

October 30, 1985

MEMORANDUM FOR: Themis P. Speis, Director, Division of Safety Technology,  
Office of Nuclear Reactor Regulation

THROUGH: Thomas L. King, Chief, ARG, Division of Safety Technology,  
Office of Nuclear Reactor Regulation

FROM: Cardis L. Allen, Reactor Engineer, ARG, Division of Safety  
Technology, Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF BRIEFING ON THE HANDLING OF HEAVY LOADS FOR  
THE SAFR PROJECT

On October 11, 1985 representatives from DOE and Rockwell International (RI) presented a briefing describing the proposed approach for handling heavy loads in the Sodium Advanced Fast Reactor (SAFR) project. The presentation included an overview of the plant, a discussion of the heavy load handling criteria, loads, options and cost evaluation as well as a description of the proposed load handling systems and a risk analysis. This briefing was held at the request of RI. They considered their approach of using a single crane to access four reactor modules (including carrying heavy loads over an operating reactor and its containment) to be unique enough to warrant an early interaction and NRC feedback on this subject. The agenda and a list of attendees are enclosed. Copies of the handouts are available in the ARG office. Significant points from the meeting are:

- 1) The criteria to be applied to handling of heavy loads will be consistent with those defined from the resolution of USI Task A-36, "Control of Heavy Loads Near Spent Fuel." These are described in NUREG-0554 (Single-Failure-Proof Cranes for Nuclear Power Plants) and NUREG-0612 (Control of Heavy Loads at Nuclear Power Plants). In addition the system will be required to meet a number of industrial standards (AISC, ANSI, ASTM, ASME, AWS, IEEE, NEMA and CMAA) as described in a draft report on this subject provided by RI.
- 2) Several crane design alternatives were considered and a single-failure proof gantry design was selected based largely on cost. Staff noted that single-failure proof analysis should include failure of the load (i.e., shield plugs, etc.) as well as failure of the crane.
- 3) RI proposed to exclude consideration of load drops as DBAs based on a predicted very low frequency of occurrence (i.e., on the order of  $10^{-6}$  to  $10^{-7}$  per year). Staff noted that load drop analyses will still likely be required, even for single-failure proof design.

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- 4) Staff noted that NUREG-0612 is intended to apply only to routine type loads such as those moved during refueling outages or routine maintenance. One time or infrequent load moves (such as for repair of an IHX or small rotating plug) must be evaluated on a case by case basis. That is, such analyses are not generally done as part of a license application but are done and reviewed at the time the load movement is required.

However, the staff also suggested that it may be desirable to provide analyses of infrequent load movements in advance (perhaps even now) to allow ample time for consideration of alternatives to possible requirements (e.g., interlocks and/or mechanical stops to restrict load paths).

Staff noted that the data base in NUREG-0612 is currently considered adequate.

- 5) Preliminary risk analyses by RI indicated load drops are very low risk contributors. More detailed risk analyses will be provided as part of the PRA. This will include more complete analyses of dropping and toppling of heavy loads that are assumed to penetrate the roof.

Staff suggested risk analyses should include human factors and should consider economic penalty (e.g., plant shutdown) due to load handling accidents.

- 6) Staff concludes that the suggested approach appears acceptable if it is limited to apply to "anticipated routine heavy loads" which can be demonstrated to not penetrate the containment. Movement of non-routine heavy loads would then be handled on a case by case basis.

Rockwell plans to modify their proposal for handling heavy loads and will include their final recommendation in the SAFR-PSID.

If you have any questions or would like to see the handouts for the meeting please let me know.

15/  
Cardis L. Allen, Reactor Engineer  
Advanced Reactors Group  
Division of Safety Technology  
Office of Nuclear Reactor Regulation

Enclosures:  
As stated

OFFICE	ARG:DST:NRR	ARG:DST:NRR					
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DATE	10/30/85	10/30/85					

Enclosure

CRANE MEETING  
October 11, 1985  
Room P-110

NAME

C. Allen  
T. King  
K. Kniel  
O. Parr  
J. Wermiel  
G. Sherwood  
A. Bailey  
R. Lancet

ORGANIZATION

DST/NRR/NRC  
DST/NRR/NRC  
DST/NRR/NRC  
DSI/NRR/NRC  
DSI/NRR/NRC  
DOE  
Bechtel  
Rockwell

Enclosure

RI SAFR LMR  
DOE/RI MEETING WITH NRC  
PHILLIPS BUILDING - ROOM P-110  
OCTOBER 11, 1985

AGENDA

	<u>SUBJECT</u>	<u>PRESENTER</u>
09:00	Introduction	R. Lancet
09:15	Overall Plant Design	R. Lancet
09:45	Criteria	R. Bailey
	Loads	
	Options	
	Costs	
	Proposed Handling Systems (SAFR)	
11:15	Risk Analysis	R. Lancet
11:45	Summary	R. Lancet
12:00	Discussion	All

DISTRIBUTION

Central File

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DST/CHRON

ARG r/f

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J. Wermiel, DSI

T. King

C. Allen

ARG Staff