

MASTER

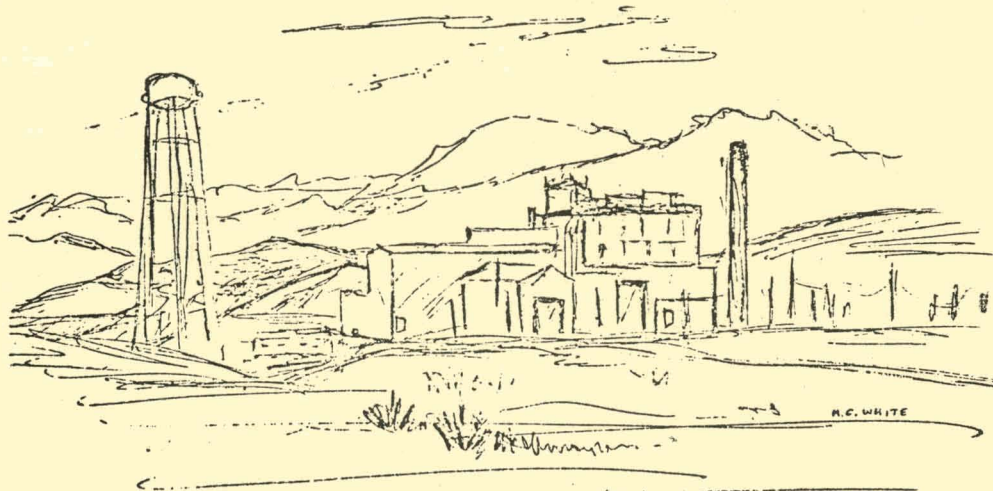
27
11/16/80
240 T.S.
XTIS

**COMMERCIAL WASTE AND SPENT FUEL
PACKAGING PROGRAM**

QUARTERLY REPORT

for the period
JULY THROUGH SEPTEMBER 1980

OCTOBER 1980



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

WESTINGHOUSE ELECTRIC CORPORATION
ADVANCED ENERGY SYSTEMS DIVISION - NEVADA OPERATIONS
Post Office Box 708
Mercury, Nevada 89023

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DISCLAIMER

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Printed in the United States of America

Available from:

National Technical Information Service
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22162

Price: Printed Copy \$ 5.00
 Microfiche \$ 3.50

COMMERCIAL WASTE AND SPENT FUEL PACKAGING PROGRAM
QUARTERLY REPORT

JULY THROUGH SEPTEMBER 1980

A. R. HAKL

WESTINGHOUSE ELECTRIC CORPORATION
ADVANCED ENERGY SYSTEMS DIVISION - NEVADA OPERATIONS
Post Office Box 708
Mercury, Nevada 89023

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

DISCLAIMER

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

feh

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 fourth quarter of Fiscal Year 1980. These activities include removal of the one kilowatt (kw) spent fuel assembly and installation of a two kw assembly into the Fuel Temperature Test in the West Process Cell; transfer of fueled canisters to Drywells 1, 2 and 3, and initiation of the Drywell Interaction Test; initiation of the two kw Drywell Test in Drywell 5; calorimetry; gas sampling; neutron spectra measurements; installation and qualification of the Canister Cutter; and continuation of the three kw Soil Temperature Test.

GLOSSARY

AESD-Large	Westinghouse Advanced Energy Systems Division at Large, Pennsylvania
AESD-Nevada Operations	Westinghouse Advanced Energy Systems Division located at the Nevada Test Site
AGSN	Allied General Nuclear Services
ARD	Westinghouse Advanced Reactor Division
DOE/NV	United States Department of Energy, Nevada Operations Office
DWK	Deutsche Gesellschaft fur Wiederaufbereitung Von Kernbrennstoffen (West Germany)
EDP	Experimental Demonstration Package
E-MAD	Engine Maintenance, Assembly and Disassembly Building, Area 25, NTS
HEDL	Westinghouse Hanford Engineering Development Laboratories
NDE	Non Destructive Examination
R-MAD	Reactor Maintenance, Assembly and Disassembly Building, Area 25, NTS
BWIP/NSTF	Basalt Waste Isolation Program/Near Surface Test Facility

OBJECTIVES

- Issue required Technical Operations Procedures and Technical Instructions; transfer canistered fuel assemblies from Drywell 3 (fuel assembly B-41) to Drywell 2, from Drywell 5 (fuel assembly B-03) to Drywell 3, and from the Fuel Temperature Test (fuel assembly B-43) to Drywell 1; instrument; initiate Drywell Interaction Test.
- Issue required Technical Instructions, transfer canistered fuel assembly D-22 from lag storage to Drywell 5, instrument, and initiate 2 kw Drywell Test.
- Issue Technical Operations Procedure; receive, install and qualify Canister Cutting Tool.
- Receive and install Radiation Area Monitoring (RAM) System and issue interim report.
- Receive, install and check out Gas Bottle Cleaning System.
- Issue Technical Operations Procedure, disassemble 1 kw Fuel Temperature Test, and encapsulate fuel assembly B-43.
- Issue Technical Operations Procedure for 2 kw Fuel Temperature Test, install fuel assembly D-15 into test stand, transfer to West Process Cell and initiate test.
- Acquire gas samples from fuel assemblies B-41 and B-03 for DWK, West Germany.

- Complete procedure and obtain neutron spectra/fluence on canistered fuel assembly D-22.
- Perform calorimetry on fuel assemblies D-15, D-22 and B-43.
- Complete repeat of 1 kw Fuel Temperature Test runs 7, 8, 9.
- Complete E-MAD Decommissioning Study and Unattended Experiment Study and issue reports.
- Perform Acoustic Emission (NDE Weld) Study and issue interim report.

HIGHLIGHTS

- Issued procedure; completed transfer of canistered fuel assemblies to Drywells 1, 2 and 3; instrumented; and initiated Drywell Interaction Test.
- Issued Technical Instruction, transferred canistered 2 kw fuel assembly to Drywell 5, instrumented, and initiated 2 kw Drywell Test.
- Received Gas Bottle Cleaning System.
- Issued procedures, disassembled 1 kw Fuel Temperature Test and encapsulated 1 kw fuel assembly, installed 2 kw fuel assembly into test stand and transferred to West Process Cell, and initiated 2 kw Fuel Temperature Test.
- Completed acquisition of gas samples for DWK, West Germany.
- Started installation of RAM system and issued interim report to DOE/NV.
- Obtained neutron spectra/fluence measurements from a canistered fuel assembly.
- Installed and qualified Canister Cutter; issued operating procedure.
- Completed all scheduled calorimeter operations.

- Completed E-MAD Decommissioning Study and Unattended Experiment Study; issued reports to DOE/NV.
- Performed initial feasibility study for an Acoustic Emission System (DNE Weld) and issued interim report to DOE/NV.

NARRATIVE SUMMARY

WORK TASK NUMBER

ACTIVITY

1.1.2

3 kw Soil Temperature Test

At 4372 hours of operation at 3 kw, the maximum Soil Temperature Test canister thermocouple temperature was 769.4°F. Temperature of the nearest liner thermocouple at that time was 732.9°F. Addendum I to WN-TOP-001, the Soil Temperature Test procedure, was revised to update guidelines and references.

1.2.3

Drywell 1, 2, 3 Array (Drywell Interaction Test)

WN-TI-002 Addendum II, for checkout and emplacement of drywell instrumentation, was issued and instrumentation of Drywells 1 and 2 was completed. Technical Operations Procedures WN-TOP-021, for transferring canisters from drywells to the Hot Bay Transfer Pit, and WN-TOP-018, for transferring a fueled canister from one drywell to another, were completed, approved, and published. The required dry runs and final briefings were conducted prior to fuel movements.

Canisters containing spent fuel assemblies B-41 and B-03 were removed from Drywells 3 and 5, at which time it was observed that a small amount of moisture had accumulated within the drywells. The moisture was removed and grout was temporarily repaired in Drywell 5 in preparation for the Drywell Interaction Test and 2 kw Drywell Test. The two canistered fuel assemblies were transferred to the Weld Pit, where gas samples were acquired for DWK, West Germany; then fuel assembly B-41 was installed into Drywell 2, fuel assembly B-03 into Drywell 3.

WORK TASK NUMBER

ACTIVITY

Spent fuel assembly B-43 was removed from the Fuel Temperature Test Stand (see work task 3.1.1) and transferred to Drywell 1. Instrumentation hookup was completed and the Drywell Interaction Test was initiated on September 15, 1980.

Highest thermocouple temperatures, after 356 hours of operation were:

<u>Fuel Assembly</u>	<u>Drywell</u>	<u>Canister(°F)</u>	<u>Liner(°F)</u>
B-43	1	179.3	131.2
B-41	2	204.6	157.3
B-03	3	224.8	179.3

1.2.4

2 kw Drywell Test

On August 7, 1980, canistered 2 kw Climax fuel assembly D-22 was removed from lag storage, the canister was seal welded, and the assembly returned to lag storage. On September 4, the canistered fuel assembly was transferred from lag storage to Drywell 5. WN-TI-002 Addendum I for instrumentation checkout and emplacement was issued and instrumentation was completed. The test was initiated on September 5. At 612 hours of operation, the maximum canister temperature was 318.0°F; the nearest liner temperature was 254.9°F. (See work tasks 3.1.4, 3.1.5 and 3.1.6 for other operations performed with this fuel assembly.)

2.1.0

Baseline Activities

- a. AESD-Nevada staff members conducted tours of the E-MAD facility for 16 groups.

WORK TASK NUMBER

ACTIVITY

b. Safety

- (1) Respirator fitting and qualifications were completed for all operations personnel.
- (2) WN-A-004, "Occupational Health Manual," Revision 1, was drafted and review comments are being resolved.

c. Operator Qualification and Training

- (1) Twenty-three trainees were qualified to operate the Leak Detection System, V-2 Bridge Crane, Floor Mounted Handling System and other E-MAD equipment.
- (2) Seven technicians were certified in the West German Gas Sampling operation and one technician was certified to operate the Emplacement Installation Vehicle (EIV).
- (3) Dry run operations required 302 man hours; hands-on training, 1436 hours; classroom training, 102 hours; and lectures, 79 hours.
- (4) The Training Program Plan, WN-P-002, was revised and published.

d. Documentation

- (1) The following Technical Operating Procedures were revised, to upgrade guidelines and references with regard to fuel handling operations, approved and published:
 - (a) WN-TOP-005, "Complete Welded Closure Test Weld and Transfer to Temporary Storage"
 - (b) WN-TOP-006, "Transfer Canister from Transfer Pit to Drywell"

WORK TASK NUMBER

ACTIVITY

- (c) WN-TOP-009, "Transfer Spent Fuel Assembly from Temporary Storage to Fuel Temperature Test Assembly and Transfer to West Process Cell"
- (2) Four Specifications were completed and published, covering special process remote seal weld of a canister lid and maintenance of the Manned Control Car (MCC), Prime Mover (L-3) and the 25-Ton Locomotive (L-2).
- (3) Fourteen Departmental Guides were drafted for preparation and processing of various AESD-Nevada Operations documents. Internal review cycles are now completed.
- (4) Twelve Facility Equipment Operating Procedures were prepared and are in the processes of review, comment resolution and approval.
- (5) WN-TOP-100, "Technical Operations Procedures Generic Guidelines and References" was revised, approved and published to update guidelines and references.
- (6) The Unattended Experiment Study Report was completed and published.
- (7) The Decommissioning Study Report was finalized and transmitted to DOE/NV.
- e. Facility and Equipment Maintenance/Repair
 - (1) V-1 crane auxiliary hook problems, discovered during annual maintenance, were corrected. The hook was successfully load tested and the V-1 crane was returned to full service.

WORK TASK NUMBER

ACTIVITY

- (2) Maintenance and recertification of the V-2 crane were completed. Annual maintenance was completed on the V-17, V-1602, V-6, V-4, WPC, and V-5 cranes; the emergency diesel generator, the mobile air compressor, mobile welder, railroad switches, surrey, rectilinear manipulator, and the PA & TV system.
- (3) While moving crane weights out of the Hot Bay with Flatcar F-1, a portion of the wheel rim broke off the wheel and lodged on the track, derailing the flatcar. The crane weights, which fell from the flatcar during rerailment efforts, were returned to the Cold Bay. Track damage was repaired and minor repairs to the crane weights completed.
- (4) Trouble shooting of the Astro-Arc welder, modification of a faulty circuit board, and welder recalibration and requalification were completed.
- (5) The vacuum backfill system in the West Process Cell was leak tested, repaired, and the system was returned to service.
- (6) A remote TV camera was installed and checked out in the Hot Hold Tunnel area.

2.2.1

Calorimeter Installation

Installation, calibration and checkout are complete. See work task 3.1.6 for report of operations.

WORK TASK NUMBER

ACTIVITY

2.2.2

Canister Cutter

WN-TOP-025, for Canister Cutter operations, was completed, approved and published.

The Canister Cutter was moved to the Hot Bay. All piping and hose connections from the operating console in the East Operating Gallery to the unit in the Hot Bay were completed. The equipment was qualified for operation.

2.2.3

RAM (Remote Area Monitoring) System

Fifteen RAM System units have been received and mounted to date. Wiring from the E-MAD building to the facility gate was completed. A report of status at the end of the Fiscal Year was transmitted to DOE/NV.

2.2.5

Gas Bottle Cleaning System

The gas bottle cleaning system was received.

2.2.7

R-MAD Windows

A memo transmitting updated costs for R-MAD window modification and installation at E-MAD was transmitted to DOE/NV.

3.1.1

1 kw Fuel Temperature Test (FTT)

WN-TOP-019, for disassembly of the 1 kw Fuel Temperature Test and transfer of the fuel assembly to the Weld Pit, and an addendum for performing dry calorimetry of a canistered fuel assembly in the Weld Pit were approved and published. The addendum was subsequently incorporated into a revision of the procedure.

WORK TASK NUMBER

ACTIVITY

On September 8, the 1 kw Fuel Temperature Test assembly, containing fuel assembly B-43, was transferred from the West Process Cell to the Hot Bay. The fuel assembly was removed from the stand and placed in the Weld Pit, where dry calorimetry was performed. It was then transferred to the Transfer Pit, then to Drywell 1 as part of the Drywell Interaction Test.

3.1.2

2 kw Fill Media (Fuel Temperature Test)

DOE comments to the procedure for operation of the 2 kw Fuel Temperature Test, WN-TOP-023, were resolved and the document was approved and published.

Spent fuel assembly D-15 was transferred from lag storage to the Fuel Temperature Test stand in the Hot Bay, then moved to the West Process Cell.

Instrumentation was installed and the 2 kw Fuel Temperature Test was initiated on September 24, 1980. At 164 hours of operation, in test #2 - vacuum calibration, the centermost fuel assembly thermocouple temperature was 516.7°F and the highest canister thermocouple temperature was 312.7°F.

3.1.4

West German Gas Sampling

WN-TOP-020, the procedure for obtaining gas samples from a welded storage canister containing spent fuel, was approved and published.

The gas sampling system was modified for remote operations and successfully leak tested.

WORK TASK NUMBER

ACTIVITY

Gas samples were acquired from Sealed Storage Cask #2 and the canisters from Drywells 3 and 5 containing fuel assemblies B-03 and B-41. The samples were shipped to Westinghouse ARD and Westinghouse HEDL for analysis.

3.1.5

Neutron/Gamma Spectra/Fluence Measurements

The procedure for obtaining neutron and gamma spectra/fluence on canistered fuel assemblies, WN-TOP-026, was approved and published.

The canister stand welds were dye penetrant examined and found acceptable. Dosimeter stands and brackets were fabricated.

On August 29, 2 kw fuel assembly D-22 was transferred from lag storage to the canister stand, positioned vertically, and neutron foils were arranged for exposure over the three-day holiday weekend. On September 2 the foils were removed and hand carried to EG&G/Santa Barbara to be measured for neutron fluence. Results of the measurements were transmitted from EG&G to DOE.

3.1.6

Calorimeter Operations

Collection tube level, vessel level and storage tank level transducers and the DC power supply were calibrated; a 1 kw reference run was satisfactorily completed.

On July 9 and 10, calorimetry was performed on 2 kw Climax fuel assemblies D-15 and D-22 in the Weld Pit (dry) and in the boiling water calorimeter, then returned to lag storage. Preliminary results indicate that fuel assemblies D-15 and D-22 produced 1.431 kilowatts and 1.271 kilowatts of heat, respectively.

WORK TASK NUMBER

ACTIVITY

To determine the concentration of radioactivity in the calorimeter water each time we perform a calorimeter operation, and to decrease the probability of contamination, the water in the calorimeter vessel and storage tank was discharged into the REECO radioactive liquid waste truck on August 13. Radioactivity in the 203 gallons of water measured 4.05×10^{-2} microcuries per cubic centimeter, or a total of 31.1 millicuries of cobalt 60. The vessel and storage tank were refilled with fresh water in preparation for the next calorimeter operations.

On September 10, the 1 kw fuel assembly which had been removed from the Fuel Temperature Test (B-43) was installed in the Weld Pit for dry calorimeter measurements and transferred to the Calorimeter Pit for boiling water calorimetry. Preliminary results indicate .637 kilowatts of thermal energy were produced.

Procedure WN-TOP-014 was revised to include only actual calorimeter operations.

3.1.7

1 kw Fuel Temperature Test

The air and vacuum tests of the 1 kw Fuel Temperature Test (FTT) repeat run #9 were completed. Just prior to completion of the helium test, a leak occurred in the helium system. After verification by AESD-Large that sufficient data had been acquired, the test was discontinued. The leak was repaired prior to initiation of the 2 kw FTT.

WORK TASK NUMBER

ACTIVITY

The final maximum thermocouple temperatures, during repeat of run #9 at 6,296 hours of operation, were 369.9°F on the centermost fuel assembly and 278.5°F on the canister.

The test assembly was transferred from the West Process Cell to the Hot Bay on September 8. The 1 kw fuel assembly (B-43) was removed from the test stand in the Hot Bay, to be replaced with 2 kw fuel assembly D-15 for the 2 kw Fuel Temperature Test.

3.2.2

NDE Weld System

An interim report of feasibility studies for the in situ acoustic monitoring of stored canister seal welds was transmitted to DOE/NV.

4.0

Climax Operations

There were no Climax activities during this reporting period.

WESTINGHOUSE AESD-NEVADA OPERATIONS QUARTERLY REPORT

DISTRIBUTION LIST

J. A. Carr	ONWI
D. Vieth	DOE/Headquarters
C. R. Cooley	DOE/Headquarters
M. J. Lawrence	DOE/Headquarters
O. P. Gormley	DOE/Headquarters
H. L. Brandt	DOE/Savannah River
R. P. Whitfield	DOE/Savannah River
J. O. Neff	DOE/Columbus
R. L. Stanford	NRC
J. P. Roberts	NRC
T. F. Carter	NRC
W. G. Stockdale	ORNL
T. E. Wade	DOE/NV
R. M. Nelson	DOE/NV
C. P. Bromley	DOE/NV
M. P. Kunich	DOE/NV
D. R. Martin	DOE/NV
D. F. Miller	DOE/NV
D. M. Rickard	DOE/NV
R. M. Jezik	DOE/NV
B. W. Church	DOE/NV
M. Marelli	DOE/NV
R. R. Loux	DOE/NV (2)
A. J. Roberts	DOE/NV
J. H. Dryden	DOE/NTSSO
A. E. Stephenson	Sandia/DOE
L. B. Ballou	LLL
W. R. Morris	AESD-Large
R. E. Lowder	AESD-Large
J. B. Wright	AESD-Large
J. V. Haley	AESD-Large
D. L. Hollingsworth	AESD-Large
DOE/TIC (27)	