

July 30, 1993

MEMORANDUM FOR: James M. Taylor  
Executive Director for Operations

FROM: Samuel J. Chilk, Secretary /s/

SUBJECT: SECY-93-092 - ISSUES PERTAINING TO THE  
ADVANCED REACTOR (PRISM, MHTGR, AND PIUS) AND  
CANDU 3 DESIGNS AND THEIR RELATIONSHIP TO  
CURRENT REGULATORY REQUIREMENTS

This is to advise you that the Commission (with all Commissioners agreeing) has approved the staff's recommendations in Enclosure 1 to SECY-93-092 as follows:

a. **Accident Evaluation**

The Commission approves the staff's recommendations as well as its response to the ACRS comment.

b. **Source Term**

The Commission approves the staff's recommendations including its agreement with the ACRS. Commissioner Rogers questions whether there is sufficient information on each specific reactor design and fuel design extant to enable the staff's three conditions for a mechanistic analysis to be met. He believes that a mechanistic "scenario specific" source term for each reactor concept warrants further consideration before evaluating the acceptability of the design.

c. **Containment**

The Commission approves the staff's recommendations, including the staff's agreement with the ACRS comment.

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SECY NOTE: SECY-93-092 WAS RELEASED TO THE PUBLIC ON APRIL 14, 1993. THIS SRM AND THE VOTE SHEETS OF ALL COMMISSIONERS WILL BE MADE PUBLICLY AVAILABLE 10 WORKING DAYS FROM THE DATE OF THIS SRM

The Commission believes that, for the MHTGR, the staff should also address the following type of event. The loss of primary coolant pressure boundary integrity whereby air ingress could occur (from the "chimney effect") resulting in a graphite fire and the subsequent loss of integrity of the fuel particle coatings.

d. **Emergency Planning (EP)**

The Commission, with all Commissioners agreeing, believes that at this time it is premature to reach a conclusion on emergency planning for advanced reactors. For ongoing review purposes, the staff should use existing regulatory requirements. However, the staff should remain open to suggestions to simplify the emergency planning requirements for reactors that are designed with greater safety margins. To that end, the staff should submit to the Commission recommendations for proposed technical criteria and methods to use to justify simplification of existing emergency planning requirements.

The Commission agrees with the ACRS recommendation and the staff's agreement that the work on EP should be closely correlated with work on Accident Evaluation and Source Term, in order to avoid unnecessary conservatism. Also, the work on EP for advanced reactors should be coordinated with the approach for evolutionary and passive reactors.

(EDO) (SECY Suspense: 11/93 - priority)

e. **Reactivity Control System**

The Commission has approved the staff's position, including its agreement with the ACRS comment.

f. **Operator Staffing and Function**

The Commission has approved the staff's position, including its agreement with the ACRS comment.

g. **Residual Heat Removal**

The Commission has approved the staff's position, including its agreement with the ACRS comment.

h. **Positive Void Reactivity Coefficient**

The Commission has approved the staff's position, including its agreement with the ACRS comment.

i. **Control Room and Remote Shutdown Area Design**

The Commission (with all Commissioners agreeing) agrees "that, at this time, justification for recommending departure from current requirements is not established."

Additionally, the Commission agrees with both the staff and the ACRS that the staff should be receptive to considering justification for a departure, if it can be provided by the applicants. The preapplication review should be used to evaluate the preapplicant's design to determine whether or not a different approach to designing the main control room and remote shutdown area would be acceptable.

The staff should be aware that pending decisions on the control rooms of passive LWRs may not address satisfactorily the issue of control of the multi-reactor modules presented by PRISM and MHTGR designs. The staff should consider the fundamental design differences between these plants and current LWRs when determining the need for safety grade equipment, seismic qualification, availability of a separate shutdown location, etc., for these advanced reactor designs.

j. **Safety Classification of Structures, Systems, & Components**

The Commission (with all Commissioners agreeing) agreed that resolution of this issue must await future design developments because the MHTGR design is still at an early stage. The staff should first classify the passive LWR SSCs and then consider classification of the MHTGR SSCs, taking into consideration whether current LWR criteria for identification of safety-related SSCs can be applied to the MHTGR design.

The Commission agrees that a prototype for the CANDU-3 is not required for design certification and that insufficient information has been provided on the advanced reactor designs at this time to pursue rulemaking on any of the 10 issues.

In approving the staff's recommendations on these issues, in a number of cases the Commission is accepting general statements or approaches by the staff on how it will proceed with its preapplication review of the advanced reactor and CANDU-3 designs. If and when it becomes apparent that one or more of these designs will be submitted for design certification, it will

be necessary for the staff to identify the data, analyses, acceptance criteria, confirmatory research, and program plans in much greater detail in order that the Commission, the vendors, and the public are more fully aware of the technical regulatory requirements for prototype demonstration (N/A to CANDU-3) and design certification.

On page 12 of Enclosure 1 to SECY-93-092, it is stated for the MHTGR design that "... (2) there is a significantly long time expected for the core to return to criticality after being shut down by the Doppler coefficient without the reactor protection system functioning (i.e., about 37 hours)." Commissioner Remick would appreciate either receiving a copy of the analysis or an informal briefing which explains the above statement. In particular, a common plot of fuel temperature, core power level, and reactivity versus time would be appreciated, if readily available.

cc: The Chairman  
Commissioner Rogers  
Commissioner Remick  
Commissioner de Planque  
OGC  
OCA  
OIG  
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)