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SPENT FUEL HANDLING AND PACKAGING PROGRAM QUARTERLY REPORT

for the period
JANUARY THROUGH MARCH 1980

MASTER

APRIL 1980

Prepared for

UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
Under Contract DE-AC-08-80NV10061

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INTRODUCTION

This document is a report of activities performed by Westinghouse Advanced Energy Systems Division-Nevada Operations at the E-MAD Facility, Area 25, Nevada Test Site, in meeting subtask objectives during the second quarter of FY1980. Activities include completion of Calorimeter equipment modifications, installation, calibration, checkout and reference run; verification of alignment of Climax canister thermocouple channels and Climax shield plugs; performance of a lifting force measurement test on a Climax canister, shield plug and dummy fuel; completion of the current series of Fuel Temperature Tests in the West Process Cell; and continued data collection/transmittal of the 1 KW Soil Temperature Test, 1 KW Fuel Temperature Test, 1 KW PWR Sealed Storage Cask Test and 1 KW PWR Drywell Tests.

GLOSSARY

PWR	Pressurized Water Reactor
BWR	Boiling Water Reactor
AESD-Large	Westinghouse Advanced Energy Systems Division at Large, Pennsylvania
REECO	Reynolds Electrical and Engineering Company, Inc. (Support Services Contractor at the Nevada Test Site)
AGNS	Allied General Nuclear Services
DWK	Deutsche Gesellschaft fur Wiederaufbereitung Von Kernbrennstoffen (West Germany)
NTSSO	Nevada Test Site Support Office
EDP	Experimental Demonstration Program
NDE	Non Destructive Examination

OBJECTIVES

- Complete installation of Calorimeter equipment; qualify and certify operators; obtain concurrence and publish procedure
- Prepare procedure for acquiring gas samples of fueled canisters for DWK, West Germany; obtain concurrence and publish document
- Start E-MAD Decommissioning Study
- Start preparation of Unattended Experiment Report
- Perform first calorimetry of unwelded, canistered Climax fuel assemblies
- Start shipping fueled canisters to Climax for storage test

HIGHLIGHTS

- Calorimeter equipment modification, installation, calibration and checkout completed
- Climax canister thermocouple channel/Climax shield plug alignment checks completed
- Climax canister/shield plug/dummy fuel lifting force measurement completed
- 1 KW PWR Fuel Temperature Test completed
- Lag Storage Pit radiation background measurement study completed
- Technical Operations Procedures, for shipping fueled canisters to Climax and for receiving fueled canisters from Climax and returning to temporary storage, completed and submitted for DOE concurrence.
- AESD-Nevada Documentation Plan (WN-P-004) published

NARRATIVE SUMMARY

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

At 8971 hours of operation, the maximum canister thermocouple temperature was 490.3°F; maximum liner temperature was 447.1°F. A Field Change notice was issued and approved to increase power of the Soil Temperature Test to 3 KW on April 1, 1980.

(1.2.1) 1 KW PWR Drywell Test

Thermocouple readings on March 28, 1980 were:

- (1) Drywell #3, at 10,279 hours of operation, canister: 227.5°F;
Liner: 176.0°F.
- (2) Drywell #5, at 10,566 hours of operation, canister: 226.8°F;
Liner: 177.6°F.

(1.2.2) BWR Test

The BWR fuel handling tool was modified and successfully load tested; however, a material "hold" was placed on the tool by Quality Assurance. Resolution of the problem is in progress.

DOE/ONWI negotiations for shipment of the two BWR fuel assemblies continue.

(1.2.3) 1-2-3 Drywell Array

Two procedures have been drafted: WN-TOP-019, "Calorimetry Canisterization and Emplacement of a PWR Fuel Assembly from the Fuel Temperature Test," which was submitted for internal review; and WN-TOP-018, "Transfer Canister from Drywell to Drywell," which is in typing.

(1.2.4) 2 KW Fuel Assembly in Drywell #5

There was no scheduled activity for this period.

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

Printouts of continuous four-hour data, for a period of five days, were recorded at AESD-Large request.

Air samples were obtained from the space between the closure head and shield plug skirt of the canister assembly stored in SSC #2, and shipped to HEDL and AESD-Large, in accordance with Addendum I to WN-TOP-007, "Transfer Canister to Sealed Storage Cask #2."

(2.1.0) Baseline Activities

1. The AESD-Nevada Operations Affirmative Action Plan for 1980 was prepared and transmitted to AES-Large.
2. Facility tours were conducted for 33 groups of visitors.
3. An estimate of costs to receive, package and reship a fuel bundle to West Germany was prepared and transmitted to AESD-Large.
4. A draft schedule and cost estimate for a proposed 40 unit high-level waste storage study were prepared for AESD-Large submittal to DOE/NV.
5. A program for E-MAD facility personnel control was instituted and its administrative procedure was prepared.
6. Safety Activities:
 - a. An evaluation was made of the applicability of 10CFR21 to the AESD-Nevada contract. Notice was subsequently received from DOE/NV that we are exempt from meeting reporting requirements of this regulation.
 - b. Radiation Safety caution signs were installed under the covers of Drywells 3 and 5 and on top of SSC #2 to complete action items recommended after a June 1979 DOE/NV Radiological Safety appraisal.
 - c. An orientation/familiarization tour was conducted for a group of REECO Radiation Safety personnel who might be required to respond to emergency alarms at E-MAD during off-shift hours.

- d. Safety lectures were presented for all E-MAD personnel on emergency response, Rad Safe dress-out and radiation worker's qualifications. The E-MAD custodians were briefed on E-MAD alarms and emergency response requirements, and were given a familiarization tour of radiation areas. Each custodian was given a copy of the "E-MAD Facility Emergency Response Manual," WN-A-006.

7. Training

Fifty-seven operator qualifications were completed on various E-MAD equipment and 33 certifications were completed. A total of 173 man hours were expended in classroom training, 1075 man hours in hands-on training, 280 man hours in dry runs, and 190 man hours in lectures.

8. Documentation

- a. WN-P-004, the "AESD-Nevada Operations Documentation Plan," was approved by DOE/NV and published.
- b. The "E-MAD Decommissioning Plan" draft outline was prepared and submitted for review.
- c. Departmental Guides for drafting and for preparation and processing of work orders were drafted and are being reviewed.

9. Facility and Equipment Maintenance/Repair

- a. Maintenance of the plant air dryer system was completed and the system is operational.
- b. Ten Cohu TV monitors were received and installed at various Hot Bay locations. Some of the equipment was defective and was returned to the manufacturer for replacement. Modification of a radiation hardened camera was completed.

- c. AVC motors were installed on Astro-Arc welder carousel #2. A certification weld was made and specimens were prepared and measured, giving satisfactory throat thickness. Weld mockups were fabricated; the carousel and spare welder heads were set up and certified.
- d. Semiannual maintenance was performed in the V-1, V-2 and V-202 cranes.
- e. Annual recertification of facility lift rigging equipment was completed.
- f. Troubleshooting and maintenance of the Varian leak detection system were completed.
- g. A dummy Lag Storage Pit shield plug was fabricated, filled with concrete, and painted red.
- h. An investigation is being made to determine the type of wireless headset intercom which would interface with existing E-MAD equipment.
- i. Results of the Lag Storage Pit ventilation test were issued.
- j. Concurrence was received to perform radiation background measurements of the North Lag Storage Pit, and the measurements were taken. A map of radiation readings is being prepared.
- k. Temperatures, after 2544 hours of operation, and with 13 canistered fuel assemblies stored in the pits, were: Highest instrumented canister thermocouple, 142.1°F; and highest recorded temperatures of all active Lag Storage Pit thermocouples, 76.6°F.

(2.2.1) Calorimeter

- 1. The following components were fabricated and installed:
 - a. Emergency lighting system for the sight glass.

- b. Sight glass support bracket.
 - c. Dummy fuel inlet nozzle which is compatible with the HEDL fuel handling tool.
 - d. Emergency power interlock hardware.
 - e. Stand for remote handling of Calorimeter lid.
 - f. Battery-powered emergency lighting fixture for the control panel.
2. Modifications to the system included the water storage tank, insulation lid, stainless steel drum for use in the emergency fill system, and fill and drain system.
 3. With DOE/NV concurrence, the Calorimeter instrumentation was installed in a modified configuration.
 4. A Field Change Notice was issued for revision of PNL drawings required by modifications to the Calorimeter system.
 5. Upon completion of installation of all equipment, construction flush-out, calibration and checkout of the system were accomplished.

(2.2.2) Canister Cutter

No activity scheduled for this period.

(2.2.3) Experimental (Plasma) Welder

AESD-Nevada Operations personnel visited the EDP welder head factory to evaluate their final design.

(2.2.4) Stack Monitoring System

An evaluation of isokinetic gas sampling and sample monitoring of the E-MAD exhaust effluents was submitted to DOE/NV. With DOE concurrence, specifications are being prepared for requests for bids for the stack monitoring system. The purchase order will include initial capability for krypton-85 analysis and will

provide accommodation for display status signals from the stack monitor on the same video screen with the RAM (Remote Area Monitoring) System. A display console will be installed at The E-MAD gate house.

(2.2.5) CAM/RAM Systems

1. Two of the new CAM (Constant Air Monitoring) System pump motors failed and were returned to the manufacturer for replacement (under warranty). Borrowed motors were installed to operate the system until the replacements were received. Panels to reduce system noise levels are being furnished by the manufacturer.
2. AESD-Nevada Operations engineers visited the RAM System manufacturer to review a mock-up of a proposed alternative to the console and remote display specified in the purchase order. The modification was recommended to DOE/NV and their approval was received. The necessary information was transmitted to the AESD-Large Purchasing Department for revision of the specification.

(2.2.6) Gas Bottle System

No activity scheduled for this period.

(2.2.7) R-MAD Windows

A letter was transmitted to DOE/NV defining the least expensive method of removal and preservation of the R-MAD shield windows and installation of one window in the E-MAD Hot Bay.

(2.2.8) AGNS Heater

No activity scheduled for this period.

(3.1.0) 1 KW PWR Fill Media (Fuel Temperature Test)

The current series of tests were completed. Power to all band heaters and the temperature controller rack was shut off. Data

from the fuel assembly, which is still installed in the West Process Cell test stand, are still being acquired. At 5032 hours of operation, the centermost fuel assembly thermocouple temperature was 335.2°F; the highest temperature of canister thermocouples was 202.6°F.

(3.2.0) 2 KW PWR Fill Media (Fuel Temperature Test)

Preparation of a procedure for the 2 KW PWR Fill Media test was started.

(3.4.0) Neutron Count Experiment

Plans for conducting the spent fuel neutron fluence study were discussed with EG&G/Atlas and EG&G/Santa Barbara personnel, who confirmed that a method for performing the required measurements is available and can be performed for us by EG&G/Santa Barbara, for approximately \$6K, at any time through June 1980. A letter was transmitted to EG&G requesting a cost breakdown.

(3.5.0) Calorimetry of 1/2 KW Fuel Assemblies

1. The "Technical Operations Procedure for the Spent Fuel Calorimetry System," WN-TOP-014, received DOE/NV concurrence and was published. A Field Change Notice was issued to the procedure for acquiring gas samples from the Climax fuel assemblies for DWK, West Germany, prior to calorimetry. A Technical Instruction was prepared for analysis of the Calorimeter water after successive runs, to monitor buildup of radioactive contaminants.
2. Technician training and dry runs were completed; six persons were qualified and certified in Calorimeter fuel handling.
3. The first Calorimeter Reference Run was completed March 31, 1980, with spent fuel calorimetry scheduled for April 1, 1980.

(3.6.0) NDE Weld Study

A request for information on application of acoustic emission techniques was transmitted to another Westinghouse division.

(3.7.0) German Test

A Field Change Notice to the Calorimeter procedure (WN-TOP-014) was prepared and approved to acquire gas samples for DWK, West Germany, from specified fuel assemblies prior to calorimetry. The first sampling operation is scheduled April 1, 1980.

(4.0) Climax Operations

1. A method was devised to perform a preliminary check of Climax thermocouple alignment and a procedure (WN-TOP-016) was prepared, approved and published. Alignment checks revealed no gross misalignments. A second procedure was prepared to verify that thermocouples could be inserted through the Climax shield plugs into the canister thermocouple channels. All units passed this inspection successfully.
2. An addendum to WN-TOP-016 was prepared and approved to monitor radiation of the Surface Transport Vehicle (STV). The survey was completed during thermocouple alignment checks.
3. During fuel handling operations on February 13, a step in the procedure, for installing a shield plug in the Lag Storage Pit from which a fuel assembly had been removed, was inadvertently deleted but signed off as completed. The error went unnoticed until personnel (including Rad Safe) started to enter the Hot Bay and discovered the open pit. A shield plug was installed and operations were completed without further incident. An investigation was conducted and a critique was held at DOE/NTSSO. A report of the incident, with corrective actions to be employed to

prevent such occurrences in the future, was transmitted to DOE. An AESD-Nevada Quality Assurance Audit Action Report (N80-1) was completed and is a permanent part of the official procedure for the operation.

4. A Climax canister, shield plug and dummy fuel were installed in the Hot Bay transfer pit, then removed to determine the load caused by any "sticking" action. A load cell was installed between the shield plug and the V-1 crane hook to measure the lifting force. Results of the test were:

<u>Time in Pit</u>	<u>Pullout Load</u>
12 days, with direct contact	6100 pounds
5 minutes, with direct contact	4500 pounds
2-3 days, with graphite foil	3750 pounds
Reinserted in Pit, direct contact with graphite residue	4000 pounds
Deadweight	3550 pounds

5. The LLL grapple and cask/STV/grapple control console were received. A grapple lifting bail was fabricated and load tested. Operations personnel assisted LLL personnel in checkout of the equipment. A dummy weight mockup was installed and the STV was released for road tests. Cold Bay and Hot Bay STV dry runs were completed.
6. Assistance was provided to LLL in installation of graphite sleeves for shield plugs at the Climax site. They were also assisted in resolving and correcting a shield plug alignment ring interference problem.
7. Assistance was provided in a motion picture production in the Master Control Room and East Gallery.
8. Procedures for shipping fueled canisters to Climax (WN-TOP-013) and for receiving them from Climax (WN-TOP-017) were prepared and submitted for DOE/NV concurrence.
9. A schedule was developed for performing dry runs and shipping the first two fueled canisters to Climax.

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