

March 23, 2006

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

SUBJECT: NRC INSPECTION REPORT NO. 50-30/2006-201 AND NO. 50-185/2006-201

Dear Dr. Whitlow:

This refers to the inspection conducted on January 17 - 20, 2006, at your Plum Brook Reactor Facility. The inspection included participation in a public meeting conducted by Congresswoman Marcy Kaptur to review the radiological contamination in off-site areas of the Plum Brook. The enclosed report presents the results of the 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 by M. Wong for/
Brian Thomas, Branch 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. 50-30/2006-201 and 50-185/2006-201
cc w/enclosure: See next page
National Aeronautics and

Docket Nos. 50-30/185

Space Administration

cc:

Ohio Department of Health
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Ohio Environmental Protection Agency
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Test, Research and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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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: 50-30/2006-201 and 50-185/2006-201

Licensee: National Aeronautics and Space Administration

Facility: Plum Brook Reactor Facility
Test Reactor and Mockup Reactor

Location: Sandusky, Ohio

Dates: January 17 - 20, 2006

Inspector: Thomas F. Dragoun

Approved by: Brian Thomas, Branch 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: 50-30/2006-201 and 50-185/2006-201

The focus of this inspection was the status of the radiological contamination surveys of Plum Brook and the Pentolite Ditch creek bed, the training and experience of the NASA staff who will continue the project after termination of USACE and contractors, procedure changes to adapt to the new arrangements, transfer of records from contractors to NASA, HP technician training, performance of the on-site analytical laboratory, and an initial site visit by NRC's contractor, Oak Ridge Institute for Science and Education (separate report to be issued).

Site Organization Restructuring

- Within the scope of this review, the on-site NASA management and safety personnel in place after the major restructuring possessed the necessary training and experience to provide the oversight and direction necessary to continue the dismantlement and decontamination activities. An initial slower pace was anticipated due to the need to revise and implement policy and procedures after USACE and associated contractors were demobilized and vacated the site.

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 management requested 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. The final transfer of policies, procedures, and records from USACE and contractors to NASA was underway. Characterization efforts, this past summer, showed the presence of low levels of Cesium 137 and Cobalt 60, at decreasing levels, down the length of Pentolite Ditch all the way to Plum Brook. The inspection included a review of the circumstances and corrective actions taken as a result of the radioactive contamination found in on and off-site portions of the Plum Brook Reactor Facility site.

1. Site Organization Restructuring

a. Inspection Scope (IP 69013)

The inspector reviewed the qualifications of 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
- training records for 10 Senior HP Technicians which included records on Form MW-PL-02-006 revision 2, completion of required reading, qualification certificates, and Form PBRF-3 revision 0 which records completion of On-the-Job-Training (OJT)
- NASA Procedure Change List (undated) provides the priority, procedure number, title, recommended changes, and status/comments on the CS, RP, HS, MW-PL, EW, AD, MC, HPP, H&S series of procedures

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 continues to be satisfactory. After USACE departure, NASA staff was unencumbered by the previous 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 performing similar surveys at another site and hence did not require extensive qualification training. Most of the procedures in use at that site were adopted for the current project and were edited to comply with NASA format. The most eagerly needed procedures had a cover sheet that translated the MWH position/title in the procedure to the correct NASA title. 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. The NRC approval of the changes will be requested if required after a 10 CFR 50.59 screening of the changes.

The licensee stated that budget carry-through from recent years, when added to the Fiscal Year 2005, 2006, and 2007 allocation, made approximately \$20 million available for continuing the decontamination and dismantlement of the site but at a lower pace. NASA recently notified the NRC that the completion date for the project was extended to the year 2010. The next infusion of funds is expected during the FY 2008 budget process.

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. The inspector observed that dry active waste (DAW) was accumulating in a few areas inside the plant and NASA did not have a contract with a waste broker or disposal site. The site Director stated that the corrective action was assigned to one of the NASA staff. The inspector stated that resolution of this matter will be reviewed in a future inspection.

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 Part 20.

c. Conclusions

Within the scope of this review, the on-site NASA management and safety personnel in place after the major restructuring possessed the training and experience to provide the oversight and direction necessary to continue the dismantlement and decontamination activities. An initial slower pace was anticipated due to the need to revise and implement policy and procedures after USACE and associated contractors were demobilized and vacated the site.

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
- Email from K. M. Peecook, NASA Acting Project Manager to distribution, "Results to date from Plum Brook Sampling," dated December 19, 2005
- 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"
- MWH Procedure MW-PL-02-006 "Radiological Protection and FSS/Characterization Training Plan for Supervisors and Technicians" revision 2, dated May 17, 2004
- NASA Procedure "Survey Methodology to Support PBRF License Termination CS-01" revision 0, undated
- Survey Request Form (SR) SR-1 for "Burn Site" dated October 26, 2005
- SR-2 for "Concrete Dump Site," dated October 26, 2005
- SR-3 for "Spill Area No. 1," dated January 4, 2006
- SR-4 for "Preliminary Scans of CV Quads and Canals," dated January 12, 2006
- SR-5 for "Section A Phase 1 Characterization of Plum Brook Stream Bed from Pentolite Road to Clark Road," dated November 10, 2005
- SR-6 for "Section B Phase 1 Characterization of Plum Brook Stream Bed from Clark Road to Taylorbrook Lane," dated November 11, 2005
- SR-7 for "Section C Phase 1 Plum Brook Stream Bed from Taylorbrook Lane to Bogart Road," dated November 11, 2005
- SR-8 for "Section D Phase 1 Plum Brook Stream Bed from Bogart Road to Route 250," dated November 11, 2005.
- SR-9 for "Section A Phase 2 Plum Brook Stream Bed from Pentolite Road to Clark Road," dated November 28, 2005
- SR-12 for "Section D Phase 2 Plum Brook Stream Bed from Bogart to Route 250," dated January 11, 2006
- NRC Letter from J. R. Schlueter, Director, Office of State and Tribal Programs to R. E. Owen, Chief, Bureau of Radiation Protection, Ohio Department of Health
- ALARA Committee minutes of meeting, dated September 27, October 4, and October 17, 2005

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 DPlan 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 the Plum Brook creek bed. Ohio 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, 2005. The 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 5x the NRC screening for cesium activity in soil but does not represent widespread contamination or a danger to workers or the public. Almost all positive results (readings above background) were from samples from the vicinity of 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 November 9, 2005 letter, from NRC to the Ohio Department of Health.

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 January 20, 2006, 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

F. Greco, NASA Program Manager
K. Peecook, NASA 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
HP Health Physics
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
SR Survey Request
TS Technical Specification
USACE United States Army Corps of Engineers