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DESCRIPTION: Ltr trans the following:			ENCLOSURES: Comments on Draft Environmental Statement for the Duane Arnold Energy Center.				
PLANT NAMES: Duane Arnold Energy Center.			<div style="text-align: center;"> <b>ACKNOWLEDGED DO NOT REMOVE</b>  (1 cy rec'd) </div>				

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ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

50-331

25 JAN 1973



OFFICE OF THE  
ADMINISTRATOR

Mr. L. Manning Muntzing  
Director of Regulation  
U.S. Atomic Energy Commission  
Washington, D.C. 20545

Dear Mr. Muntzing:

The Environmental Protection Agency has reviewed the draft environmental statement for the Duane Arnold Energy Center and our detailed comments are enclosed.

Our review indicates that except for radioiodine releases from the turbine building, the center's radioactive waste treatment system is capable of limiting discharges to "as low as practicable" levels. Our assessment indicates that, in the event land in the vicinity of the site boundary is used for pasturing of dairy cows, treatment of turbine building ventilation effluent may be required in order to meet the guidelines of proposed Appendix I to 10 CFR Part 50.

We believe that the construction and operation of the plant, as proposed, will not have a significant impact on the aquatic environment.

We will be pleased to discuss our comments with you or members of your staff.

Sincerely,

A handwritten signature in cursive script that reads 'Sheldon Meyers'.

Sheldon Meyers  
Director  
Office of Federal Activities

Enclosure

ENVIRONMENTAL PROTECTION AGENCY

Washington, D.C. 20450

JANUARY 1973

ENVIRONMENTAL IMPACT STATEMENT COMMENTS

Duane Arnold Energy Center

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## INTRODUCTION AND CONCLUSIONS

The Environmental Protection Agency (EPA) has reviewed the draft environmental statement for the Duane Arnold Energy Center prepared by the U.S. Atomic Energy Commission (AEC) and issued on November 20, 1972.

Following are our major conclusions:

1. Except for radioiodine releases from the turbine building, the capabilities provided by the waste management equipment appear to be consistent with the concept of "as low as practicable." The estimated quantity of radioiodine released via component leakage and subsequently released through the turbine building ventilation system leads to predicted concentrations and thyroid doses which exceed the guidelines of proposed Appendix I to 10 CFR Part 50. In the event dairy cows become pastured nearer the site boundary, potential thyroid doses via the air-cow-milk pathway may be such that additional effluent control measures will be required to limit radioiodine releases from this source.
2. The EPA expects that the construction and operation of this plant, as proposed, will not result in a significant adverse impact upon the aquatic environment and that the proposed discharges will meet the present water quality standards. However, the final statement should provide additional assurance that chlorine concentrations in the blowdown water will be maintained at levels consistent with the preservation of area biota.

## RADIOLOGICAL ASPECTS

### Radioactive Waste Management

Except for potential radioiodine releases, the radioactive waste treatment systems provided for the Duane Arnold Energy Center appear to be capable of limiting releases of radioactive wastes to within the guidelines of the proposed Appendix I to 10 CFR Part 50. Our analysis indicates that the radioiodine effluent from the turbine building ventilation system may exceed the proposed guidelines.

### Dose Assessment

Our calculations indicate that the maximum concentration of iodine-131 at the site boundary will be two orders of magnitude above the  $10^{-15}$   $\mu\text{Ci/ml}$  guideline given in the proposed Appendix I to 10 CFR Part 50. If dairy cows were to be pastured where such radioiodine concentrations prevail, annual child thyroid doses of hundreds of millirems could potentially result through the air-cow-milk pathway. The draft statement indicates that the nearest "... identifiable dairy herd is pastured about 1.6 miles to the west-northwest..." and that the annual child thyroid dose will be less than 6.5 millirems from the consumption of milk from this source. Therefore, it appears that radioiodine effluents will exceed the guidelines of proposed Appendix I. Further, we note that land suitable for pasture lies nearer the site than 1.6 miles, and there are three occupied farm houses within 1 mile of the site, and approximately 7,000 dairy cows are pastured within 10 miles. The final statement should identify the location of the nearest cow, and include an estimate of the potential thyroid dose from this cow. The statement should also describe: (1) how the applicant will

assure that dairy cows are not pastured near the site boundary where radioiodine concentrations are high and (2) what steps the applicant will take in the event dairy cows become pastured in the vicinity of the site boundary.

The draft statement indicates that the direct dose from on-site sources will be less than 1 millirem per year. Our analysis, however, based on a nominal 2-ft of ordinary concrete shielding, indicates that the direct dose from nitrogen-16 in the turbine alone can be expected to be 20 to 30 millirems per year at the site boundary of the Duane Arnold Energy Center. We are pleased to note that the applicant has recently committed himself to the installation of additional shielding in the turbine building to reduce direct dose. Even with the additional shielding, the applicant's calculated annual doses are 20 to 30 millirems. The final statement should include the bases and assumptions used to arrive at the estimate of "...less than one mrem/yr at the closest approach...." Also, a determination should be made as to what levels of turbine shine doses will require corrective action and what corrective action will be taken if needed. Interpretation by the AEC on allowable direct shine doses is necessary since the proposed Appendix I to 10 CFR Part 50 does not address direct radiation doses.

The draft statement indicates that water "... downstream from the plant ... is no longer used for drinking water...." However, Table 5.5 presents estimates of individual and population doses from Cedar Rapids tap water during normal operations, but does not give the bases and assumptions used in making these estimates. The applicant's environmental report indicates that the City of Cedar Rapids draws water

from wells near the river bank, and some of the recharge for these wells comes from the Cedar River as water is withdrawn to supply the municipal system. The final statement should describe the details of this indirect use of river water for human consumption purposes, including pertinent details such as settling, filtration, decay time, and dilution factors.

#### Transportation and Reactor Accidents

In its review of nuclear power plants, EPA has identified a need for additional information on two types of accidents which could result in radiation exposure to the public: (1) those involving transportation of spent fuel and radioactive wastes and (2) in-plant accidents. Since these accidents are common to all nuclear power plants, the environmental risk for each type of accident is amenable to a general analysis. Although the AEC has done considerable work for a number of years on the safety aspects of such accidents, we believe that a thorough analysis of the probabilities of occurrence and the expected consequences of such accidents would result in a better understanding of the environmental risks than a less-detailed examination of the questions on a case-by-case basis. For this reason we have reached an understanding with the AEC that they will conduct such analyses with EPA participation concurrent with review of impact statements for individual facilities and will make the results available in the near future. We are taking this approach primarily because we believe that any changes in equipment or operating procedures for individual plants required as a result of the investigations could be included without appreciable change in the overall plant design. If major redesign of the plants to include engineering

changes were expected or if an immediate public or environmental risk were being taken while these two issues were being resolved, we would, of course, make our concerns known.

The statement concludes "... that the environmental risks due to postulated radiological accidents are exceedingly small." This conclusion is based on the standard accident assumptions and guidance issued by the AEC for light-water-cooled reactors as a proposed amendment to Appendix D of 10 CFR Part 50 on December 1, 1971. EPA commented on this proposed amendment in a letter to the Commission on January 13, 1972. These comments essentially raised the necessity for a detailed discussion of the technical bases of the assumptions involved in determining the various classes of accidents and expected consequences. We believe that the general analysis mentioned above will be adequate to resolve these points and that the AEC will apply the results to all licensed facilities.



## NON-RADIOLOGICAL ASPECTS

### Thermal and Biological Effects

The Duane Arnold Energy Center has one boiling-water reactor which produces a gross electrical output of 550 MW. Condenser cooling will be accomplished by evaporative, forced-draft cooling towers within a closed-cycle cooling system. Makeup water for the cooling system will be drawn from Cedar River at the rate of 11,000 gallons per minute (gpm) and at an intake velocity not to exceed 0.75 feet per second. Cooling-tower blowdown will be discharged downstream from the intake at the design rate of 4,000 gpm.

Iowa water quality standards, applicable to the Cedar River, limit stream temperature to a maximum of 90°F and a maximum rise over ambient river temperature of 5°F. Water sampling to determine conformance with these thermal requirements is to be done at a sufficient distance downstream from the discharge to allow adequate mixing.

The highest discharge temperature is expected to be 91.5°F, and the highest discharge temperature increase above ambient is expected to be 40.5°F. The surface area encompassed by the 2°F isotherm is expected to be less than one acre, under the worst conditions of river flow and temperature. Since the thermal plume is unusually small, and the applicable water quality standards allow a mixing zone, it appears likely that the applicant will be in compliance with the applicable thermal standards.

The applicant should be aware that the 1972 Amendments to the Federal Water Pollution Control Act (Public Law 92-500) define the thermal component of any discharge as a pollutant. EPA is required by this law to set effluent guidelines, by the fall of 1973, for pollutants discharged from steam electric power plants. Effluent discharges from the Duane Arnold Energy Center will have to be in accordance with the requirements of Public Law 92-500.

The proposed monitoring plans of the applicant appear to be adequate to determine the thermal impact of the plant on the aquatic biota.

Chemical Impact on Biota

Chlorine, for which standards are not presently established, will be used for defouling of the condenser cooling system. The draft statement presents an extensive discussion of (1) the potential impact of residual chlorine on the aquatic environment, (2) a thorough chlorine monitoring system, and (3) numerous alternatives to the use of chlorine for defouling the condenser cooling system. The applicant's present plans call for intermittent application of chlorine, during the initial stage of plant operation, which may result in high residual chlorine levels in the blowdown. We propose that the applicant consider, as an additional alternative, a continuous application of chlorine on the following schedule:

<u>TYPE OF CRITERION</u>	<u>RECOMMENDATION FOR TOTAL RESIDUAL CHLORINE</u>	<u>DEGREE OF PROTECTION</u>
Continuous	A. Not to exceed 0.01 mg/l	This concentration would probably not protect fish reproduction, some important fish food organisms, and could be lethal to sensitive life stages of sensitive fish species.
	B. Not to exceed 0.002 mg/l	This concentration should protect most aquatic organisms.

ADDITIONAL COMMENTS

During the review we noted in certain instances that the draft statement did not present sufficient information to substantiate the conclusions presented. We recognize that much of this information is not of major importance in evaluating the environmental impact of the Duane Arnold Energy Center. The cumulative effects, however, could be significant. It would, therefore, be helpful in determining the impact of the plant if the following topics were addressed in the final statement:

1. The inhalation dose estimates given in Table 5.4 of the draft statement are one to two orders of magnitude lower than indicated by our calculations. Even so, the inhalation dose does not appear to be a significant component of the individual or population dose commitment. However, the final statement should include revised estimates of inhalation doses, or should state the bases and assumptions used in the calculations which lead to the lower estimates.
2. The draft statement indicates that plant laundry will be done off-site by an outside contractor, and potential releases of radioactivity from laundry processing are not included in the statement. Such releases are a part of the total impact of the center, and should be considered. The final statement should include estimates of the annual amounts of radioactivity leaving the site with the laundry and the amount entering the biosphere through this pathway. The final statement should also discuss the monitoring and surveillance activities which will be employed by the applicant to quantify the radioactivity entering the biosphere through this source, and should include an assessment of the resulting environmental impact.

3. The applicant plans to use 1,500 gpm of well water for demineralizer makeup, drinking water, and the dry-well area air-cooling system. This large drawdown of ground water may reduce or eliminate flow to privately owned wells in the area. If this occurs, and a large number of wells are affected, the applicant should consider the following alternatives:

(a) Installation of a closed-cycle water system with a water-cooler unit. In this way, the portion of the water used for dry-well area cooling could be maintained at the required 50°F. The draft statement makes no comment on the source of the 110 gpm of water required for drinking and demineralizer makeup if this alternative is used.

(b) Return the well water to the aquifer, after use, by injection back into the ground.

If only a few private wells are adversely affected, the benefits of using one of the above-mentioned alternatives would probably not be considered sufficient to warrant the cost. The final statement should discuss the remedial action to be taken if this is the case.

4. Contingency plans and measures to control accidental spillage of liquids such as oil, liquid chlorine, acid, and caustic are mentioned in the applicant's Environmental Report and should be referenced in the final statement.

5. Temperature data for the Cedar River for the period 1944 to 1954 are summarized in Table 3.2. Similar treatment of 1960 to 1970 temperature data, if available, should be presented in the final statement in order to supply a more accurate picture of present river conditions.

6. The effects of the plant heating boiler system on air quality should be discussed including:

- (a) fuel type and specifications, including sulfur content and BTU rating,
- (b) fuel use rate and expected number of hours of use annually,
- (c) emission rates for particulates,  $\text{SO}_2$ , and  $\text{NO}_2$ , and
- (d) maximum ground level concentrations of boiler emissions and where they occur.

Regulatory

File Cy.

