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File No. G9.5.1, G9.8.6

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commisson
Washington, D. C. 20555

Dear Mr. Denton:

River Bend Station Units 1 & 2
Docket Nos. 50-458/50-459

As a result of the November 30, 1983 meeting with reviewers in the Siting Analysis Branch (SAB) of the Nuclear Regulatory Commission (NRC), Gulf States Utilities Company (GSU) provides with this letter the additional justification for the absence of Ammonia and Chlorine Detectors at River Bend Station (RBS). Attachment 1 provides a further analysis of Anhydrous Ammonia Barge traffic and accident probabilities on the Mississippi River. Attachment 2 provides the recent results of discussion with both Cajun Electric Power Cooperative, Inc., Big Cajun No. 2 Power Plant and the Crown-Zellerbach Corporation Paper Mill regarding notification of chlorine spills.

This letter supplements the GSU position forwarded in our letter of October 17, 1983. Together, these letters provide a complete evaluation of toxic chemicals that may affect RBS and show that no adverse affects are expected. This information will be reflected in the Final Safety Analysis Report (FSAR) in a future amendment.

Sincerely,

J. E. Booker

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Manager-Engineering
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/ERG/JWL/kt

ATTACHMENT 1

With regard to a hypothetical ammonia barge accident within 5 miles of River Bend Station (RBS), Gulf States Utilities Company (GSU) has concluded that the rate of occurrence of this type of accident is less than the critical probability of 1.0 X 10(-7) (as specified in Section 2.2.3 of the Standard Review Plan (SRP)).

As indicated in GSU docketed correspondence dated October 17, 1983, the probability of unacceptable meteorological conditions during a hypothetical accident is 4.4 X 10 (-3). This analysis conservatively assumed the probability of an accident is 1; however, a more realistic assessment of the probability of the accident is provided below.

The probability (P) of an ammonia barge accident in the vicinity of RBS, which might jeopardize the Control Room Habitability, was determined from the following equation:

$$P = (B)x(A)x(L)x(D)$$

Where;

B = Probability of a barge accident per river mile per year

A = Probability that ammonia will be on the barge

L = Length of river from which an ammonia spill could potentially have an adverse effect on personnel in the Control Room.

D = Probability of atmospheric dispersion conditions that would result in the Control Room operator having less than 120 seconds between the time the operator detects the ammonia and the time the Control Room reaches the toxic level as defined in Regulatory Guide 1.78.

Discussions with Wilson, Hill, and Associates, an information retrieval contractor for the Department of Transportation, revealed the following accident statistics between January 1974 and October 1983.

Incidents by water	- 226
Incidents in the States of: Ill., Mo., Ky., Tenn., Ark., Miss., La. by water	- 28
Incidents by barge in the States listed	- 4
Incidents by barge in the States listed between Cairo, Ill. and Baton Rouge, La. (726 miles)	- 1

This one accident occurred in Memphis, Tenn. and involved the loading/unloading of cargo (cargo type was not available in the search conducted.) Using this information, the probability of a barge accident per river mile per year is;

$$B = \frac{(1 \text{ Accident})}{(726 \text{ Miles}) \times (9.75 \text{ years}} = 1.4 \times 10(-4) \ \frac{\text{Accidents}}{\text{Mile-Year}}$$

For the same time period, the probability that ammonia would be on the barge was determined according to the following equation:

$$A = \frac{P(A)}{P(BC)} \times \frac{T(BC)}{T(TOT)}$$

Where;

P(A) = Average amount of anhydrous ammonia produced in the U.S.

P(BC) = Average amount of basic chemicals produced in the U.S.

T(BC) = Average tonnage of basic chemicals shipped by barges on the Mississippi River between Cairo, Illinois and Baton Rouge, Louisiana

T(TOT) = Average total tonnage shipped by barge on the Mississippi River between Cairo, Illinois and Baton Rouge, Louisiana

Compilations of data from the Survey of Current Business, a Department of Commerce publication, revealed that between 1974 and 1981, the average amount of anhydrous ammonia and basic chemicals produced in the United States was;

P(A) = 17.54 mil. tons/year
P(B) = 134.64 mil. tons/year

Discussions with the Army Corp of Engineers in New Orleans, Louisiana revealed the average tonnage shipped on the Mississippi River between Cairo, Illiniois and Baton Rouge, Louisiana between 1974 and 1982 was;

T(BC) = 6.661 mil. tons/year
T(TOT) = 104.69 mil. tons/year

Assuming anhydrous ammonia is shipped on the Mississippi River in the same percentage to basic chemicals as that amount which is produced, the probability that ammonia will be on the barge is;

$$A = \frac{(17.54 \text{ mil. tons/year})}{(134.64 \text{ mil. tons/Year})} \times \frac{(6.661 \text{ mil. tons/year})}{(104.69 \text{ mil. tons/year})} = 8.3 \times 10(-3)$$

A value of 8.4 miles for the length of the Mississippi River in a circle of a 5 mile radius centered on RBS is used for the value of L (See FSAR Table 2.1-5).

A value of 4.4 X 10(-3) is used for the value of D. This represents the third tier of Stone & Webster Engineering Corporation's (SWEC) VAPOR computer program, which assesses the frequency of occurrence of wind speed/stability combinations leading to unacceptable Control Room build-up times. See GSU docketed correspondence dated October 17, 1983.

Substituting these values in the equation for P, the probability of an ammonia barge accident in the vicinity of RBS jeopardizing the Control Room personnel is determined to be:

$$P = (2.4 \times 10(-3)) \frac{\text{Accidents}}{\text{Mile-Year}} \times (8.3 \times 10(-3)) \times (8.4 \text{ miles}) \times (4.4 \times 10(-3))$$

$$= 4.3\ 10(-8) \frac{\text{Ammonia Accidents}}{\text{year}}$$

This preceding discussion has several conservatisms which substantiate the values calculated. In determining the accident probability, B, it is important to realize that no collisions between barges or with river structures have occurred on the Mississippi River during the time period studied. In addition, more stringent storage, handling, and transportation procedures are practiced for ammonia than for common cargo reducing the likelihood of an accident and reducing the size and amount of a spill should an accident occur. In determining the probability that ammonia is on a barge, it has been conservatively estimated that anhydrous ammonia accounts for 13% of all basic chemical produced in the U. S. However, our analysis of basic chemical production did not include production of organic basic chemicals which would decrease the anhydrous ammonia percentage. The analysis then assumed that 13% of all Mississippi River basic chemical traffic was anhydrous ammonia. Finally, the meteorological probability, D, includes conservatisms in the areas of odor detection by the human nose and human toxicity limit such that shorter elapsed times yielded a higher meteorogical probability. In addition, the assumptions used by SWEC from NUREG-0570 and Regulatory Guide 1.78 include the absence of crosswind dispersion which leads to direct transport of the spilled chemical to the Control Room air intake.

Based upon these assumptions, the probability of an ammonia barge accident which might jeopardize the Control Room personnel is 4.3 X 10(-8) ammonia accidents per year, which is less thar the 1-in-10 million (1 X 10(-7)) specified in the SRP. In addition to this low probability, the October 17, 1983 letter indicates approximately 120 seconds exist from the time personnel in the Control Room detect ammonia to don self-contained breathing apparatus prior to ammonia reaching toxic concentrations. The combination of these two factors (low probability and ample time for reaction) formulate the basis for GSU's conclusion that ammonia detectors are not warranted in the design of RBS.

References:

Annual Complications from Survey of Current Business Compiled by Bureau of Economic Analysis, U.S. Department of Commerce. Washington, D.C.

Docket 50-458/50-459, River Bend Station, Gulf States Utilities Company letter from Mr. J. E. Booker to Mr. H. R. Denton dated October 17, 1983.

Personal telephone call from J. W. Lawrence (GSU) to Lori Frank (Wilson, Hill, & Assoc./DOT Contractor Washington, D.C., 202-472-1024) on December 19, 1983.

Personal telephone call from J. W. Lawrence (GSU) to David Penick (U.S. Army Corp of Engineers, New Orleans, Louisiana 504-885-6803) on December 15, 1983.

ATTACHMENT 2

Recent follow up discussions with Cajun Electric Power Cooperative, Inc. regarding the storage of chlorine at their Big Cajun No. 2 Power Plant have indicated the following revision to the information currently provided in the RBS FSAR. Chlorine is no longer stored onsite in 50 or 80 ton railroad cars. This storage mechanism was utilized during startup operations at the power plant, but proved to be uneconomical for normal commercial operation. The largest single container currently utilized at Big Cajun No. 2 for storage of chlorine is a one ton cylinder. A postulated release of the contents of this cylinder is calculated to result in maximum Control Room concentrations almost equivalent to the toxicity limits specified in Regulatory Guide 1.78. However, almost fourteen (14) minutes are required for the Main Control Room concentrations to build from the human detection odor threshold concentration to the toxicity limit concentration. Therefore, this case no longer meets the criteria for further evaluation discussed as the second tier of our analysis in our letter of October 17, 1983.

Gulf States Utilities has been included in the Crown Zellerbach Paper Mill's list of notifications to be made in the event of a substantial chlorine release at their facility. This notification is expected to be made within one-half hour of such a release via their Toxic Spill Emergency Procedures as required by Louisiana state regulations. Since previous calculations (outlined in GSU's October 17, 1983 submittal) indicated that River Bend Station Main Control Room concentrations did not reach toxic levels for approximately two hours, this is considered ample advance notification for action to be taken to protect the operators.

The revisions to previous information indicated above and the provision for advance notification supplement GSU's position forwarded in our letter of October 17, 1983 and together are considered to preclude the need for chlorine detectors and automatic control room isolation in the River Bend Station design.