

March 4, 1985

Docket No. 50-282
and 50-306

Mr. D. M. Musolf
Nuclear Support Services Department
Northern States Power Company
414 Nicollet Mall
Midland Square - 4th Floor
Minneapolis, Minnesota 55401

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Dear Mr. Musolf:

The Commission has completed review of your Control Room Habitability Study submitted by letters dated January 30, 1981, July 20 1981, and July 9, 1984, for the Prairie Island Nuclear Generating Plant Unit Nos. 1 and 2. Our review covers the effects of the control room habitability from the toxic gases of ammonia, hydrogen chloride and formaldehyde as reported by your consultant, Bechtel Power Corporation (June 20, 1984).

Based on our evaluation of your submittals, we conclude that the monitoring system associated with these toxic gases (i.e., ammonia, hydrochloric and formaldehyde) are not necessary and there is no need to continue maintaining these monitors operable. However, we require that you institute the training program as you proposed to assure toxic gas detection by the operators which includes donning self contained breathing apparatus during such emergencies and to manually isolate the control room in the event of noticeable toxic chemical odors.

A copy of our Safety Evaluation is enclosed.

Sincerely,

Original signed by:

James R. Miller, Chief
Operating Reactors Branch #3
Division of Licensing

Enclosure:
Safety Evaluation

cc w/enclosure
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-282 AND 50-306
CONTROL ROOM HABITABILITY-TOXIC GAS
(AMMONIA, HYDROGEN CHLORIDE & FORMALDEHYDE)

Introduction

In response to the requirements of the Task Action Plan as promulgated in NUREG-0737, the licensee submitted a response to Item III.D.3.4 dated January 30, 1981. This response proposed control room habitability system modifications, and the staff accepted the design subject to the implementation of those modifications. Included in those modifications were detectors for the toxic gases ammonia, hydrogen chloride and formaldehyde, which are shipped in anhydrous form along transportation routes in the site vicinity. These detectors were located in the control room ventilation system air intake to automatically cause control room isolation upon the detection of those three gases in the outside air at concentrations above the threshold limit values established for long-term exposure in the chemical process industry.

The licensee installed the proposed protection against these three gases, but experienced difficulties with the detectors, which proved unreliable. In a further submittal dated July 9, 1984, the licensee proposed to replace ammonia, hydrogen chloride and formaldehyde detectors by a training program in which control room operators would be taught to recognize these gases by smell and react before incapacitation would occur. Included in this submittal was an analysis demonstrating that the increase in control room air concentrations of any of these three gases following their accidental release would be sufficiently slow to permit human detection and manual isolation. This analysis used a gas concentration exposure model from NUREG/CR-1741, and time to respond to odor detection from Regulatory Guide 1.78.

Staff Evaluation

The staff has independently analyzed the concentrations of ammonia, hydrogen chloride and formaldehyde as functions of time following postulated spills at the nearest transportation route location and unfavorable weather conditions. In all three cases it was apparent that a noticeable stench would appear within

the control room two or more minutes before potentially incapacitating concentrations. This meets the response time criterion of Regulatory Guide 1.78, allowing human response. All three gases are toxic primarily by nature of chemical attack upon exposed tissue rather than poisonous effects upon metabolic function. The staff concludes that, with the institution of the training program proposed, automatic isolation of the control room against ammonia, hydrogen chloride and formaldehyde is unnecessary.

The training program should assure that, upon detection of any noticeable chemical odor, operators will manually isolate the control room and don self-contained breathing apparatus.

Principal Contributor:

J. Read