National Aeronautics and
Space Administration

Lewis Research Center
Plum Brook Station
6100 Columbus Avenue
Sandusky, Ohio 44870

NASA

FEB 10 1994

Reply to Attn of

2870

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 January 1994, 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, 1993, through December 31, 1993. Submission of this annual report is in compliance with Section 3.31 of the current TR-3 and R-93 possess-but-not-operate licenses which became effective January 28, 1987, and January 12, 1987, respectively.

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

Henry G. Planner
Engineer, Plum Brook Reactor Facility

Enclosure

Approved:

Carol J. Russo
Dr. Carol J. Russo
Director of Aeronautics

190050

A020
1/1

9403010048 940210
PDR ADOCK 05000030
R PDR

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
801 Warrenville Road
Lisle, Illinois 60532-4351

Attn: Mr. Marvin Mendonca
U.S. Nuclear Regulatory Commission
PDNP
MS 11-B-20
Washington DC 20555

ANNUAL STATUS REPORT

Reporting Period: January 1, 1993 - December 31, 1993

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 #8
November 30, 1989

NASA, Plum Brook Mock-Up Reactor
License No. R-93
Amendment #4
October 12, 1989

January 1994

NASA Lewis Research Center
Plum Brook Station
6100 Columbus Avenue
Sandusky, Ohio 44870

TABLE OF CONTENTS

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, 1993, through December 31, 1993, has been prepared pursuant to Section 3.3.1 of the Plum Brook Reactor Facility (PBRF) TR-3 License effective January 28, 1987, and Mock-Up Reactor R-93 License effective January 12, 1987. 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 remove various uncontaminated tools, spare parts, and experimental hardware not required for maintaining protected safe storage or supporting future dismantling efforts. This is being done to make such items available to NASA and other Government agencies.

In its letter to NASA dated August 16, 1984, the USNRC directed NASA to either request reinstatement of the "possess-but-not-operate" status for the two Plum Brook Reactors or 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 applications and supporting documents to the USNRC for the "possess-but-not-operate" status. The PBRF TR-3 License was issued January 28, 1987, and the MUR R-93 License was issued January 12, 1987. 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 CY84, and major field work began in early 1985. 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 twelve-year radiological decay period since Reactor shutdown in January 1973.

3. Organization:

During the reporting period, Mr. Henry G. Pfanner continued to serve as the Plum Brook Reactor Facility (PBRF) Engineer, responsible for maintaining the protected safe storage mode of the reactors. The daily security, surveillance, and maintenance activities were performed by an on-site support service contractor, Sverdrup Technology, until June 30, 1993. As of July 1, 1993, Sverdrup Technology was replaced by Gilcrest Electric & Supply Co., as the Plum Brook Station (PBS) Support Service Contractor. There was no change in the personnel who perform the daily security, surveillance and maintenance tasks at the PBRF. As before, Mr. Harry E. McCune continued to serve as first alternative PBRF Engineer. Mr. Albert B. Smith, NASA Lewis Research Center Health Physicist and Radiation Officer, was replaced by Ms. Gayle Reid. Ms. Reid has worked at NASA Lewis for 13 years and has a Bachelor of Science Degree in Environmental Science. In her employment at NASA Lewis, she has nine years' experience as a Health Physics technician and two years' experience as a Health Physicist. Mr. Robert P. Kozar continued to serve as Chief of the Plum Brook Management Office (PBMO). The PBMO is responsible for the day-to-day level 2 management of the PBRF.

Mr. Dean Sheibley was replaced by Mr. Keith Peecook as chairman of the PBRF Safety Committee (PSC). Mr. Peecook has a Bachelor of Science in Mechanical Engineering. He has four years' experience as a U.S. Navy Nuclear Power Officer, in addition to three years experience in commercial nuclear power projects. He has been employed by NASA Lewis for seven years and has been a member of the PSC for six years. There were two PSC meetings conducted during 1993.

4. Condition of Systems and Components:

The condition of all systems and components vital to maintaining safe protected 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 portions of the CV wall. Ultrasonic testing at four inspection ports in 1993 showed no measurable change in CV wall thickness from the original material specifications. The ultrasonic testing continues on an annual basis. In addition, NASA has established annual visual inspections and corrosion rate assessment checks using sample coupons. No significant corrosion has been observed during the first eight years of data evaluation.

5. Security and Surveillance Measures:

Security inspections are conducted at the PBRF twice daily and each of the major buildings is inspected by a security 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 they are promptly and properly completed. Completed ITRs are reviewed and approved by the PBRF Engineer and/or alternate and filed in the PBRF Vital Records. ITRs indicating that corrective action is required are a responsibility of the PBRF Engineer and the PBMO.

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 significant known or suspected levels of radiation 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 two SWPs were issued during 1993, 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
Measurable Exposure Less than .1	4
.1 to .25	0
.25 and Above	0

6. Facility Changes

A Facility Change (FC) 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 PBRF End-Condition statement.

No FCs were initiated in 1993. There was one FC in progress at the beginning of this reporting period and a brief summary of that FC is given below.

1) FC-92-03 Removal of Cryogenic Piping from the Reactor Building (RB) -15' basement (East Side)

The removal of cryogenic piping was anticipated to be necessary in order to remove existing facility sump pumps that were to be replaced. The existing sump pumps were located directly below the cryogenic piping. As the job progressed, it was found that adequate clearance existed to remove the existing sump pumps without removing the cryogenic piping. The FC was so noted and closed out as completed.

7. Facility and Environmental Radiological Surveys:

The 1993 monitoring data continued to include direct radiation, surface contamination, airborne and waterborne activity and stream silt. These parameters did not vary significantly from data obtained during the previous 19 years of standby or protected safe storage of the PBRF. All data indicates the radioactivity within PBRF is being safely contained.

8. Maintenance Performed:

All maintenance performed during the reporting period fell under the Equipment Maintenance Record (EMR) System.

The work covered under the 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 19 maintenance tasks completed in 1993 under the EMR system described.

9. Audits and Inspections:

Mr. Earl Boitel has been replaced as chairman of the PBRF Audit Team by Mr. Kerry Remp. Mr. Remp has a Bachelor of Science in Marine Engineering, a minor in Nuclear Engineering and has been employed by NASA Lewis for the past nine years. During this time he has worked in Safety, Reliability and Quality Assurance and Space Nuclear Power Projects.

The other two audit team members are Mr. Michael Sudsina and Mr. Robert Corban. Mr. Sudsina has been a member of the PSC for 13 years and a member of the PBRF Audit Team for eight years. Mr. Robert Corban has replaced Mr. Phillip Paulsen as the third member of the Audit Team. Mr. Corban has a Bachelor of Science Degree in Aerospace Engineering and a Master of Science Degree in Mechanical Engineering. He has been employed by NASA Lewis for 13 years and has three years experience in the Nuclear Propulsion Office. All three members of the PBRF Audit Team are currently employed by NASA Lewis Research Center in Cleveland, Ohio.

One audit of the PBRF was conducted on December 3, 1993, by the PBRF Audit Team. No items of non-compliance were noted during this audit.

No on-site inspections were performed by the NRC during 1993. However, the scheduled 1993 on-site inspection and audit for the PBRF was performed by the NRC at the PBRF on January 3, 1994. There were no items of non-compliance found during this audit.

10. Unusual Occurrences:

There were no unusual occurrences at the PBRF during 1993 which were reportable to USNRC under the criteria of 10 CFR 21.3, 10 CFR 21.4 and 10 CFR 50.72.

11. License Status:

The effective date of the PBRF TR-3 license is January 28, 1987, and the effective date of the MUR R-93 License is January 12, 1987. Both licenses are effective for ten years from the date of issuance.

12. Other:

The PBRF procedures were revised to accommodate the recent changes in 10 CFR Part 19 and 20. These revised procedures were reviewed and approved by the PSC committee. The revised procedures were placed in effect at the PBRF during 1993. In addition, training was provided to the PBRF radiation workers regarding the revised procedures.

Disposal of Excess Plum Brook Station Property - GSA continues to investigate the possible transfer of 604 acres in the western area of Plum Brook Station to other government agencies. If this transfer occurs, the Station fence line will be modified to conform to the new Station perimeter. The nearest point of property affected is approximately 5,000 feet from the fenced site of the PBRF. NASA will continue to control access to the total Station, as well as inspect, maintain and provide security surveillance for the existing or revised Plum Brook Station perimeter fence line. Conditions at the PBRF will be unaffected.