

**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS**  
**UNITED STATES ATOMIC ENERGY COMMISSION**  
**WASHINGTON. 25, D.C.**

February 6, 1963

Honorable Glenn T. Seaborg  
Chairman  
U. S. Atomic Energy Commission  
Washington, D. C.

Subject: REPORT ON N. S. SAVANNAH

Dear Dr. Seaborg:

At its 46th meeting, January 31 - February 2, 1963, the Advisory Committee on Reactor Safeguards reviewed the request submitted by the AEC-Maritime Joint Group for approval of Proposed Significant Changes No. 13 and No. 18. The Committee had the benefit of the references listed below and discussions with representatives of the AEC-Maritime Group, the Marvel Schebler Corporation, and the Regulatory Staff. Discussions on these changes were also held at a subcommittee meeting November 30, 1962, and the 45th ACRS meeting during December 1962.

It is not intended in this report to review comments made in past Committee reports on this reactor. However, the Committee still believes that a reliable auxiliary power source with adequate maneuvering and propulsion reversing capability should be installed. The Committee believes that the installation of a control rod drive system that will not require an inert gas atmosphere in the primary containment should be carried out as soon as possible.

These and a number of other overhaul items appear to be postponed to some indefinite time beyond their original proposed date at Galveston. This leads the Committee to recommend that there be a complete review of the status of the ship and its proposed post-Galveston operation before it puts to sea again.

In regard to Change No. 13, the proposed ventilation, filter, and monitoring changes should substantially decrease any radioactive releases associated with the reactor compartment. The use of spring-loaded doors and the alarm system proposed will help to assure that

negative pressures will be maintained in the reactor compartment. In addition, the improved installation will reduce temperatures in the reactor compartment and permit more frequent inspections. The Committee believes that the revisions proposed for the filter and ventilation systems provide adequate assurance that they will function properly in event of an accident resulting in the release of fission products to the compartment.

Change No. 18 requests the substitution of hermetically sealed Marvel-Schebler control rod drives instead of the existing hydraulic-electric drives. In general, the Committee is impressed with the advantages to be gained with the new type of rod drive. The Committee has a reservation concerning the lack of a spring to aid in the initiation of rapid rod insertion in event a scram is required.

A new method of rod actuation and control is proposed. This system is novel and unproven. As presently conceived it would give no read-out of individual control rod position in the control room and would operate the rod groups according to a pre-set plan. The Committee can see no valid reason for not indicating the rod position in the control room and recommends that this be done. The Joint Group has stated that it is feasible to do this. In many ways the proposed method of control may prove in the long run to be safer than others. However, this reactor is a first of its kind with no prototype, no hot critical flux measurements, and no incore instrumentation. Therefore, the Committee believes that introduction of this new system should be carried out carefully and prudently. The Committee recommends that the rods, even with the new system, be operated one group at a time from the control room by means of a group select switch as is currently being done with the system now in use.

The Committee believes that the proposed ventilation system changes outlined in Change No. 13 as modified by the Regulatory Staff represent a distinct improvement in safety of the N.S. SAVANNAH. The Committee believes that with the changes stated above, the Marvel-Schebler rod drive system also represents an improvement in safety. However, the Committee cannot recommend full approval of the proposed control system since the testing program has not been completed.

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The Committee specifically cannot recommend any approval of operation beyond Galveston and feels that such approval must await a full review of the ship status at that time.

Sincerely yours,

/s/

D. B. Hall  
Chairman

References:

1. BAW-1249, Vol. I, N.S. SAVANNAH Replacement Control Rod Drives Safeguards Report, dated October 1962.
2. BAW-1249, Vol. II, N.S. SAVANNAH Replacement Control Rod Drives Safeguards Report, dated October 1962.
3. BAW-1203, Vol. I, Nuclear Merchant Ship Reactor Project, Extended Zero Power Tests -- N.S. SAVANNAH Core 1, Final Report, dated January 1961.
4. Proposed Significant Change No. 13, Memo 970/4608, dated August 30, 1962.
5. Proposed Significant Change No. 13, Modified Reactor Space Ventilation Operation Description, Rev. 1, dated November 28, 1962.
6. Answers to Questions Concerning Significant Changes 13 and 18, undated, received January 24, 1963.