DEC 19 1973

R. C. DeYoung, Assistant Director for PWR's, L

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: December 7, 1973
REVIEW STATUS: AAB input partially complete

Enclosed is the Accident Analysis Branch input for the Control Room Habitability Section of the Vogtle SER. This section was inadvertently omitted from the AAB input of December 11, 1973.

Original signed by
J. Kastner

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

Enclosure:
AAB Input

cc: w/o encl.:
A. Giambusso
W. McDonald

w/encl.:
S. Hanauer
J. Hendrie
B. Grimes
K. Kniel
L. Crocker
W. Nischan
E. Adensam
K. Murphy

DISTRIBUTION:

Docket File (No. 50-424)
AAB/RDG
AD/SS/L
L/RDG

MEMO

OFFICE	AAB/L	AAB/L	AAB/L	AD/SS/L		
SURNAME	KMurphy/tam	WNischan	BKGrimes	HRDenton		
DATE	12/14/73	12/ /73	12/19/73	12/ /73		

9.4 HABITABILITY SYSTEM

9.4.1 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.

9.4.2 TOXIC GASES

We are concerned with the possible effects on the Vogtle plant of an accidental Hydrogen Sulfide (H_2S) release originating at the Savannah River Plant (SRP). 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 have identified three basic 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 ignited 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 all 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 has been asked to provide dispersion analyses to estimate the potential hazards of an H_2S release. He has also been 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 theoretical maximum concentrations between 100 to 200 ppm for a short period of time before the operators are able to protect themselves by doning breathing apparatus. This short exposure is considered 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 could theoretically exist inside the H_2S cloud (as it passes the Vogtle site) if a puff release of 25 tons or greater occurs during very stable, low wind conditions.

As a minimum, the applicant will be required to commit to a design which provides the following:

1. Quick-acting H_2S detectors
2. Automatic control room isolation
3. Assurance of low control room air infiltration
4. Prevention of build-up of flammable concentrations in critical plant buidlings For example, by automatically cutting off the make-up air flow into the buildings containing vulnerable safety related equipment

5. Adequate breathing apparatus and protective clothing for operators.
6. Assurance that equipment necessary to shut down the plant will not be permanently impaired by overpressure, fire, or chemical action from a cloud or plume of H_2S in vicinity of plant.

In addition to H_2S, the plant will be prepared to cope with the accidental release of chlorine in the vicinity of the site. The applicant has already committed to the installation of chlorine detectors that will automatically isolate the control room upon detection of chlorine at the fresh air inlets. We believe adequate protection against both H_2S and chlorine will be achieved provided Items 1-6 above are satisfied.

ESF AIR CLEANING SYSTEMS

Although the applicant has agreed to design the engineered safety feature air cleaning systems in conformance with the positions of Regulatory Guide 1.52, the applicant has not provided sufficient information in the PSAR to permit an independent staff asse sment of conformance of those systems to the Regulatory Guide. Information now in the PSAR does not show conformance with all of the Guide recommendations.

The applicant was asked to analyze each ESF air filtration system as to each position in Regulatory Guide 1.52 and to flag each item not in conformance with the Guide recommendations. The response did not include the requested analysis. The applicant has stated that appropriate revisions to the PSAR which demonstrate conformance with Regulatory Guide 1.52 will be submitted.