

ANNUAL STATUS REPORT

Reporting Period: January 1, 1987 - December 31, 1987

NASA, Plum Brook Reactor  
License No. TR-3  
Docket No. 50-30

NASA, Plum Brook Mock-Up Reactor  
License No. R-93  
Docket No. 50-185

USNRC Dismantling Order  
Dated May 26, 1981

NASA Application to USNRC,  
Dated July 26, 1985,  
Requesting Return To  
"Possess-But-Not-Operate" Status

NASA, Plum Brook Reactor  
License No. TR-3  
Amendment #7  
January 28, 1987

NASA, Plum Brook Mock-up Reactor  
License No. R-93  
Amendment #3  
January 12, 1987

February 1988

NASA, Lewis Research Center  
Plum Brook Station  
6100 Columbus Ave.  
Sandusky, OH 44870

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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, 1987 through December 31, 1987, has been prepared pursuant to Section 3.3.1 of the Plum Brook Reactor Facility PBRF TR-3 License effective 1/28/87 and Mock-up Reactor License effective 1/12/87. Both of the above-mentioned reactors are licensed as "possess-but-not-operate."

2. Status of Reactor Facility:

At the time NASA requested a Dismantling Order, funding for the reactor dismantling project was anticipated and an active dismantling effort was planned and scheduled. However, because of continuing federal budget restrictions, NASA has continued to find it necessary to defer funding for this project. As a result, no major dismantling activities have been performed to date, nor are any planned.

Since 1982, NASA has continued to slowly remove various uncontaminated tools, spare parts, and experimental hardware which is not required for either maintaining protected safe storage or supporting future dismantlement efforts. This is being done to reduce the Plum Brook Station inventories and to make such items available to NASA and other Government agencies.

In its letter to NASA dated August 16, 1984, the USHRC requested NASA to either request reinstatement of the "possess-but-not-operate" status for the two Plum Brook Reactors, or to submit a revised dismantling plan and schedule. NASA responded in a letter dated October 29, 1984, stating that it intended to formally request return to the "possess-but-not-operate" licensing status. On July 26, 1985, NASA submitted to the USNRC applications and supporting documents for the "possess-but-not-operate" status. The PBRF TR-3 License was issued 1/28/87 and the MUR R-93 License was issued 1/12/87. Both licenses are in effect for ten (10) years.

In addition to providing adequate resources and funding for past, present and future protected safe storage of the reactors, NASA funded an engineering study in 1984 to document the existing conditions at the site. The study was initiated near the end of CY 1984, and major field work began in early 1985. The study was performed by Teledyne Isotopes, Inc., the same company which provides the contracted services for daily security, surveillance, and maintenance of the reactors and the Plum Brook Station. The purpose of the study was to gather data on the current condition of the facilities and equipment at the site, and to reinventory the radioactive contamination at the end of the thirteen year radiological decay period since Reactor shutdown in January, 1973. All of the field work for this study has been completed and the final report is in the final review stage.

### 3. Organization:

Mr. Henry G. Pfanner is the Engineer, Plum Brook Reactor Facility (PBRF) and is responsible for maintaining the protected safe storage mode of the reactors. The daily security, surveillance, and maintenance activities continue to be performed by an on-site service contractor, Teledyne Isotopes, Inc. Mr. Harry E. McCune is assigned as first alternate PBRF Engineer. Mr. Albert B. Smith, NASA-Lewis Health Physicist and Radiation Officer, remains the PBRF Radiation Safety Officer and also serves as second alternate PBRF Engineer. Mr. Robert P. Kozar is the Manager of the Plum Brook Station.

Mr. Richard Schuh remains as chairman of the Plum Brook Reactor Facility Safety Committee (PSC). Two PBRF Safety Committee meetings were held in 1987.

The management of the PBRF remains under the Plum Brook Management Office. An Organization Chart appears in Section 4 of the current License. (See Figure 1.)

### 4. Condition of Systems and Components:

The condition of all systems and components vital to maintaining safe protective storage has been carefully reviewed. All systems are performing satisfactorily.

As reported in previous years, the Containment Vessel (CV) cathodic protection system remains energized, but is providing less than the recommended level of cathodic protection for a portion of the C wall. Ultrasonic testing at four inspection ports in 1987 showed no measureable change in (CV) wall thickness from the original material specifications. The ultrasonic testing continues on an annual basis. In addition, NASA has established periodic visual inspections and corrosion rate assessment checks using sample coupons. These coupons are currently being sampled annually. No conclusive evidence of significant corrosion was determined after the first two years of data evaluation.

### 5. Security and Surveillance Measures:

Security inspections are conducted at the PBRF once per 8-hour shift and each of the major buildings is inspected by a guard once each day. In addition, other security checks, such as inspection of fences and locks, are conducted monthly. Surveillance of operating systems and components, absolute filters, and radiological surveys are performed as specified in the PBRF Procedures Manual. Surveillance inspections are performed for some non-operating systems and components to assure that the protected safe storage conditions are maintained.

All of the security and surveillance inspections are accomplished by use of Inspection and Test Report (ITR) check sheets to insure that they are promptly and properly completed. Completed ITRs are reviewed and approved by the Engineer, PBRF and/or alternates and filed in the PBRF Vital Records. ITRs indicating corrective action is required are a responsibility of the PBRF engineer and the Plum Brook Management Office.

Equipment Maintenance Records (EMRs) are utilized to document maintenance on vital components, equipment, systems and facilities which are not otherwise covered under the routine ITR system (See Section 8).

Personnel access to areas of the reactor site with known or suspected significant levels of radiation present is controlled under a Safe Work Permit (SWP) system.

The security and surveillance program in effect at the PBRF appears to be adequate to maintain the facilities in a protected safe storage mode.

A total of 3 (SWP)s were issued during 1987 and all personnel exposures were well within permissible limits of 10 CFR 20. A statistical breakdown of the exposure levels as per 10 CFR 20.407 is given below.

Estimated Whole Body Exposure Range (REMs)	Number of Individuals in Each Range
No measurable exposure	0
Measureable exposure less than .1	4
.1 to .25	0
.25 and above	0

#### 6. Facility Changes:

A Facility Change System is utilized to provide documentation and approval of changes to existing facilities and structures, new structures, a physical change to equipment or system, or any change which alters a defined end condition.

There were two Facility Changes (FC) initiated in 1987. A brief summary of each (FC) is given below.

1) FC-87-01 SECONDARY COOLING PUMP MOTOR CONTROL CENTER (MCC) REMOVAL

Three Motor Control Center (MCC) electrical breakers were removed from the Service Equipment Building (SEB) in 1987 under this Facility Change. The (MCC)s were utilized for other NASA facility requirements.

The motors, pumps and wooden cooling tower associated with the secondary cooling water system had previously been removed under Facility Change FC 83-01. The removal of the inactive wooden cooling tower eliminated a potential fire hazard.

2) FC-87-02 REMOVAL OF LEAD SHOT FROM THE -25' HOT CAVE SHIELD CAVITY

The Quad "D" Hot Cave Cavity front panel at the -25' level inside the Containment Vessel was found to be bowed and cracked in 1986. The damage was due to the approximately 19,000 pounds of lead shot behind it. Temporary shoring was installed at that time and mention was made of this in the 1986 Annual Report

During 1987, approximately 50 percent of the lead shot was removed relieving pressure on the panel. Work is continuing in 1988 to remove the remaining lead shot. The work area and lead shot has been surveyed and no radiological problems encountered.

In addition, two Facility Changes, FC 86-04 and FC 86-05 reported on the 1986 Annual Report as being in progress, were completed in 1987.

7. Facility and Environmental Radiological Surveys:

The 1987 monitoring data continued to include direct radiation, surface contamination, airborne and waterborne activity, stream silt, and precipitation/fallout radioactivity. These parameters did not vary significantly from data obtained during the previous 14 years of standby or protected safe storage of the PBRF. All data indicates the radioactivity within PBRF is being safely contained.

8. Maintenance Performed:

The maintenance performed during the reporting period fell under two major categories:

- a. Work covered under the Equipment Maintenance Record (EMR) System
- b. Facility Changes

Work covered under the Equipment Maintenance Record (EMR) System involved routine maintenance and other minor repairs made to equipment within the Reactor complex. This work was normally performed by the On-Site support service contractor that conducted normal day-to-day maintenance and surveillance at the PBRF.



There were a total of twenty-five maintenance tasks completed under the (EMR) system described. Twenty-two (EMR)s were classified as routine maintenance. The remaining three tasks involved Facility Changes (FC)s. The (FC)s are discussed in Section 6 of this report. The major building repair and maintenance project reported on in the 1986 Annual Report was 95 percent complete at the end of 1986. The remainder of this maintenance project was completed in 1987.

#### 9. Audits and Inspections:

Dr. Ira T. Myers remains chairman of the Plum Brook Reactor Facility (PBRF) audit team. Mr. Michael W. Sudsina and Mr. Edward F. Stevenson are audit team members. Both have been members of the PSC for eight years. Dr. Myers was associated with the experimental programs at the PBRF, and Mr. Sudsina was employed at the PBRF during its operation. All three members of this committee are currently employed by NASA Lewis Research Center in Cleveland, Ohio.

One audit of the (PBRF) was conducted on December 23, 1987 by the PBRF Audit Team. No items of non-compliance were noted during this audit.

One on-site inspection of the PBRF Facility was conducted by the NRC on August 10, 1987 during this year. This inspection was performed by Mr. Don Miller of the Region III Emergency Preparedness and Radiological Branch. No violations of NRC requirements were identified during the course of this inspection.

#### 10. Unusual Occurrences:

There were no unusual occurrences at the PBRF during 1986 which were reportable to USNRC under the criteria of 10 CFR 21.3, 10 CFR 21.4 and 10 CFR 50.72.

#### 11. License Changes:

The license status of both the PBRF (TR-3) and MUR (93) was changed from the Dismantling Order (February, 1980) to "possess-but-not-operate." The effective date of the PBRF (TR-3) license is January 28, 1987 and the MUR (R-93) license is January 12, 1987. Both licenses are effective for a period of 10 years from the date of issuance.

12. Other:

Disposal of Excess Plum Brook Station Property - GSA continues to investigate the possible transfer of 604 acres in the Southwest portion of Plum Brook Station to other government agencies. It is anticipated the disposal of this parcel may be completed in 1988, however, the transfer could take longer. The Station fenceline will be modified to conform to the new Station perimeter when the disposal of this parcel is completed. The nearest point of property affected is approximately 5,000 feet from the fenced site of the PBRF. In any case, NASA will continue to control access to the total Station, inspect, maintain and provide security surveillance for the existing or revised Plum Brook Station perimeter fenceline. Conditions at the PBRF will be unaffected.



Lewis Research Center  
Cleveland, Ohio  
44135

Reply to Attn of 1605

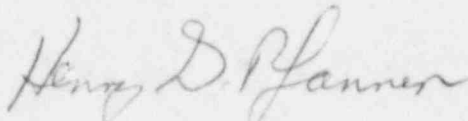
February 29, 1988

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 R-93, Docket 50-135)

Enclosed is the Annual Status Report dated February 1988, for the Plum Brook  
Reactor, 60 MW (th), and the Plum Brook Mock-Up Reactor, 100 kw (th) for the  
reporting period January 1, 1987 through December 31, 1987. Submission of  
this annual report is in compliance with Section 3.31 of the PBRF (TR-3) and  
MUR (R-93) possess-but-not-operate licenses effective January 20, 1987 and  
January 12, 1987, respectively.

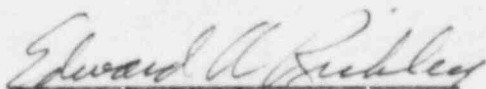
Subject reactors continue to be maintained in a protected safe storage  
condition.



Henry G. Pfanner  
Engineer, Plum Brook Reactor Facility

Enclosure

Approved:



Edward A. Richley  
Director of Administration  
and Computer Services

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cc:

U. S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement, Region III  
Attn: Mr. Kenneth R. Ridgeway, Inspector  
Reactor Operations Nuclear Support Branch  
Program Support Section  
799 Roosevelt Road  
Glen Ellyn, IL 60137

U. S. Nuclear Regulatory Commission  
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Attn: Mr. John Drosa, Project Manager  
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