National Aeronautics and
Space Administration
John H. Glenn Research Center
Lewis Field
Plum Brook Station
Sandusky, OH 44870

June 17, 2005

Reply to Attn of: QD

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Report of Reactor Status for the NASA Plum Brook Reactor (License No. TR-3, Docket 50-30) and the NASA Plum Brook Mock-Up Reactor (License No. R-93, Docket 50-185)

Enclosed is the Annual Status Report dated June 2005 for the Plum Brook Reactor (License TR-3) and the Plum Brook Mock-Up Reactor (License R-93). This report is for the reporting period January 1, 2004, through December 31, 2004. Submission of this annual report is in compliance with Technical Specification 6.12.1 of the current TR-3 and R-93 possess-but-not-operate licenses that became effective March 20, 2002.

Subject reactors are currently undergoing decommissioning.

Keith M. Peecook
Senior Project Engineer, Plum Brook Reactor Facility

Enclosure

Approved:

Vernon W. Wessel
Director of Safety and Mission Assurance

A020
A001

cc:

USNRC Headquarters
Attn: Document Control
Washington, DC 20555

USNRC Headquarters
Attn: Mr. Patrick Issac
Operating Reactor Improvements Program
Mail Stop 012-G13
Washington, DC 20555-0001

Mr. Thomas F. Dragoun
USNRC Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. Ronald Nabors
Ohio EPA
Northwest District Office
347 North Dunbridge Road
Bowling Green, OH 43402

Mr. Robert Owen
Ohio Department of Health, Bureau of Radiation Health
Post Office Box 118
Columbus, OH 43266-0118

cc:
G/J. W. Sikora
PM/R. R. Corban
QD/F. J. Greco
QD/T. J. Polich
QD/K. M. Peecook
ANL/J. A. Thomas
Glenn Research Center Library
Decommissioning Project Records

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FOR THE
NASA PLUM BROOK REACTOR AND
PLUM BROOK MOCK-UP REACTOR

1. Introduction

The following Annual Status Report for the period January 1, 2004, through December 31, 2004, has been prepared pursuant to Technical Specification 6.12.1 of the Plum Brook Reactor Facility (PBRF) TR-3 and the Mock-up Reactor (MUR) R-93 Licenses, both effective March 20, 2002. These are possess-but-not-operate licenses, and the facility is operating in accordance with its Decommissioning Plan, also effective March 20, 2002.

2. Summary of Facility Activities

Significant progress was made in decommissioning activities across the site during 2004. Segmentation was nearly completed on the main reactor. Fixed equipment was completed in most buildings. Removal of equipment stored in the Hot Dry Storage vault was completed. The resulting waste material was classified, size reduced, packaged and sent off site for proper disposal.

During the year, approximately 4.4 million pounds of material, mostly activated and contaminated metal, was sent to one of three NRC licensed sites. These include Alaron in Wampum, Pennsylvania, Barnwell in Aiken, South Carolina, and Envirocare in Clive, Utah. The total activity sent off site to date is 9,990 Ci. This is estimated to represent approximately 97% of the pre-decommissioning source term.

3. Major Preventative and Corrective Maintenance Operations

No major preventative or corrective maintenance operations with safety significance were conducted this year.

4. Major Changes in Reactor Facility, Procedures, and Activities

Decommissioning continues to generate major changes in the reactor facility. Segmentation of the main reactor is nearly complete. All reactor internal components have been removed, and the segmentation of the reactor tank is well along. All work has been performed dry, and the use of distance and shielding has kept cumulative dose to workers to less than 1/3 of the dose budget. At this point, the reactor tank wall is being cut up from the inside of the tank and this work is about half way done. Dose rates inside the tank in the core region are averaging less than 2 mrem/hour.

Major Changes in Reactor Facility, Procedures, and Activities *(Continued)*

Fixed equipment removal has been completed in several areas of the site, including the Reactor Office Lab Building, Service Equipment Building, Primary Pump House, Cold Pipe Tunnel, Reactor Building and several areas of the Containment Vessel, including Quadrants A, B, and C, and the ground level.

Loose and fixed equipment removal has been completed in the Hot Dry Storage vault. This 25' deep vault with a 5' thick concrete cover held many highly activated items including left over in core experiment support equipment, original stainless steel cadmium control rods and several original beryllium core reflector plates. These components contained almost 1/3 of the original source term for the site. All of this material was safely removed from the vault and disposed of off-site, with the exception of the control rods. These rods are Class C with a hazardous component in the form of the cadmium. The rods are currently stored on-site in a transfer cask while NASA works to identify a proper disposal path.

Characterization has continued around the facility, including the performance of approximately 500 geoprobe samples to determine the extent of subsurface contamination. Of these samples only four have been found to be above proposed clean up levels. Survey efforts have begun in the embedded pipe, starting with the primary coolant piping.

The Final Status Survey Plan was submitted for NRC review at the end of December.

5. **Release of Radioactive Effluents**

There have been no uncontrolled releases from the site to the environs during this reporting period. This statement is based on the results of continuous local monitoring at the job site while work has been going on, and the results of offsite environmental monitoring as described in the next section.

6. **Environmental Survey Results**

NASA has continued extensive offsite environmental monitoring for the PBRF. This has included monitoring of direct radiation, air, ground water, surface water, and silt.

Airborne monitoring was done using six continuous air samplers (four at the facility fence line, one ½ mile upwind, one 1 mile downwind). Filter elements from the units are collected and counted weekly, and are then bagged and kept for future reference. There is an environmental TLD co-located with each of the four fence line air samplers. These are collected and read monthly.

Environmental Survey Results *(Continued)*

Water and silt sampling is performed in several locations in potentially impacted surface streams. Samples are collected monthly, and sent off site for analysis. Background samples (i.e. from locations well upstream) are also collected and analyzed. Groundwater monitoring is done using a number of wells, both overburden and bedrock.

Minor elevations over historic levels were seen in the silt samples taken during July in Pentolite Ditch, immediately downstream of the reactor outfall. These may have been caused by decommissioning activities, including characterization efforts on the ditch banks, an area that is known to need remediation. The characterization work disturbed the existing soil, and may have resulted in the change. Levels returned to normal the following month, and no elevated levels were noted at any of the monitoring points further down stream.

All other observed levels remained consistent with those seen through the last 30 years of shutdown monitoring. The levels are indistinguishable from background levels. Detailed monitoring results are available in the PBRF Annual Environmental Report.