

November 4, 2005

Dr. Julian M. Earls, Director  
NASA Glenn Research Center at Lewis Field  
21000 Brookpark Road M.S. 3-2  
Cleveland, Ohio 44135

SUBJECT: NRC SPECIAL, ANNOUNCED INSPECTION REPORT NOS. 50-30/2005-203  
AND 50-185/2005-203

Dear Dr. Earls:

This refers to the special inspection conducted on October 17-19, 2005, at your Plum Brook Reactor Facility. The inspection focused on the review of recent events including the detection of radiological contamination in off-site areas of the Plum Brook Reactor Facility, and termination of the agreement with the US ARMY Corps of Engineers to provide oversight of the decommissioning project. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliance with NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

**/RA/**

Brian E. Thomas, Chief  
Research and Test Reactors Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket Nos. 50-30 and 50-185  
License Nos. TR-3 and R-93

Enclosure: NRC Inspection Report Nos. 50-30/2005-203 and 50-185/2005-203  
cc w/enclosure: See next page

National Aeronautics and  
Space Administration

Docket Nos. 50-30/185

cc:

Ohio Department of Health  
ATTN: Radiological Health Program  
Director  
P.O. Box 118  
Columbus, OH 43216

Ohio Environmental Protection Agency  
Division of Planning  
Environmental Assessment Section  
P.O. Box 1049  
Columbus, OH 43216

Mr. J. Eric Denison  
Bureau of Radiation Protection  
Ohio Department of Health  
P.O. Box 118  
Columbus, OH 43216

Mr. Hank Pfanner  
NASA  
Plumbrook Station  
6100 Columbus Avenue  
Sandusky, OH 44870

Mr. Timothy Polich  
NASA  
Plumbrook Station  
6100 Columbus Avenue  
Sandusky, OH 44870

Test, Research and Training  
Reactor Newsletter  
University of Florida  
202 Nuclear Sciences Center  
Gainesville, FL 32611

November 4, 2005

Dr. Julian M. Earls, Director  
NASA Glenn Research Center at Lewis Field  
21000 Brookpark Road M.S. 3-2  
Cleveland, Ohio 44135

SUBJECT: NRC SPECIAL, ANNOUNCED INSPECTION REPORT NOS. 50-30/2005-203  
AND 50-185/2005-203

Dear Dr. Earls:

This refers to the special inspection conducted on October 17-19, 2005, at your Plum Brook Reactor Facility. The inspection focused on the review of recent events including the detection of radiological contamination in off-site areas of the Plum Brook Reactor Facility, and termination of the agreement with the US ARMY Corps of Engineers to provide oversight of the decommissioning project. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliance with NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

Brian E. Thomas, Chief **/RA/**  
Research and Test Reactors Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket Nos. 50-30 and 50-185  
License Nos. TR-3 and R-93

Enclosure: NRC Inspection Report Nos. 50-30/2005-203 and 50-185/2005-203  
cc w/enclosure: See next page

DISTRIBUTION:

PUBLIC PRTA/PRTB r/f AAdams CBassett  
RidsNrrDnrl MMendonca PDoyle TDragoun  
WEresian RidsNrrDir CLyon DHughes  
EHylton Plsaac RidsNrrDprPrta KWitt  
BDavis (cover letter only)(O5-A4)  
NRR Enforcement Coordinator (Only IRs with NOV, O10-H14)

Accession Number: ML053000208

TEMPLATE #: NRR-106

OFFICE	PRTA:RI	PRTA:PM	PRTA:LA	PRTA:BC
NAME	TDragoun	Plsaac	EHylton	BThomas
DATE	/ /2005	10/27/2005	10/27/2005	11/04/2005

C = COVER

E = COVER & ENCLOSURE  
OFFICIAL RECORD COPY

N = NO COPY

U. S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION

Docket Nos: 50-30 and 50-185

License Nos: TR-3 and R-93

Report Nos: 50-30/2005-203 and 50-185/2005-203

Licensee: National Aeronautics and Space Administration

Facility: Plum Brook Reactor Facility  
Test Reactor and Mockup Reactor

Location: Sandusky, Ohio

Dates: October 17-19, 2005

Inspectors: Thomas F. Dragoun

Approved by: Brian E. Thomas, Chief  
Research and Test Reactors Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY  
NASA Plum Brook Reactor Facility  
Report Nos: 50-30/2005-203 and 50-185/2005-203

The focus of this inspection was the on-site review of the results of radiological contamination surveys of Plum Brook and the Pentolite Ditch and changes resulting from the termination of US Army Corps of Engineers (USACE) oversight of the decommissioning project.

Site Organization Restructuring

- Within the scope of this review, NASA staff with management safety responsibilities were still in place after the recent demobilization of USACE and its contractors. Decommissioning will continue at a slower pace with oversight and direction provided by NASA personnel.

Plum Brook and Pentolite Ditch Contamination

- The inspector determined that the licensee's response to the discovery of low level radiological contamination in off-site areas of Plum Brook was appropriate for the level and location of the contamination.

## REPORT DETAILS

### **Summary of Plant Status**

NASA used Space Act enabling legislation to establish an agreement with the US Army Corps of Engineers (USACE) to manage and oversee the Plum Brook reactor decommissioning project. USACE designated one of its remediation contractors, Montgomery-Watson-Harza, along with lower tier contractors, to perform the decommissioning. USACE presence on site was limited to a small field office. In July 2005, budget constraints forced NASA management to request USACE to place the Plum Brook site in a safe condition and demobilize its staff and contractors by mid-September 2005. USACE completed this action as requested. This NRC inspection occurred soon after the demobilization was complete. The NASA Acting Project Manager, Radiation Safety Officer, Safety Officer, Construction Manager, Environmental Manager, Quality Assurance Manager, Radiological Analytical Laboratory Technician, and Senior Project Engineer remain on site, supported by a small administrative staff.

In addition, the inspection included a review of the circumstances and corrective actions taken as a result of radioactive contamination found in off-site portions of the Plum Brook creek bed.

### **1. Site Organization Restructuring**

#### **a. Inspection Scope (IP 69013)**

The inspector reviewed the NASA site staff in place after the USACE demobilization to determine if the DPlan Section 2.4 requirements continued to be met:

- organization and staffing
- available budget and planned future work
- transfer of records and files required by regulation
- worker exposure records

#### **b. Observations and Findings**

All NASA management and supervisory positions described in the DPlan section 2.4.1 remain filled with NASA personnel or Argonne contracted personnel, all of whom were in place prior to the USACE demobilization. The training and experience of these personnel was found to be satisfactory in prior inspections. After USACE departure, NASA staff was unencumbered by contract limitations and directly arranged with MOTA (labor contractor) to provide Health Physics technicians to complete the scoping survey of the Pentolite Ditch and Plum Brook. These technicians were selected because each had several years experience at the Saxton site performing similar soil surveys and hence did not require qualification training. The Saxton procedures were also adopted for the project and were edited to comply with NASA format. The Acting Project Manager stated that a draft DPlan revision will be completed within the next few weeks and will remove references to USACE and its contractors and will assign direct responsibility to NASA staff for various program elements and eventual completion of the decommissioning project. NRC approval of the changes will be requested if required after a 10 CFR 50.59 screening of the changes.

The licensee stated that NASA management is committed to continue funding the decontamination and demolition of the site. With budget carry-through from recent years, and expected funds from CY 2008, NASA estimates that the project will be sufficiently funded. NASA recently notified the NRC that the completion date for the project was extended to the year 2010.

NASA has designated three on-site work coordinators to oversee the cleaning of imbedded pipe, cleanup of hot cell #1, and characterization of the remaining hot cells. The demolition of the reactor and most reactor systems was completed by MWH. This use of work coordinators was a trial arrangement for NASA staff to complete selected work and its success will be evaluated. The Acting Director stated that shipment of contaminated soil or equipment for disposal was halted temporarily since the bulk of the waste was already shipped and the NASA staff needs to develop expertise in the applicable DOT and NRC regulations shipping regulations.

Using a "punch list", the NASA staff retrieved records and reports from the USACE contractors prior to their departure. These documents were packaged in boxes and are awaiting the return of the NASA Central File Clerk who is on maternity leave. These records include the worker exposure records and radiation survey results required by 10 CFR 20.

c. Conclusions

Within the scope of this review, NASA staff with management and/or safety responsibilities were still in place after the recent demobilization of USACE and its contractors. Decommissioning will continue at a slower pace with oversight and direction provided by NASA personnel.

## 2. Plum Brook and Pentolite Ditch Contamination

a. Inspection Scope (IP 69013)

To determine the licensee's long term and short term corrective actions after the discovery of radiological contamination in the Plum Brook silt at off-site locations, the inspector reviewed the following:

- results of surveys of Plum Brook and Pentolite Ditch conducted in 1985 and 1998 and reported in the DPlan Sections 2.2.1 and 2.2.2.4
- tour of the locations where the contamination was discovered with the NASA Assistant Radiation Safety Officer
- observation of briefings for the local media, Erie County safety and health personnel, and State of Ohio safety and health personnel held on October 18, 2005
- observed the briefing for the Decommissioning Community Workgroup and later, the general public on October 18, 2005

- results of the scoping radiological survey
- planning for the characterization survey
- review of reactor historical events and records with assistance from a retired employee to determine the source of the cesium -137, the dominant radionuclide found in the contamination
- review of NASA document, "SVI04 DATA REPORT.DOC"

b. Observations and Findings

Based on radiation surveys done in 1985 and 1998 of the silt and banks, the Pentolite Ditch was classified as "impacted" in accordance with requirements of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). This information was included in the Decommissioning Plan submitted to the NRC for approval in accordance with 10 CFR 50.82. Samples from Plum Brook were at background during the early surveys so it was not listed as an impacted area. The 1998 survey reported cesium concentration from 2 to 15 pCi/gm in the Ditch but no contamination in the Plum Brook. A search of records, information, and assistance from a retired employee indicated that during the period from mid-1968 to mid-1969 (reactor operating cycle #76) a pinhole leak in the cladding of one reactor fuel element introduced the cesium into the reactor cooling water. The faulty element was eventually identified and removed. The licensee stated that no cesium was detected in the reactor cooling water before or after cycle #76. Calculations using the historic data indicated that up to a total of 1 Curie of cesium may have been discharged during the one year period.

A scoping survey was conducted from August 11 to 25, 2005 to bound the extent of contamination in the Pentolite Ditch. Cesium was detected in samples from the Plum Brook. The unanticipated finding was relayed to the NRC on August 29, 2005, with a commitment to obtain silt samples from additional biased survey points in Plum Brook. State and local agencies were also notified. The second-round survey was conducted from October 3 to October 14, 2005, and confirmed the initial results.

An annual briefing for the media and regulators, followed by presentations to the Decommissioning Community Work Group and general public was scheduled for October 18. NASA management recommended that the new findings regarding Plum Brook be presented at that time. The highest dirt sample was obtained from an area along Taylorbrook Road and read 38.3 pCi/gm. This was approximately five times the NRC screening for cesium activity in soil but does not represent wide contamination or a danger to workers or the public. Almost all positive results (readings above background) were from samples from the Taylorbrook Road near to the location of the waste water treatment building which was demolished several years ago.

The NASA Acting Project Manager stated that a MARSSIM characterization survey and a job specific decontamination plan will be designed by NASA staff with assistance from experienced radiological engineers available from MOTA. Coordination of NRC inspections with the licensee, county, and State regulators

will be based on the experience and lessons learned at other power reactor decommissioning projects.

c. Conclusions

The inspector determined that the licensee's response to the discovery of low level radiological contamination in off-site areas of Plum Brook was appropriate for the level and location of the contamination.

**3. Exit Interview**

The inspection scope and results were summarized on October 18, 2005, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

K. Peacock, Acting Project Manager  
P. Kolb, Environmental Monitoring Program Manager  
J. Thomas, ANL/NASA Quality Assurance Engineer  
R. Case, ANL/NASA Assistant Radiation Safety Officer  
W. Stoner, ANL/NASA Radiation Safety Officer  
J. Fuerstenberg, PBOSG Administrative Assistant

INSPECTION PROCEDURES USED

IP 69013      Research and Test Reactor Decommissioning

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened      None

Closed      None

LIST OF ACRONYMS USED

CFR            Code of Federal Regulations  
DPlan        Decommissioning Plan  
IP             Inspection Procedure  
MARSSIM    Multi Agency Radiation Survey and Site Investigation Manual  
MOTA        Mechanical Organization Technical Assistance  
MWH         Montgomery Watson Harza  
NASA        National Aeronautics and Space Administration  
NRC         Nuclear Regulatory Commission  
RSO         Radiation Safety Officer  
TS            Technical Specification  
USACE       United States Army Corps of Engineers