M-32
PDR/LPDR

Department of Energy
Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

January 7, 1991

Mr. R. Davis Hurt
U. S. Nuclear Regulatory Commission
Headquarters
Washington, D. C. 20555

SUBJECT: Concrete Placement in Wall Modules

Dear Mr. Hurt:

I have enclosed a copy of the West Valley Nuclear Services Company, Inc. (WVNS) "Lessons Learned on Wall Module Mock-Up" for your information. We feel that the recent placement in the two lower sections of the east wall went extremely well. The forms on the exterior side have been stripped and the surface looks very good. On January 3, 1991, we placed the lower section of the north wall. Next we will place the upper sections of the east wall. We will keep you informed of future concrete pours as they occur.

Should you have any questions, please call me at 716-942-4780.

Sincerely,

J. Alan Yeazel, Program Manager
Operations, Construction,
and Fuel Shipout
West Valley Project Office

Enclosure

cc: J. E. Solecki, DOE-ID

DEM:001:91 - 0014:91:01

DEM/sl

NF13

WVNS CONSTRUCTION PROJECTS

LESSONS LEARNED ON WALL MODULE MOCK-UP

BACKGROUND

A need for the Wall Module Mock-up was recognized when it was found that the previous subcontractor, Bell Power Group (BPG), had placed concrete in the Vitrification Facility walls and left a considerable number of large voids around penetrations and in other areas. (These voids were documented on NCR's and repaired using approved repair procedures.) At the time it was determined that a new mix design would be required to gain better concrete flow. A mock-up should be built to demonstrate the method of concrete placement, the flowability and strength of the new mix design, and to verify that the concrete could be successfully placed with no significant voids prior to actual placement of concrete in the wall modules inside the Component Test Stand (CTS).

The concrete mix used on the mock-up was developed specifically for use in the wall modules. It had been used in only two other placements before this, and demonstrating its properties in the mock-up was considered essential to the successful placement within the wall modules.

Subsequent to that, WVNS determined that it would be in their best interest to take the wall module concrete placement out of BPG's contract and have the next contractor bid it. WVNS was able to negotiate a change to the J. A. Jones contract and incorporate the wall module placement into their work. The mock-up was built using the north wall module as representative of the most congested area.

LESSONS LEARNED

1. During the placement the amount of plasticizer and accelerator in the mix was adjusted to obtain the optimum flowability for the congested areas of the wall modules.

2. It was recognized that braces and trusses can impede the flow of concrete across the width of the modules. The top braces are an example of this problem and the solution was modeled in the mock-up to verify that cutting them out of the actual wall modules will allow concrete to flow across the top and eliminate voids. The top of the trusses will be removed before the last placement in each module. These truss members serve no structural purpose now that the module faces have been welded in place. Several ports have been cut in structural members to relieve potential air pockets and allow the concrete to flow into blind corners.

3. A considerable delay occurred between trucks at a critical point in the placement. When the concrete that was left in the pump truck lines was placed in the forms it was discovered that the slump was too low to allow it to flow under the window opening. The concrete was eventually induced to flow under the window and did not result in any voids. This problem is not anticipated during actual wall module placements due to continuous truck availability to allow for a monitored rate of placement. The only restriction will be lift heights based on liquid head pressure and initial set time. Should there be an unacceptable delay between loads the pump hopper and lines will be purged and fresh concrete used.

4. The strength of this concrete mix design was proven, and the method of placement demonstrated that it did not segregate. The quality of the concrete was very good with uniform distribution of aggregate throughout.

5. The existing vents and openings in the face of the hotside and the bottom of the window openings proved to be adequate for venting.

6. Placing concrete through the six inch vent pipes proved to be both practical and provided good contact with the (top form) existing concrete beam.

7. When placing this mix in areas of minimal congestion the Accelerator Dose Rate will be increased to provide for quicker setting and a reduction in the liquid head pressure. This measure will help increase early strength gain and also help to reduce the placement time.

8. A pre-placement meeting in accordance with J. A. Jones Procedure WVNS-3300.01 will be held prior to the first wall module placement and as required for the remaining placements.

CONCLUSIONS

The Mock-up was core bored and selected areas were destructively examined for voids; none were found. The Mock-up was then broken up and placed in a trash container for disposal; during this effort it was monitored for voids and again none were found.

The Mock-up proved to be a valuable tool and implementation of the foregoing lessons will give the project the best possible end product during actual placement of concrete in the wall modules.