concentration of 2% may occur within approximately 5 hours, which is considered to be adequate time for an operator to restart one of the Battery Room Exhaust Fans from the Control Room.

Control Building Chillers

The actual time available for operators to start one of the chillers will vary, depending on initial conditions. With the chillers not operating, assuming a normal ventilation lineup with dampers open to the outside, the Control Room temperature will depend mainly on the outside air temperature. During cooler weather, adequate cooling to the control room is provided by maintaining the dampers open to the outside; therefore, starting one of the chillers is not an immediate concern. However, during warmer weather, the Control Room temperature will increase more rapidly and operator action to start one of the chillers will be required more quickly.

The outside air temperature at the plant site is usually less than 90 degrees-F. Assuming such a warm outside temperature, and using conservative engineering judgment, at least thirty minutes would be available for the operator to start one of the Control Building Chillers.

In the event of a control building ventilation system isolates, opening the outside air dampers will require resetting of the lockout relays. As discussed previously, resetting the lockout relays is performed from the Control Room back panel on 1C026.

b) No adverse environmental conditions are postulated to exist following the DBE that would prevent the local operator action required to reset the Control Building Chillers. This action requires the operator to be in the general vicinity of the chillers or travel a short distance from the Control Room by using the Control Room back door which leads to the north Reactor Building stairway at elevation 786'. While in the stairway, the operator is required to go up one floor to Reactor Building elevation 812' and enter that floor. The chillers and their corresponding local panels are located a short distance away. Therefore, the required operator actions in this case are also reasonable and achievable. Also see the response to Item 1.

NRC Request 3:

Are the operator actions associated with resetting the SSEL equipment affected by the postulated contact chatter considered to be routine and consistent with the skill of the craft? If not, what operator training and operational aids were developed to ensure the operators will perform the actions required to reset the affected equipment?

IES Utilities Response:

The required operator actions are considered to be routine and consistent with the skill of the craft. The status of the five plant equipment items on the Operator Action list is already available to the operators and the equipment failure is similar to that which may occur under the postulated conditions of a design basis earthquake and is covered by the existing operational procedure and instructions. Therefore, no specific operator training or exercises were needed.