

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



February 24, 2006

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 February 2006 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, 2005, through December 31, 2005. 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.

A handwritten signature in black ink, appearing to read "Keith M. Peacock".

Keith M. Peacock
Acting Decommissioning Project Manager, Plum Brook Reactor Facility

Enclosure

Approved:

A handwritten signature in black ink, appearing to read "Vernon W. Wessel".

Vernon W. Wessel
Director of Safety and Mission Assurance

A020

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ANNUAL STATUS REPORT
FOR THE
NASA PLUM BROOK REACTOR AND
PLUM BROOK MOCK-UP REACTOR

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ANNUAL STATUS REPORT
FOR THE
NASA PLUM BROOK REACTOR AND
PLUM BROOK MOCK-UP REACTOR

1. Introduction

The following Annual Status Report for the period January 1, 2005, through December 31, 2005, 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 2005. Segmentation of the reactor vessel was completed and the segmented components were shipped off site for shallow land disposal.

Significant decontamination was performed in the Hot Retention Area and the holding tanks in this area were segmented and removed. The water was removed from the Cold Retention Area tanks and the majority of the fixed equipment and piping was removed from these holding tanks. Initial characterization surveys were performed on the tanks and scoping surveys were performed of concrete core bores from the Cold Retention Area Tank walls and from the substrate material around the tanks to assess the radiological conditions in the surrounding soil.

Fixed equipment removal continued and is complete in almost all areas of the facility. The resulting waste material was size reduced, packaged, and sent off site for proper disposal.

Characterization studies were initiated on the embedded piping and testing of decontamination techniques was performed.

Characterization surveys were performed in the Pentolite Ditch and considerable soil remediation was performed in the land areas along the banks of the Pentolite Ditch.

Additional environmental surveys were performed in Plum Brook between the plant and the Sandusky Bay. These surveys identified the presence of radioactivity above background indicating the need for more extensive characterization studies.

Those studies are in progress and NASA has worked closely with the NRC, the Ohio Department of Health, and the public to assure that the regulatory bodies and the members of the public are kept informed on the status and results of the characterization efforts.

As of the end of 2005, about 98% of the original radioactivity has been removed from the site. About 8 million pounds of low level radioactive waste resulting from system and component removal have been shipped to licensed waste burial sites for disposal. In addition to this, about 10 million pounds of soil containing low levels of radioactive contamination have been removed and disposed.

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 complete. The reactor vessel and all internals have been removed and the reactor cavity cleared of debris.

Fixed and loose equipment removal has been completed in almost all areas of the site.

Embedded pipe surveys were performed and proof of process testing was completed on selected sections of pipe to demonstrate the effectiveness of the methods planned for decontamination of embedded piping and for performance of post-remediation and final status surveys. The methods appeared to have been successful in cleaning the piping to the expected license termination limits.

Seven activated control rods from Plum Brook Reactor were placed in temporary safe storage in a commercially available dry storage cask located on the Plum Brook Station property away from the Reactor Facility. These stainless steel clad cadmium control rods contain about 60 curies of total activity, and are Class C mixed waste. In November, an amendment to the Glenn Research Center Materials License was issued allowing ownership of these control rods to be transferred to that license. NASA continues to work with the Department of Energy on the ultimate disposition of these rods, since no commercial disposal site is available.

Characterization surveys were performed in the Emergency Retention Basin and removal of approximately 7 million pounds of contaminated soil was completed. It is expected that additional removal of small quantities of soil will be required when post remediation surveys are performed.

Characterization studies on the Pentolite Ditch and the land areas around the ditch identified areas of elevated activity. Initial remediation of soil was performed on the land areas around the Pentolite Ditch and approximately 3 million pounds of soil containing low levels of radioactivity was excavated, packaged, and shipped to a licensed disposal facility.

As a result of finding radioactivity in Pentolite Ditch, additional characterization studies were performed in Plum Brook. The initial scoping survey of Plum Brook sampled the stream bed and the banks along an 8-mile stretch, from 3-miles upstream of the junction of Pentolite Ditch and Plum Brook, to 5-miles downstream where Plum Brook enters Sandusky Bay. Low levels of Cesium-137 and Cobalt-60 were found in sediment samples in the 1-mile stretch of Plum Brook closest to the NASA fence line. The levels were above background and believed to be the result of normal facility discharges during the years when the reactor was operated. NASA has held a number of meetings with the local public and officials of the Ohio Department of Health, NRC, and the Ohio EPA to assure that all parties are kept apprised of the on-going characterization efforts and the results of the studies. The levels of contamination found to date are not believed to present any health hazard to the public. More detailed characterization studies are being performed and the results are communicated to the public and the regulatory agencies as they become available. NASA will continue to work closely with the NRC in determining an appropriate course of action in dealing with these extremely low levels of contamination.

In July, NASA submitted formal notification to the Nuclear Regulatory Commission of a change to the Decommissioning Project schedule that will extend the project end date beyond the date of December 31, 2007 stated in the original Decommissioning Plan. The currently projected end date is now December 31, 2010. NASA still intends to complete the project with license termination and release of the site for unrestricted use. The U. S. Army Corps of Engineers and their TERC Contractor, Montgomery Watson Harza have been phased down from the project. The project has reached a transition point where work planned in the near term for 2006 will include remediation of embedded pipe and decontamination of the hot cells, but will concentrate on engineering studies and proof of principal studies to determine the most productive and cost effective methods for project completion.

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.

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, and building sumps that collect ground water in-leakage.

Minor elevations over historic levels were seen in the silt samples taken during February, March, and October in Pentolite Ditch, immediately downstream of the reactor outfall. These may have resulted from 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 both the PBRF Annual and Semi-Annual Environmental Reports.