

ENCLOSURE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

July 25, 1979

Harold R. Denton
Director, Office of Nuclear Regulatory Regulations

SUBJECT: ACRS REVIEW OF THE FLOATING NUCLEAR PLANT CORE LADLE DESIGN

At the June 27, 1979 ACRS Subcommittee Meeting on the Floating Nuclear Plant, members of your staff requested that the ACRS meet at an early date to discuss the proposed FNP Core Ladle Design and to write a letter to Mr. Gossick commenting on that preliminary design prior to the NRC Staff's issuance of its safety evaluation. The Acting ACRS Subcommittee Chairman informed your staff and representatives of Offshore Power Systems that the suggestion to hold an early ACRS meeting would be considered at the July 1979 ACRS meeting.

The proposal to hold an early ACRS review of the conceptual design of the FNP core ladle was discussed at the July 1979 ACRS meeting. It was decided that additional information, as indicated below, is necessary before the Committee can proceed with its review of the FNP.

a. Items Related to the Impact that the Core Ladle Will Have on Other Containment Structures

1. Calculate the fraction of decay heat radiated from the pool for the proposed design.
2. Calculate the effects of heat radiation in Item 1 on the rate of:
 - (a) disintegration and collapse of exposed concrete
 - (b) disintegration and collapse or melting of concrete behind the 6 inch magnesite brick wall
 - (c) collapse of steel from the reactor cavity.
3. Discuss the consequences of Item 2 with respect to:
 - (a) loss of integrity of superstructures
 - (b) loss of hearth capacity

7909040 052

987359

- (c) impact resistance of the hearth and its supports
 - (d) integrity of structural steel members.
4. Discuss the stability of the 6 inch magnesite brick wall above the hearth level with respect to:
 - (a) loss of brick by spalling
 - (b) differential motion with respect to the hearth, concrete walls, and anchors
 - (c) loss of concrete behind the wall by spalling, disintegration, and melting at calculated temperatures, or at temperatures indicated in Fig IV-6 of OPS Topical Report No. 36A59
 - (d) slagging reaction between the brick walls and melted concrete.
 5. Discuss the fluxing of magnesite brick by siliceous material falling into the hearth.
 6. Discuss the properties and merits of basalt as a concrete aggregate.
 7. Discuss the possibility of the heat flux being higher on the sides of the molten mass than on the bottom (FRG conclusion for concrete melt) with melting going horizontally faster than vertically.

b. Items Related to Three Mile Island Accident

1. Discuss the possibility of the Upper Head Injection System releasing nitrogen into the primary system and impeding the ability to establish or maintain natural circulation.
2. Discuss the acceptability of the single failure criterion.
3. Discuss the timed sequence of events upon the loss of all AC power before core damage will result.
4. Discuss the reliability of the auxiliary feedwater system.
5. Discuss how H₂ buildup in the ice condenser containment is dealt with following a TMI event and following a core melt.
6. Discuss how the FNP compensates for the difficulty, due to the remote location and the lack of space available, in improvising new systems and techniques in case of an accident.
7. Discuss how one faces lack of flexibility for design changes due to the compactness and lack of available space on the FNP.

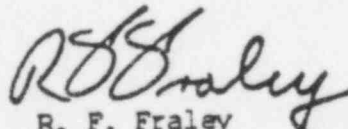
c. Items Concerning the Effects of Changing Base Mat Materials

1. Discuss the effects of changing the base mat from concrete to magnesium oxide on the probability of a major air release during a core melt accident. Discuss the comparisons of probabilities and dose levels for air releases associated with concrete and magnesium oxide during a core melt accident.
2. Discuss the consideration given to the use of a vented containment. Discuss the consideration given to the use of sea water for venting and/or cooling a molten core.
3. Discuss the change in position for allowing the FNP to be placed on riverine and estuarine sites. Has the proposed installation of the core ladle changed the NRC Staff's position on this matter, if so, why? What actions and in what time period, are considered practical to isolate the core for a riverine or estuarine site?
4. Discuss the NRC Staff's position that the FNP Core Ladle is considered an environmental issue and not a safety issue.

d. Additional Information Requested From the NRC Staff

1. Provide available information on the Sandia 100 plant liquid pathway study.
2. Provide available information on the WASH-1400 type study of the ice condenser type plant, along with a comparison for non-ice condenser type plants.

Following receipt of Offshore Power System's response to the items listed above and a written evaluation by the NRC Staff, another ACRS Subcommittee meeting will be held. Please advise us of the date by which you believe the above information will be available so we can schedule related ACRS activities.


R. F. Fraley
Executive Director

cc: D. Muller, DSE
E. Case, NRC
D. Vassallo, DPM
F. Schroeder, DSS