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Docket No. 50-331

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MEMORANDUM FOR: Thomas Ippolito, Chief  
Operating Reactor Branch #2  
Division of Licensing

FROM: Frank G. Pagano, Chief  
Emergency Preparedness Licensing Branch  
Emergency Preparedness Program Office

SUBJECT: REVIEW OF EMERGENCY PLAN - DUANE ARNOLD ENERGY CENTER (DAEC)

We have completed our review of the Emergency Plan for Duane Arnold Energy Center Nuclear Plant which was transmitted by licensee submittal dated July 30, 1980. The review was performed against the criteria in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plan and Preparedness in Support of Nuclear Power Plants". Our review has indicated that additional information and commitments from the licensee are required before we can find the plan acceptable.

We request that the attached comments and a letter similar to the enclosed draft be sent to the licensee. Please provide this Branch with a copy of the correspondence.

The Emergency Preparedness Licensing Branch contact is B. Axelson (FTS 384-2625).

Frank G. Pagano, Chief  
Emergency Preparedness Licensing Branch  
Emergency Preparedness Program Office

Enclosures:

Comments on DAEC Emergency Plan  
Draft Letter to Licensee

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D R A F T

Docket No. 50-331

Mr. Duane Arnold, President  
Iowa Electric Light & Power Co.  
P. O. Box 351  
Cedar Rapids, Iowa 52406

Dear Mr. Arnold:

We have completed our review of your Emergency Plan submittal dated July 30, 1980, for the Duane Arnold Energy Center (DAEC). Your Plan was reviewed against the criteria stated in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Plans and Preparedness in Support of Nuclear Power Plants". This document addresses the standards in the revised 10 CFR 50 which become effective November 3, 1980.

Our review has indicated that additional information and commitments are required before we can conclude that your onsite emergency preparedness program meets these criteria

Enclosed are our comments for which resolution is necessary. Your Emergency Plan should be revised to address these comments in accordance with the provisions of the revised 10 CFR 50.

Sincerely,

Thomas Ippolito, Chief  
Operating Reactor Branch #2  
Division of Licensing

Enclosure

LIST OF DEFICIENCIES OF THE DUANE ARNOLD ENERGY CENTER SITE EMERGENCY PLAN

Docket No. 50-331

The following staff comments follow the format of NUREG-0654:

A. Assignment of Responsibility (Organization Control)

- o The Plan does not include written agreements with Federal, State, and local offsite agencies which would provide assistance during an emergency. These agreements must identify the emergency measures to be provided and the mutually acceptable criteria for their implementation. Further, these agreements must be appended to the plan and should be updated as necessary or at least every two years.

- B. o The Plan does not provide for the "Minimum Shift Staffing for Plant Emergencies" as per Table B-1 of the criteria. Specifically, the Plan does not provide for a (1) HP technician for immediate in-plan surveys, (2) a Rad/Chem technician for immediate chemistry/radio-chemistry analysis, (3) a dedicated communicator for immediate notification and communications, and (4) an additional senior reactor operator for accident assessments. Further, the Plan does not provide for adequate shift augmentation nor does it indicate what means are available to ensure that shift augmentation can be accomplished in a timely manner. Shift augmentation should be in order of precedence to indicate which major functional areas will be augmented in 30 minutes and 60 minutes following declaration of an emergency. The implementation schedule for licensed operators and auxiliary operators and shift technical advisors on shift shall be as specified in the July 31, 1980 letter to all power reactor licensees. Any deficiencies in the other staffing requirements

of Table B-1 must be capable of augmentation within 30 minutes by September 1, 1981 and such deficiencies must be fully removed by April 1, 1982.

C. Emergency Response Support and Resources

- o The Plan does not provide for agreements with the U. S. Department of Energy (DOE) for implementing the DOE Radiological Assistance Plan. The Plan should indicate which organization will request this assistance, (e.g., state, local or operator).
- o The Plan indicates that services from the University of Iowa and that the State Department of Public Health may be utilized during an emergency. The Plan should list the specific services (i.e., radiological laboratory support, dosimetry, environmental monitoring, etc.) to be provided and the expected response times for these services.

D. Emergency Classification System

- o Table D-1 of the DAEC Plan does not include several of the required "licensee actions" as specified in Appendix 1 (NUREG-0610) of the criteria. Specifically the TSC and OSC should be activated for an Alert emergency as well as a Site and General Emergency and the near-site EOF brought to standby status. Periodic plant status updates should be provided to offsite authorities (at least every 15 minutes). These updates should include meteorology assessment and offsite dose estimates. In general, Table D-1 must include all of the "licensee actions" listed in Appendix 1 for an Unusual Event, Alert, Site, and General Emergency.
- o Table D-2 (Emergency Action Levels) of the Plan needs improvement.

Several accident conditions in this Table do not indicate specific instrument readings which will be used to classify the emergency (i.e. containment pressure, temperature and radiation levels; status of ECCS systems; status of major electrical systems). When at all possible, actual reliable and observable instrument readings should be listed for establishing each emergency class, both in the Plan and in the implementing procedures.

o Several emergency initiating conditions were missing in Table D-2. For an Alert Emergency the following were missing:

- a) Severe loss of fuel cladding - high offgas at the air ejector monitor corresponding to a release greater than 5 ci/sec for 16 isotopes decayed 30 minutes.
- b) Fuel damage accident with significant releases of radioactivity to the reactor building.
- c) Loss of all alarms (annunciators) during normal plant operation.
- d) Other plant conditions exist that warrant precautionary activation of the Technical Support Center and near-site Emergency Operations Facility.

For a Site Emergency, the following were missing:

- a) Loss of all alarms (annunciators) for more than 15 minutes and plant not in cold shutdown or plant transient initiated while all alarms lost.
- b) Imminent loss of physical control of the plant.
- c) Other plant conditions exist that warrant activation of emergency centers and monitoring teams and a precautionary

public notification.

- d) Degraded core with possible loss of coolable geometry (indication should include instrumentation to detect inadequate core cooling, coolant activity and/or containment radioactive levels).

For a General Emergency, the following were missing:

- a) Loss of physical control of the facility
- b) Loss of 2 of 3 fission product barriers with a potential loss of 3rd barrier, (e.g., loss of core geometry and primary coolant boundary and high potential for loss of containment). Indicators should include instruments to detect coolant activity or sample results, containment radioactivity level, containment pressure and temperature level, and containment cooling systems.
- c) Other plant conditions exist from whatever source, that make release of large amounts of radioactivity in a short time period possible, e.g., any core melt situation. See the specific BWR sequence in Appendix 1 of the criteria.

#### E. Notification Methods and Procedures

- o The Plan does not indicate that an Early Warning System meeting the design objectives of Appendix 3 of the criteria will be developed. The Plan should address the administrative and physical means, and the time required to promptly notify the public of an emergency. The Plan should commit to the establishment of such a system and indicate when the system will be operational. It is the licensee's responsibility to ensure that such means exist, regardless of who implements this requirement.
- o Several sections in the Plan (Sections A, E, and F indicate that

the TSC, OSC, and EOF will not be activated for an Alert Emergency.

In our view, these centers should be activated for any Alert Emergency.

The Plan should be corrected to indicate this.

G. Public Information

- o The Public Information Program described in the Plan does not provide information for the transient adult population within 10 miles from the site. This population would include campers or other recreational personnel within the 10 mile Emergency Planning Zone.
- o The Plan does not include an actual sample of the Public Information Program which will be distributed to the public. This Program will be reviewed by the NRC to determine that it meets the planning objective.

H. Emergency Facilities and Equipment

- o The Plan indicates the OSC or TSC will provide a central point for receipt and analysis of field monitoring data. In our view, this function should be implemented at the near-site EOF. This should be corrected.
- o The Plan indicates floor plans for the TSC, OSC, and EOF will be provided at some later date. This item will be reviewed later.
- o The Plan does not provide a map showing the locations of fixed radiological monitoring equipment (i.e., air samples and TLDS) and, as a minimum, must meet the NRC Radiological Assessment Branch Technical Position for the Environmental Radiological Monitoring Program.

- o The Plan does not properly identify onsite monitoring systems which will be used for accident classification and assessment. Specifically, the type, range and location of these instruments (i.e., meteorological, hydrological, seismic, radiological effluents and reactor process monitors) should be indicated in the Plan. EALs should be calculated using these instruments and factored into Table D-2.
- o The Plan does not identify offsite meteorological capability in the vicinity of the nuclear facility.
- o The Plan does not provide meteorological instrumentation and procedures which satisfy the criteria in Appendix 2, and provisions to obtain representative real-time meteorological information from other sources.

I. Accident Assessment

- o The Plan briefly describes the method and technique for determining the source term of release of radioactivity within containment. However, the Plan should include a plot or graph indicating the relationship between the containmmnet radiation monitor(s) reading(s) and radioactive material available for release from containment.
- o The Plan indicates that instrumentation is available to detect and measure radioiodine concentrations in air in the site vicinity as low as  $5 \times 10^{-8}$  uci/cc under field conditions. The Plan should be more specific and describe this capability and indicate where these instruments are located.
- o The Plan does not adequately describe field monitoring team composition, equipment or estimated deployment times. The teams



must be capable of assessing any radiological hazard through liquid or gaseous release pathways.

- o The Plan (Section 2.10) indicates that the licensee is presently evaluating the installation and implementation of an interactive mini-computer system which will have the capability to integrate plant meteorological data, effluent release data, and measured radiological field data on a real time basis. When this system is operational, the Plan should be revised to reflect this capability.

J. Protective Response

- o The Plan does not make provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density and specific radiological conditions.
- o The Plan is not clear regarding radiological monitoring of people evacuated from the site. Specifically, the Plan does not indicate where this monitoring is to be conducted.
- o The Plan does not adequately address site evacuation or offsite decontamination capability. It is not clear where site evacuees are going to be relocated, monitored, and (if necessary) decontaminated. Further, the Plan does not indicate that non-essential personnel will be evacuated for a Site or General Emergency.
- o The Plan is not clear regarding the use and dissemination of radioprotective drugs (KI) to onsite personnel. Specifically, it is not clear where the drugs are located, who will authorize its use, and what criteria are developed for determining administration of the drug.

- o The Plan does not establish a mechanism for recommending protective action to the appropriate State and local authorities regarding exposures resulting from the ingestion exposure pathway (50 miles EPZ). These recommendations should be consistent with those of HSS (old HEW)/FDA regarding radioactive contamination of human food and animal feeds as published in the Federal Register of December 15, 1978 (43 FR 58790). Procedures to assess this pathway should be developed (i.e., public water intake restrictions, milk-pathway restrictions, etc.).
- o The Plan does not contain a summary of the Evacuation Time Estimate Study which was conducted for Linn and Benton Counties. These times should be factored in the Plan and used to help determine the appropriate protective measures for the public (evacuation or sheltering). Further, local protection factors afforded in residential units for direct and inhalation exposure should be identified and factored into the Plan.
- o The Plan does not include maps showing evacuation routes, evacuation areas, relocation centers in host areas, shelter areas, and hospital and other medical facilities for the plume exposure pathways. Further, the Plan does not include a map showing population distribution around the nuclear facility. This should be by sector and by evacuation areas.

K. Radiological Exposure Control

- o The Plan does not clearly describe the provisions for 24-hour-per-day

capability to determine the doses received by emergency personnel involved in an accident. Specifically, which organization (licensee, vendor, etc.) is going to provide this service.

- o The Plan does not specify action levels for determining the need for decontamination of personnel or equipment.
- o The Plan does not provide the capability for decontaminating re-located onsite personnel, including provisions for extra clothing.

M. Recovery and Reentry Planning and Postaccident Operations

- o The Plan does not establish a method for periodically estimating total population exposure. Procedures to determine total man-rem exposure based on calculated releases or actual environmental measurements should be developed. The Plan should describe the methodology used.

N. Exercises and Drills

- o The Plan does not indicate that an exercise will be conducted between 6:00 p.m. and midnight, and another between midnight and 6:00 a.m. once every six years. This exercise should include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident.