



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 24, 1997

72-21

NOTE TO: Eric J. Leeds, Section Chief
Spent Fuel Licensing Section
Spent Fuel Project Office

FROM: Stephen McDuffie, Project Scientist
Spent Fuel Licensing Section
Spent Fuel Project Office *Stephen M. Duffie*

SUBJECT: VISIT TO HANFORD FACILITIES TO OBSERVE REMOTE HANDLING EQUIPMENT
SLATED FOR USE AT THE U.S. DEPARTMENT OF ENERGY'S CENTRALIZED
INTERIM STORAGE FACILITY

On July 10, 1997, demonstrations were held of remote handling equipment at U.S. Department of Energy (DOE) facilities in Richland, Washington. These demonstrations were arranged primarily for the benefit of DOE staff and contractors who are managing efforts to design similar equipment to aid cask handling at a centralized interim storage facility (CISF). As the NRC project manager for CISF, I and a member of the Spent Fuel Technical Review Section, Ron Parkhill, were invited to observe the demonstrations.

DOE plans to use some form of tele-operated or robotic equipment to aid cask handling at the CISF, as stated in Chapter 4 of the CISF Topical Safety Analysis Report (TSAR). This equipment will be used for tasks, such as removing personnel barriers and impact limiters from incoming casks, collecting contamination swipes, and installing and removing lifting trunnions. Remote handling equipment will allow significant reductions in occupational radiation doses at the CISF.

The day's activities began with a briefing to participants (13 from DOE and DOE contractors) by Bruce Carlisle of Duke Engineering and Services (DE&S). Mr. Carlisle discussed the operational challenges facing DOE in decommissioning the two K-basin spent fuel pools. Eric Shen, also of DE&S, then described the tele-operated equipment to be used in removing the spent fuel from the K-basin pools. A key point mentioned by Mr. Shen is that tele-operated equipment reduces handling efficiency by a factor of 8 or more, so such equipment should be used only when necessary.

After Mr. Shen's description, the participants visited a mock-up with the prototype equipment slated for use in the K-basin pools. An experienced operator was present to demonstrate the fuel handling maneuvers to be carried out in the pools. Although the operator was quite proficient, the tedious nature of the task was obvious. The operator controlled the tele-operated, hydraulic arm through a joystick, with the arm and the fuel visible only via closed-circuit television.

The prototype observation was followed by a presentation by David Smet of Lockheed Martin Hanford. Mr. Smet discussed some of the challenges he has faced in remote handling, as well as the equipment designed to meet these needs. He also provided his views on how to design a successful piece of remote handling equipment.

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The lunch break was followed by a presentation given by several individuals on the hot conditioning system (HCS). The HCS will remove chemically bound water and metal hydrides once the K-basin fuel is loaded into canisters. The tele-operated arm used in the HCS was described, and the prototype was demonstrated. The arm is used to manipulate the shield plugs on top of the storage canisters, among other HCS-related tasks.

Joe Stringer and Bob Eble of DE&S gave a presentation on the need for remote handling equipment at the CISF and the tasks at the CISF that would be suitable for such equipment. Without remote handling operations at the CISF, the projected 25 operational employees would each receive doses well in excess of the 5 rem/year limit. With remote handling, they predict occupational doses close to 1 rem/year for each employee. Stringer and Eble mentioned that DOE has the responsibility of working with storage and transport cask vendors to ensure that cask designs are compatible with remote handling operations.

The meeting concluded with Phil Bennett of Sandia National Laboratories providing an overview of the accomplishments of the Sandia intelligent systems and robotics center. Mr. Bennett confirmed that most CISF tasks suitable for remote handling, such as detaching impact limiters and performing radiation surveys, have been successfully completed by robotic systems. In some cases, the robotic systems perform the tasks more efficiently than humans. Mr. Bennett believes that a robotic system may be more beneficial for the CISF than a tele-operated system. Furthermore, Mr. Bennett sees the main challenge for the CISF to be adapting a remote handling system to several different cask designs. During the day's final discussion, Dan Kane of DOE reiterated that DOE must play a key role ensuring that casks are suitable for remote handling at the CISF; the responsibility should not be left solely to the cask vendors. If a cask design change is necessary, DOE should be responsible for implementing and gaining regulatory approval for the design change.

If you have any questions about this visit, please contact me at 415-1085 or Ron Parkhill at 415-1376.

Docket 72-21

Attachment: Attendance List

Distribution: Docket 72-21 NRC File Center PUBLIC
 NMSS R/F SFPO R/F VTharpe WFKane CJHaughney
 PEng FSturz RParkhill

OFC	SFPO	E	SFPO	E					
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ATTENDANCE AT JULY 10, 1997, DEMONSTRATION OF REMOTE HANDLING
EQUIPMENT USED AT HANFORD K-BASIN SPENT FUEL POOLS

<u>NAME</u>	<u>REPRESENTING</u>	<u>PHONE NUMBER</u>
Joe Stringer	Duke Engineering & Services	704-382-5711
Steve Cho	Duke Engineering & Services	509-373-5041
Bruce Carlisle	Duke Engineering & Services	509-376-3573
Robert Howell	Duke Engineering & Services	704-382-2769
Bob Eble	Duke Engineering & Services	703-204-8657
Eric Shen	Duke Engineering & Services	
Phil Bennett	Sandia National Laboratories	505-845-8777
Prasanna Kumar	U.S. Department of Energy	202-586-8980
C. Philip Smith	U.S. Department of Energy	202-586-5646
Dan Kane	U.S. Department of Energy	202-586-4970
Steve McDuffie	U.S. Nuclear Regulatory Commission	301-415-1085
Ron Parkhill	U.S. Nuclear Regulatory Commission	301-415-1376
Doug McAfee	Morrison Knudsen	702-295-4491
Mark Weimar	Pacific Northwest National Lab.	509-373-9185
Michael Cremonini	Numatec	509-373-1248