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SPENT FUEL HANDLING AND PACKAGING PROGRAM QUARTERLY REPORT

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for the period

OCTOBER THROUGH DECEMBER 1979

JANUARY 1980

Prepared for

UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
Under Contract DE-AC-08-79NV10061

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D. C. DURRILL

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INTRODUCTION

This document is a report of activities performed at the E-MAD facility, Area 25, Nevada Test Site in meeting subtask objectives during the first quarter of FY 1980. Activities include a Fuel Temperature Test in the West Process Cell; continued surveillance and data collection for the electrically heated Soil Temperature Test, the Sealed Storage Cask Test, and the Drywell Storage Site Test; installation and check-out of the Calorimeter system provided by the Hanford Engineering Development Laboratory; encapsulation and temporary storage of 13 spent fuel assemblies, assembly of electrically heated simulators, fabrication of handling fixtures and facility modifications for the Granite Program--NTS Climax Spent Fuel Test.

OBJECTIVES

- Complete Soil Temperature Test data acquisition/transmittal
- Fabricate BWR fuel handling tool
- Install and check out Calorimeter; train techs, perform dry runs; complete operating procedure
- Complete Fuel Temperature Test
- Receive, encapsulate and store 13 fuel assemblies for Climax
- Prepare and issue procedures for Climax electrically heated mockup assemblies (EHMA): receive and pre-assemble 6 EHMA at E-MAD, deliver to Climax site and complete assembly
- Receive, assemble and check out Climax transporter control/operating system
- Receive and assist LLL in the assembly of Climax cask components
- Prepare and issue draft procedure to prepare and ship canistered fuel assemblies to the Climax site
- Complete analysis of E-MAD stack monitoring system and submit recommendation to DOE
- Extend RAM and CAM system alarms to the E-MAD gate alarm panel
- Receive and install temporary RAM system
- Order, receive and install CAM system
- Receive and install Transfer Pit adapter and Lag Pit adapter for Climax operations

HIGHLIGHTS

- Balance of 13 fuel assemblies for the Climax programs were received; 9 were completely encapsulated, 4 were canistered without welding; all were placed in Hot Bay lag storage
- Six Climax electrically heated mockup assemblies (EHMA) were pre-assembled at E-MAD, delivered to the Climax site and assembly was completed
- The BWR fuel handling tool was fabricated and proof tested
- The new constant air monitor (CAM) equipment was received
- Fuel Temperature Test controller modifications were completed and testing was resumed
- Calorimeter equipment installation was resumed; modification of lower vertical supports was completed; and the first review draft of the operating procedure was issued
- The Lag Storage Pit ventilation test was completed

NARRATIVE SUMMARY

(1.1.1) Soil Temperature Test #1 (1 & 2 KW)

An agreement was reached, between AESD-Large and DOE/NV, to continue collection of data past the milestone completion date of 12/31/79. At 6784 hours of operation at 2 KW power, the maximum canister thermocouple temperature was 502.5°F; maximum liner temperature, 457.1°F.

(1.2.1) 1 KW PWR Drywell Test

Thermocouple readings on December 28, 1979 were: Drywell #3, at 8119 hours of operation, canister - 238.6°F, Liner - 184.9°F. Drywell #5, at 8406 hours of operation, canister - 238.8°F, Liner - 189.0°F.

(1.2.2) BWR Test

The BWR fuel handling tool was completed and satisfactorily load tested. Canisters for BWR fuel encapsulation were stored in the E-MAD Cold Bay.

(1.3.1) 1 KW PWR Sealed Storage Cask (SSC) Test

Concurrence was received from DOE/NV to publish the procedure addendum for monitoring the space between the closure head and shield plug skirt of the canister assembly stored in SSC #2. The equipment was installed and eight sample containers were shipped to AESD-Large for bake-out and evacuation.

(2.1.1) Baseline Activities

1. Forty groups of visitors were given tours of the facility.
2. ROM costs for performing the proposed West German Fuel Temperature Test were prepared and transmitted to DOE/NV. Enlarged photographs of Drywell and SSC temperature charts were delivered to DOE/NV for transmittal to the West Germans.
3. Safety indoctrination/update for spent fuel handling work and facility tours were conducted for REEC Co Fire Protection Services personnel, at NTSSO request. Particular emphasis was placed on proper access to the Hot Bay in case of emergency.
4. The annual AESD-Large audit of the AESD-Neyada Operations safety program was conducted.
5. Connection of all E-MAD fire alarm pull boxes to the Mercury fire station was completed.
6. The new CAM (Constant Air Monitor) equipment was received.
7. Specifications for the RAM (Remote Air Monitor) system were completed, recommendations were transmitted to DOE/NV. After receiving notice of DOE approval, AESD-Large Purchasing placed the order for the equipment.

8. Forty employees were qualified to operate various E-MAD equipment. A total of 208 man-hours were expended in classroom training; 1364 man-hours for hands-on training and 460 hours in dry run operations. All employees attended a lecture on "ABCs of Radiation" presented by the AESD-Nevada Senior Health Physicist.
9. WN-R-001, the report of training and operational experiences associated with receiving, encapsulating and storing the first four PWR fuel elements received at E-MAD, was transmitted to DOE.
10. Two surplus 120-ton locomotives were received and activated. One unit is fully operational.
11. A new wind direction and velocity recording system was received.
12. Installation of an emergency lighting control circuit in the Hot Bay was completed.
13. The weld pit turntable was installed.
14. The final Astro-Arc welder carousel drive motor was installed and checked out. The second, spare, welderhead was received and a recertification weld was satisfactorily performed.
15. A hydrocarbon trap was installed in the leak detection system.

16. The Lag Storage Pit ventilation test was completed. With 11 fuel assemblies stored in the pit, the results are summarized below:

TEST #	DESCRIPTION	MAX. TEMPERATURE (F ⁰)		MAXIMUM STACK FLOW VELOCITY FPM
		CANISTER	STACK	
1.	Full ventilation	141.3	77.8	905
2.	One fan, no blockage	175.3	99.5	193
3.	One fan, one inlet blocked	150.1	83.6	760
4.	Natural convection	181.0	103.4	155

17. Comments were prepared to the "1979 Energy Survey from the Nevada Test Site," as the document pertained to E-MAD.

(2.2.1) Calorimeter Installation and Checkout

Installation of calorimeter equipment resumed, after interruption for Climax fuel handling operations. Modification of the motor support was completed and the blower/condensor was installed.

Design of the lower support columns was modified to increase load bearing capacity. Four new columns were fabricated, installed and grouted in place.

The first draft of WN-TOP-014, "Setup and Operation of the Calorimeter," was completed and distributed for internal review.

(3.1.1) Fuel Temperature Test - 1 KW PWR

Modification of the controller wiring was completed and test #4 was repeated as a post-modification check. Permission was received from DOE to increase test temperatures to 500⁰F and above, but not to exceed fuel plate temperature of 715⁰F. Testing has

progressed to test #14, during which temperatures were reduced to 250°F for the year-end holiday period. At 2872 hours of operation, the centermost fuel assembly thermocouple temperature was 394.4°F and the highest canister thermocouple temperature was 273.9°F. Additional test requirements delayed completion until mid-January (with DOE/NV authorization).

(3.2.3) E-MAD Stack Sampling

Representatives of the Westinghouse Nuclear Instrumentation and Controls Division at Baltimore, Maryland, visited E-MAD to present a preliminary specification for a facility stack monitoring system. A specification was prepared for transmittal, with recommendations, to DOE/NV.

Climax Operations

Technical Instructions were prepared for assembly of the Electrically Heated Mockup Assemblies (EHMA); the units were pre-assembled at E-MAD and shipped to the Climax site, where assembly was completed.

Receipt, encapsulation and lag storage of all fuel assemblies were completed. Nine assemblies were welded, four were stored unwelded.

Bump recorders which had been installed on the shipping trailers were received and processed in accordance with HEDL instructions.

The transfer pit liner shield plug adapter was modified, to increase the hold-down restraint, and the adapter was installed.

A special shield plug lifting fixture was designed, fabricated and successfully load tested.

Components of the Surface Transport Vehicle (STV) cask were received and assembled by LLL and AESD-Nevada personnel. The STV was received, with assembly of the cask and transporter scheduled for early January.

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