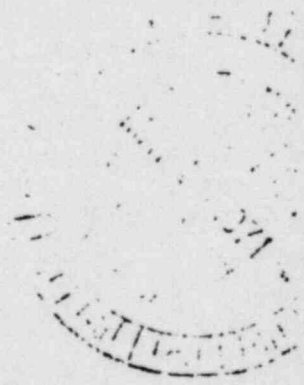


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ENVIRONMENTAL IMPACT REVIEW
MIDLAND PLANT UNITS 1 AND 2



Coordinated By
Radiation Office
ENVIRONMENTAL PROTECTION AGENCY
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PREFACE

This report is one of a series designed to summarize the results of evaluations by the Environmental Protection Agency of the environmental effects of nuclear facilities. The evaluation is based on a detailed technical review of design information for the facility as well as the "Draft Detailed Statement on Environmental Considerations" submitted by the Atomic Energy Commission pursuant to the requirements of the National Environmental Policy Act of 1969. The reviews are coordinated with the operating offices of the Environmental Protection Agency by the Division of Technology Assessment, Radiation Office. The Water Quality Office has the major role in developing comments on thermal effects and general water quality; comments by other offices are included as appropriate for specific problem areas. As part of this review process, several technical documents have been developed and referenced to support the discussion presented.

The evaluation presented in this report is directly responsive to the requirements placed on Federal agencies by the National Environmental Policy Act and as such is intended to state the position of the Environmental Protection Agency on the environmental effects of carrying out the various nuclear activities. The report is also intended to provide information to the State involved for its use in developing and conducting environmental programs that may be related to the particular nuclear activity.

INTRODUCTION AND CONCLUSIONS

This report summarizes an evaluation of the potential environmental effects of the Midland Plant Units 1 and 2, proposed for construction near Midland, Michigan. The plant will be located on the south shore of the Tittabawassee River and will utilize a large pond for condenser cooling water. A distinguishing feature of the facility is that it is the first plant designed to supply process steam for an industry. About 25 percent (4,050,000 lb/hr) of the plant's steam energy will be supplied to the Dow Chemical Company for manufacturing chemicals and plastics at its Midland Plant. The steam for both units will be produced by a pressurized water reactor (PWR) operating at 2,552 MWt or 650 MWe. Both units 1 and 2 will be supplied by the Westinghouse Electric Corporation; commercial service is scheduled for November, 1974 and November, 1975, respectively.

This evaluation is based on design information⁽¹⁾ and an Environmental Report⁽²⁾ provided by the Consumers Power Company in support of an application for a construction permit and the Atomic Energy Commission's Draft Environmental Statement.⁽³⁾ This review considered the site suitability, the adequacy of waste treatment, the potential radiological impact on the environment, the proposed environmental surveillance program, the documented emergency planning activities, the radiation problems presented by the furnishing of process steam from the plant to the Dow Chemical Company's Midland operations and water quality effects. The principal conclusions are:

- 1) The facility can be operated well within the regulations for unrestricted areas specified in 10CFR20, within the guidance of the Federal Radiation Council, and within applicable water quality standards.
- 2) The main factor in siting the Midland plant appears to be the proximity of the Dow Chemical Company plant which will utilize process steam produced by the nuclear generators. There appear to be no major compromises made on the site to accomplish this feature; therefore, the site is concluded to be suitable for the facility as planned.
- 3) Since the operator has available several options for treating both liquid and gaseous wastes, he should routinely use the processing route which will result in the lowest practicable effluent level. In this context it is suggested that gaseous wastes not be discharged until sufficient decay has occurred for the mixture to be essentially krypton-85 (about 95%), a criterion that can be met by a holdup time of approximately 60 days.
- 4) Plant operating procedures concerning radioactivity levels in process steam and the monitoring systems to be used are not sufficiently complete at this stage to permit evaluation of potential hazards. A more detailed operational plan which describes the monitoring system should be developed and included in the final environmental statement.

- 5) In order to evaluate the potential environmental impact of radioactive waste discharges from the Midland Plant, the Atomic Energy Commission should include the results of a population dose assessment for the facility in its Detailed Environmental Statement.
- 6) The proposed environmental surveillance program is generally adequate for assessment of environmental and public health effects from radioactive effluents that will occur as a result of operating the facility.
- 7) Emergency planning for the facility is incomplete at this stage of the application. Detailed plans need to be developed that clearly show relationships between the operator and the Michigan Department of Health for all non-routine releases of radioactivity to the environment.
- 8) If the conclusions presented in this report are given proper consideration, other alternate actions which would reduce the levels of radioactive effluents do not appear to be necessary since the facility can, in our judgment, be constructed and operated without a significant radiological impact on the environment or the public.

WASTE TREATMENT

Liquids: The liquid waste treatment system proposed for the Midland Plant^(1,2,3) has the capability to reduce discharges of radioactivity in the liquid waste to the lowest level practicable. However, the attainment of this objective is directly dependent on the selection

of the specific flowpath through the several available treatment systems. The flowpath routinely used should be the one which will insure that the effluent radioactivity is at the lowest practicable level.

In order to more fully ascertain the water quality effects of the operation of the Midland Plant, it is requested that additional information be supplied on the impact of the thermal and chemical discharges on the fish population of the Titabawassee River. Further details are also requested on the amount and types of chemical wastes, other than sulfates, which will be discharges into the river, and on the concentration of dissolved solids in the blowdown wastes discharged from the cooling pond, especially those discharges following periods of low river flow.

Gases: The gaseous waste treatment system described by the applicant (12, has available for use four waste-gas decay tanks. The description of this system includes a statement to the effect that it is possible to compress the waste gas and store the compressed gas in these tanks to allow for radioactive decay. No mention is made in the system description, however, of the criteria governing the use of these tanks other than that they can be used if the activity of the gas is too high for immediate discharge. The applicant states that, under expected operating conditions, the waste gas will be discharged directly, after filtration, from the waste gas surge tanks. In our judgment, these discharges should be reduced to as low a level as practicable since they contain noble gases such as xenon which produce whole body doses. Most holdup periods achievable with current technology

would not appreciably reduce the quantities of ^{85}Kr ; however, the resulting beta radiation doses from the small quantities expected would, in our opinion, be negligible. It would be prudent to reduce gaseous discharges to a point that essentially all the off-site doses would be from ^{85}Kr . Since several options are available to the operator for treating gaseous wastes of varying compositions and amounts, we would propose as a general criterion that radioactive noble gases be discharged only when the total mixture is essentially ^{85}Kr (about 95%). We feel that a determination should be made of the operating specifications that meet this general criterion and such a requirement should be placed on the discharge of radioactive gaseous waste from the Midland Plant. If the reduction is to be achieved by gaseous waste holdup alone, a holdup time of about 60 days would normally satisfy this criterion for typical estimates of PWR fission product production.

PROCESS STEAM SYSTEM

Most of the steam delivered to the adjacent Dow Chemical Company plant will be condensed and returned as heated feedwater after use in various chemical processes. The steam not condensed will be replaced with treated makeup water. A tertiary water cycle with a heat exchanger between the secondary and tertiary systems is discussed in Amendments 15-19 of the PSAR⁽¹⁾. This system is designed to prevent any radionuclides found in the secondary system due to primary to secondary leakage from being transported to the Dow Plant. The applicant plans to use an on-line continuous gamma monitor that will

alarm in the control room if the level of radioactivity exceeds 3×10^{-6} $\mu\text{Ci/cc}$, in the process steam line to the Dow plant. There will also be a continuous monitor on the secondary steam system. These monitors are to help insure that radioactivity is not released to Dow at concentrations in the steam significantly greater than the background beta-gamma levels of Lake Huron water.

There is no indication as to whether or not the above course of action is initiated automatically, nor how long it will take to switch from one heat exchanger to the other, nor how much radioactivity could possible enter the tertiary system during this time period. More information relating to this monitoring system is needed to permit a full evaluation of this operation.

ENVIRONMENTAL IMPACT

In our opinion, the most significant radiological effect due to the operation of the Midland Plant will be the population dose which will occur. An estimate of the radiation doses to the population during normal operation of the plant is essential for evaluating the potential radiological effects on the population.

A population dose assessment should be included for review which includes calculations of potential total doses from all critical pathways for 1) individuals residing in the plant's immediate environs; and 2) the exposed population within 50 miles of the plant expressed as man-rem/yr, taking into consideration environmental and demographic

factors. The results of such an assessment should be expressed in the context of the recommendation of the Federal Radiation Council that the benefit expected should outweigh the risk that must be assumed. The criterion that should be satisfied is that the risk is so low that it is obvious the benefit far outweighs it. Therefore, a dose assessment should be presented and analyzed in this context by the Atomic Energy Commission in its Environmental Statement for the Midland Plant.

ENVIRONMENTAL SURVEILLANCE PROGRAM

The applicant's environmental surveillance program is generally of sufficient scope to allow an adequate evaluation of the plant's environmental impact. One additional item which should be included, however, is a detailed plan for the sampling of non-aquatic foodstuffs. We believe that the applicant should document the extent to which he, or some other Federal or State agency, will sample such items as milk and the various crops grown in the area. In addition, we suggest that the applicant indicate the degree to which he plans to coordinate his proposed environmental surveillance programs with that of the Michigan Department of Health. Such coordination would be helpful to the Department in gaining maximum efficiency from its surveillance of the effects of the operation of the facility on the environment.

EMERGENCY PLANNING

The emergency planning information presented by the applicant in the PSAR⁽¹⁾ appears to be quite comprehensive with respect to the coordination with the Dow Chemical Company and the local police and civil defense authorities. The State Department of Health has the responsibility for evaluating off-site conditions and directing all actions to protect the public in the event of non-routine releases of radioactivity. The arrangement between the company and the State Department of Health has not been clearly delineated in regard to this aspect of the emergency plan.

REFERENCES

1. Midland Plant--Units 1 and 2, "Preliminary Safety Analysis Report with Amendments," Docket Nos. 50-329 and 50-330, Public Document Room, U.S. Atomic Energy Commission, Washington, D.C., January 13, 1969.
2. Midland Plant--Units 1 and 2, "Applicant's Environmental Report, Construction Permit Stage," Ibid., July 24, 1970.
3. U.S. Atomic Energy Commission. "Draft Detailed Statement of the Environmental Considerations by the Division of Reactor Licensing U.S. Atomic Energy Commission, Related to the Proposed Construction of the Midland Plant Units 1 and 2 by the Consumers Power Company, Docket Nos. 50-329 and 50-330." AEC Public Document Room, February 5, 1971.