JAN 22 1974

Voss A. Moore, Assistant Director for Light Water Reactors,
Group 2, L

MODIFICATION OF AAB INPUT TO VOGTLE SER

PLANT NAME: Vogtle Units 1-4
LICENSING STAGE: CP
DOCKET NUMBER: 50-424
RESPONSIBLE BRANCH: PWR-2
REQUESTED COMPLETION DATE: N.A.
REVIEW STATUS: AAB Input partially complete

The staff meteorologists have completed an evaluation of the dispersion of an instantaneous release of H_2S at the Savannah River Plant to the Vogtle site. Their analysis predicts a lower X/Q at the Vogtle site than that used by the AAB in its earlier calculations. Our SER input of December 7, 1973, should be changed to reflect this lower X/Q. We have enclosed a modified Habitability System section showing the appropriate changes. The enclosure also reflects changes as a result of Amendment #14 which commits to upgrading the control room for H_2S protection. The H_2S provisions now appear acceptable.

The lower X/Q (based on F stability and a distance of 4.5 miles) essentially eliminates the concern involving the possibility of flammable concentrations of H_2S existing at the site as a result of a catastrophic failure of all H_2S containers at Savannah River. The lower flammability limit is 65 gm H_2S/m^3. We calculate a peak centerline concentration of 20 gm/m^3 based on an instantaneous release of 370 tons of H_2S and a X/Q of $6 \times 10^{-8}\ m^{-3}$.

The applicant still owes us an analysis determining H_2S concentrations at Vogtle and assurance that equipment necessary to shut down the plant will not be permanently impaired by a cloud or plume of H_2S.

Original signed by
H. R. Denton

Harold R. Denton, Assistant Director
for Site Safety
Directorate of Licensing

Enclosure:
AAB Changes

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Docket File (50-424)
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6.4 HABITABILITY SYSTEM

6.4.1 CRITERION 19

The applicant proposes to meet General Design Criterion 19, Control Room, of Appendix A to 10 CFR Part 50, by use of adequate concrete shielding and by installing redundant 17,500 cfm recirculating charcoal filters in the control room ventilation system. An additional 1500 cfm charcoal filter train (also redundant) will be installed for the purpose of pre-filtering make-up air. These filters will be automatically activated upon an accident signal or high radiation signal. We have concluded that the potential radiation doses to control room personnel following a LOCA would be within the guidelines of Criterion 19.

6.4.2 TOXIC GASES

The possible effects on the Vogtle plant of an accidental Hydrogen Sulfide (H_2S) release originating at the Savannah River Plant (SRP) have been reviewed - H_2S is a toxic gas and thus, if not protected against, could overcome control room operators if a substantial release of H_2S were to occur under adverse meteorological conditions. SRP uses large quantities of Hydrogen Sulfide (H_2S) gas at the heavy water production facility (Area D in Figure 2.5). The total quantity of H_2S which can be present is 580 tons including three 100-ton storage tanks, and the balance contained in the process units. We identified three potential concerns:

- Control room operator protection

- Limiting H_2S concentration inside critical plant structures to concentrations below the flammability range (4.3 to 46% H_2S by volume).

- Verifying that an H_2S cloud in the vicinity of the plant will not damage or otherwise seriously effect safety related equipment.

Information received from the Savannah River Plant shows that releases of 12 to 46 tons of H_2S in less than 24 hours have occurred four times in the first 10 of the 20 years of operation of the SRP heavy water facility. On one occassion, 46 tons of H_2S were released within a few minutes. SRP states that subsequent corrective action and an aggressive inspection and preventive maintenance program have significantly reduced the probability of a release from the previously experienced causes. Leaks of 10-30 tons over several hours, though rare, should be considered possible. Rarer yet, would be a catastrophic event such as a complete failure of one of the storage tanks. Such an event would release about 33 tons of H_2S in a puff followed by 67 tons which would boil off over a period of time. However, the tanks have had no special seismic design or flood design. Our design basis for this accident assumes that <u>all</u> containers have ruptured releasing 370 tons instantaneously and the balance of the inventory (210 tons) over a 100-hour period. This is a theoretically possible, but extremely unlikely, event.

The applicant was asked to provide dispersion analyses to estimate the potential hazards of an H_2S release. He was also asked to determine what precautions and plant modifications are necessary to cope with the design basis H_2S release. We have calculated the build-up of H_2S in the control room given the above design basis release. We assumed an instantaneous release under very stable conditions and various winds speeds. Assuming that the control room will be isolated in 15 seconds and an infiltration rate of 100 cfm after isolation, we determined that the operator would be exposed to concentrations of about 10 ppm for a short period of time before the operators are able to protect themselves by doning breathing apparatus. This exposure is acceptable as it will not incapacitate the operators. We conservatively assumed that the plant was not warned of the release and we gave no credit for removal of H_2S by the charcoal filters.

We have determined that flammable concentrations are not likely to exist inside the H_2S cloud (as it passes the Vogtle site) even if the design basis puff release of 370 tons occurs during very stable, low wind conditions.

The applicant was asked to commit to the following design requirements:

1. Quick-acting H_2S detectors

2. Automatic control room isolation

3. Assurance of low control room air infiltration