

**Omaha Public Power District**

P.O. Box 399 Hwy. 75 - North of Ft. Calhoun Fort Calhoun, NE 68023-0399  
402/636-2000

January 17, 1995  
LIC-95-0007

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Station PI-137  
Washington, D. C. 20555

References: 1. Docket No. 50-285  
2. Letter from NRC (S. D. Bloom) to OPPD (T. L. Patterson) dated  
November 23, 1994

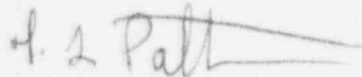
Gentlemen:

SUBJECT: Request for Additional Information (RAI) to assist closure of NRR  
Staff review of Fort Calhoun Revised Evaluation of Control Room  
Habitability (TAC No. M90495)

As requested by the NRC Staff, attached are responses from Omaha Public Power  
District to the RAI transmitted by Reference 2. Included is a large size area  
drawing referred to in the first response.

Please contact me if you have further questions.

Sincerely,



T. L. Patterson  
Division Manager  
Nuclear Operations

TLP/tcm

Attachments

- c: LeBoeuf, Lamb, Greene & MacRae (w/o drawing)  
L. J. Callan, NRC Regional Administrator, Region IV (w/o drawing)  
R. P. Mullikin, NRC Senior Resident Inspector (w/o drawing)  
S. D. Bloom, NRC Project Manager

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Drawing  
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Additional Information to Assist Closure of NRR Staff Review of Fort Calhoun Station Revised Evaluation of Control Room Habitability (TAC No. M90495)

NRC Request 1

Provide drawings of the Cargill site in relation to the Fort Calhoun plant and of the highways and the rail lines to be used to transport materials for the Cargill operation. The drawing should be scaled so that distances between important points and the plant can be determined for site analysis.

OPPD Response 1

See layout drawing of sites and key transportation routes attached.

NRC Request 2

Identify explosive materials that will be transported into and out of the Cargill facility. Provide maximum expected quantities of such materials and conservative minimum distance between the points of postulated explosion and the plant.

OPPD Response 2

Gasoline and ethanol are the only two explosive materials identified which will be transported into and out of the Cargill facility. The ethanol to be transported out of the plant will be contained in 29,000 gallon railcars. Approximately 6.5 railcars of ethanol per day will be transported from the plant. The gasoline to be transported into the plant will be contained in 28,000 gallon railcars. Approximately 2 railcars of gasoline per week will be transported to the plant.

The minimum distance that the railcars can be from the plant control room air intake is approximately 0.4 miles. The point of closest approach for the railcars to the Fort Calhoun Station switchyard is slightly over 100 feet.

NRC Request 3

When any screening process was used to eliminate certain explosive materials from the safety analysis consideration because of expected small quantities of explosive materials, low probability of explosion, frequencies of shipment, or any other reasons, please discuss the process and provide bases for the criteria used in the process.

OPPD Response 3

The only potentially explosive/flammable materials which were not considered in the explosive analysis were small volumes (i.e., less than or equal to 2 gallons) of cleaning solvents. All other potentially explosive/flammable materials were identified and analyzed for impact on the Fort Calhoun Station.

- (1) In accordance with guidance from NUREG-0542, a five-mile radius was used as the screening criterion to identify sources of hazardous materials that may pose explosive effects to the plant.
- (2) A list of explosive/flammable materials was submitted to Cargill's engineers to determine which, if any, explosive materials would be used, transported, or produced. Cargill identified by quantity all explosive/flammable materials to be used and/or transported at their facility. Cargill also provided best-estimate data for the amount of material to be transported and stored onsite. Gasoline and ethanol were the only materials of significant volume (i.e., greater than 2 gallons) identified by Cargill to be explosive and/or flammable.

NRC Request 4

Provide engineering analyses of the effects on plant structural safety of ground motion and pressure waves from postulated explosions of the hazardous materials. Provide bases and references for the analysis methods, including values for the input and any parameters used.

OPPD Response 4

The first level of the explosive analysis was a deterministic evaluation of the potential explosive hazard to the Control Room. Regulatory Guide (RG) 1.91 and NUREG/CR-5042 recommend using a peak overpressure of 1.0 psi as the threshold below which no significant damage to safety related structures is expected. Two types of explosions were analyzed. One type assumed detonation of the entire contents of a railcar anywhere on the rail line or a tank at the Cargill site. The other type considered detonation of a drifting vapor cloud. Those explosive materials were analyzed for the effects of overpressures and dynamic particle velocities, and compared to site design criteria and NUREG-1407.

Determination of the amount of flammable/explosive material needed to overpressurize the site is based on the equivalent amount of TNT required to generate the same overpressure. The equivalent TNT weight of hydrocarbons was determined based on guidance from NUREG/CR-5042, which states that an upper bound for the TNT equivalent charge is 240% of the hydrocarbon mass. Given the peak overpressure of 1.0 psi recommended by RG 1.91, the scaled distance  $z$  (ft/lb<sup>1/3</sup>) for a blast wave from an explosion of TNT is 45. In each case the scaled distance is the critical parameter used to estimate explosive impacts per RG 1.91.

With respect to ground motion from an explosion, it is not anticipated that any Fort Calhoun Station site safety structures would be impacted. For unconfined vapor clouds the proportion of the energy absorbed by the ground is very small. This is based upon corollaries drawn from experience with underground detonations performed by the United States Geological Survey in California. Minimal ground motion was reported in these tests; therefore, the ground motion input to plant impact was neglected. The pressure effects from the blast wave, which may simulate a seismic motion of a structure, are accounted for in the RG 1.91 analysis.

#### NRC Request 5

On page 5 of the August 19, 1994, submittal, step 1 provided criteria for admitting the chemically hazardous materials for safety analyses: distance between the material and the nuclear plant and frequency of the material shipment. Provide bases for the criteria.

#### OPPD Response 5

Regulatory Guide 1.78 was used as the screening criterion for consideration of hazardous materials stored or situated near the Fort Calhoun Station. Regulatory Guide 1.78 specifies on page 1.78-2 that hazardous chemicals stored or situated at distance greater than five miles from the nuclear facility need not be considered. The analysis submitted to the NRC considered hazardous materials stored or situated within a five-mile radius from Fort Calhoun Station.

With respect to shipment frequency of hazardous materials, the criteria specified in Regulatory Guide 1.78 were used as the basis for our analysis. Regulatory Guide 1.78 states on page 1.78-3 that shipments are defined as being frequent if there are 10 per year for truck traffic, 30 per year for rail traffic, or 50 per year for barge traffic. For explosive hazards, a shipment frequency was not limited since the effects of an explosion would be independent of wind direction.

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