

January 11, 2008

James F. Schweitzer, Ph.D.
Radiation Safety Officer
Radiological and Environmental Management
Purdue University
550 Stadium Drive Mall
West Lafayette, IN 47907

SUBJECT: NRC INSPECTION REPORT 030-00696/07-01(DNMS) AND
NOTICE OF VIOLATION PURDUE UNIVERSITY

Dear Dr. Schweitzer:

On December 13, 2007, the NRC completed inspection activities at the Purdue University, West Lafayette, Indiana campus. The purpose of the inspection was to determine whether specific decommissioning activities were conducted safely and in accordance with NRC requirements. Specifically, the University's decommissioning program for: the tracking of current and past radioactive material use locations, the conduct of radiological surveys for unrestricted release of former use areas, and performance of decommissioning activities were reviewed. At the conclusion of the inspection, the inspectors discussed the findings with you and members of your staff.

The inspection consisted of an examination of activities as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with personnel, and the conduct of NRC confirmatory surveys.

Based on the results of this inspection, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. The violations were evaluated in accordance with the Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforcement-pol.html>. The violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. The violations are being cited in the Notice because they were identified by the NRC.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. For your consideration and convenience, an excerpt from NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," is enclosed. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements

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 in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). The NRC's document system is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

We will gladly discuss any questions you may have regarding this inspection.

Sincerely,

/RA by K. O'Brien Acting for/

Patrick L. Loudon, Chief
Decommissioning Branch

Docket No.: 030-00696
License No.: 13-02812-04

Enclosures:

- 1. Notice of Violation
- 2. NRC Inspection Report 030-00696/07-01(DNMS)

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NOTICE OF VIOLATION

Purdue University
West Lafayette, Indiana

Docket No. 030-00696
License No. 13-02812-04

During an NRC inspection completed on December 13, 2007, two violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," the violations are listed below:

1. Title 10 CFR 30.35 requires, in part, that each person licensed under this part or Parts 32 through 36 and 39 of this chapter shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. Specifically, 10 CFR 30.35(g)(3) requires, in part, that a list contained in a single document must be kept of all areas designated and formerly designated restricted areas as defined in 10 CFR 20.1003.

Contrary to the above, the licensee failed to keep a list contained in a single document of all areas designated restricted areas that included those areas designated as restricted prior to 1996.

This is a Severity Level IV violation (Supplement VI).

2. 10 CFR 20.1501 requires that each licensee make or cause to be made surveys that may be necessary for the licensee to comply with the regulations in Part 20 and that are reasonable under the circumstances to evaluate the extent of radiation levels, concentrations or quantities of radioactive materials, and the potential radiological hazards that could be present.

Pursuant to 10 CFR 20.1003, survey means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.

Contrary to the above, the licensee did not make surveys to assure compliance with 10 CFR 20.1402, which limits radiation exposure to 25 millirem per year from residual radioactivity that is distinguishable from background. Specifically, the licensee released for unrestricted use an authorized location of use on April 20, 2007, without having conducting an adequate survey of a laboratory to verify compliance with the 25 millirem exposure requirement.

This is a Severity Level IV violation (Supplement IV).

Pursuant to the provisions of 10 CFR 2.201, Purdue University is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, Region III, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, Notice of Violation or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed

correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action, as may be proper, should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 11th day of January 2008

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 030-00696

License No: 13-02812-04

Report No: 030-00696/07-01(DNMS)

Licensee: Purdue University

Location: 550 Stadium Drive Mall
West Lafayette, Indiana

Dates: December 10-13, 2007

Inspectors: George M. McCann, Senior Health Physicist, RIII
William G. Snell, Senior Health Physicist, RIII
Kevin O'Sullivan, Project Manager (Financial), FSME,
DILR, RBB

Approved by: Patrick L. Loudon, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Purdue University Report No: 030-00696/07-01(DNMS)

This inspection focused on the licensee's decommissioning program for: the tracking of current and past radioactive material use locations, the conduct of decommissioning activities performed prior to the release of these areas, and the maintenance of required information important to the decommissioning of a facility until the site is released for unrestricted use. During the inspection the inspectors discussed the status of decommissioning activities with licensee personnel, examined licensee records and procedures and performed confirmatory surveys in former use areas.

Purdue University (University) is a Type A Broadscope licensee authorized to use a variety of radionuclides for research and development, including animal studies, as defined in 10 CFR Part 30.4. The University is authorized to use licensed material at the main campus complex and at the Fort Wayne Campus, Fort Wayne, Indiana; Crooked Lake Station, Columbia City, Indiana; Calumet Campus, Hammond, Indiana; North Central Campus, Westville, Indiana; and the Purdue University Farms, as specified in the current license.

Closeout Inspection and Surveys

- The inspectors concluded that the licensee's program for managing and tracking current locations of restricted use was being well managed. However, the inspectors identified one violation for failure to maintain a list of all areas designated as restricted areas of use that included those areas designated as restricted areas prior to 1996, as required by 10 CFR 30.35(g). (Section 1.0)

Radiation Protection

- The inspectors determined that the licensee had an active program for the survey and release of buildings, individual laboratories, and former storage areas. However, the inspectors identified one violation for a failure to conduct adequate radiation surveys to demonstrate compliance with 10 CFR Part 20.1402, the exposure criteria for release for unrestricted use, prior to releasing a laboratory unrestricted use. (Section 2.0)

Report Details¹

1.0 Closeout Inspections and Surveys (IP 83890)

1.1 Inspection Scope

The inspectors interviewed the University's Radiation Safety Office health physics staff regarding the maintenance and tracking of decommissioning records necessary for the release of areas for unrestricted use and license termination pursuant to the requirements of 10 CFR Part 30.35 Financial Assurance and Record keeping for Decommissioning. The inspectors reviewed and evaluated the licensee's procedures, practices, and documentation used to track areas approved for use of licensed material as follows: 1) the Radiation Safety Tracking Application (RASTA), a Microsoft Access 2000 database application, and 2) the Radioisotopes Inventory Tracking System (RITS), a DOS-based application, and 3) current computer records of users and locations of use.

1.2 Observations and Findings

The RASTA database was implemented during 2002, replacing the RITS DOS database which was implemented during 1996. The RASTA database identified a total of 601 active laboratories by location, 256 authorized projects, and 1,180 active users. In addition to approved users of licensed materials, the database also tracks users of lasers and x-ray devices. During the transition from the RITS system to the RASTA system, the licensee believes that not all of the RITS information transferred into the RASTA database. This problem in transferring data was due to computer operating system differences. The licensee cannot access the older database to verify the differences between the databases. The licensee also did not possess a print copy of the information contained in the 1996 database.

The RASTA is maintained on a University computer network, and is updated daily. The RASTA database is organized by project and contains the nuclides approved for each project, the nuclides currently being used, records of radiological spills and incidents (including fields for radioactive material location), survey dates, survey results, leak tests and results, meter calibration, waste tracking, inventory, and active or inactive status of a laboratory. The database further identifies projects with open and or sealed sources, and buildings and committee approved laboratory locations, as well as the required survey frequency for each laboratory. However, the RASTA database did not contain information regarding formerly designated restricted areas that existed prior to 1996.

Title 10 CFR 30.35(g) requires, in part, that each person licensed under this part or Parts 32 through 36 and 39 of this chapter shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. Specifically, 10 CFR 30.35(g)(3)(i) requires, in part, that a list contained in a single document and updated every 2 years, be kept of all areas designated and formerly designated restricted areas as defined in 10 CFR 20.1003. The licensee's failure to identify and track all locations designated as restricted areas, that

¹A list of acronyms used in the report is included at the end of the Report Details.

included those areas designated as restricted areas prior to 1996, constitutes a violation of 10 CFR 30.35(g). This is a Severity Level IV violation (VIO 030-00696/07-001-01).

1.3 Conclusion

The inspectors concluded that the licensee's program for managing and tracking current locations of restricted use was being well managed. However, the inspectors identified one violation for failure to maintain a list of all areas designated as restricted areas of use that included those areas designated as restricted areas prior to 1996, as required by 10 CFR 30.35(g).

2.0 Radiation Protection (IP 83822)

2.1 Inspection Scope

The inspectors evaluated applicable licensee procedures and practices for surveying, decontaminating, and periodically releasing for unrestricted use, areas associated with decommissioning activities. The inspectors evaluated and reviewed procedures and documents as follows: 1) Standard Operating Procedure (M01), *Radiation Survey Meter Calibration*, May 15, 2007, 2) Standard Operating Procedure (M02), *Sources for Survey Meters – Efficiency Checks*, May 5, 2007, 3) Standard Operating Procedure (M03), *Survey Meter Efficiency to Beta Radiation*, May 5, 2007, 4) Standard Operating Procedure (L05), *Laboratory Close-out Room Survey Reports*, 5) Draft Standard Operating Procedure, *Radioisotope Laboratory Decommissioning*, and 6) specific laboratory drawings and diagrams documenting release of former buildings, laboratories and storage locations. The University's health physics staff was interviewed regarding their performance of close-out surveys, including use of radiation instrumentation and documentation of survey results.

The inspectors performed independent confirmatory radiological surveys in three University Halls (housing five laboratory locations approved by the University's Broadscope Committee), and three University buildings used for processing, decay-in-storage, disposal of liquids, and incineration of solid wastes contaminated with radiological materials. The inspectors' surveys included evaluation for levels of gross radiological contamination using calibrated survey meters equipped with hand-held probes sensitive for alpha, beta, and gamma radiations. The inspectors' surveys included: floors, building drains, ventilation hoods and ducts, and adjacent unrestricted areas.

2.2 Observations and Findings

On April 20, 2007, the licensee's radiation safety office certified, that a laboratory where uranium-238, thorium-232, and technetium-99 compounds had been used for academic research and development activities, was suitable for unrestricted use. The licensee's Radiation Safety Office based this approval on a closeout survey performed by members of its staff on April 18, 2007.

The licensee's radiation safety staff conducted direct radiation surveys and collected wipes to test for removable contamination to evaluate the laboratory area and equipment for the presence of gamma and beta contamination. The licensee's survey document

did not identify any residual contamination above ambient background. However, since the licensee's survey measurements were limited to beta and gamma radiations, the potential for alpha contamination, which is one of the radiation constituents of the radioactive materials used in the laboratory, was not evaluated. Further, the room close-out survey record did not document direct surface survey measurements performed on the laboratory floor, counter-tops, hoods, etc., in units of disintegrations per minute per 100 centimeters squared (dpm/100 cm²), which are necessary to determine and document any fixed radiological contamination and to determine removable fractions. The licensee's direct survey document indicated that measurements were taken using a sodium iodide scintillation detector, which reports radiation results in millirem per hour. Also, the instrument serial and model numbers and calibration dates were not provided for the survey meter(s) used.

The NRC inspectors performed confirmatory measurements in the laboratory. The inspectors identified general surface alpha contamination levels in the laboratory's radioisotope hood ranging from 10 to 400 dpm/100 cm², with one small spot measuring approximately 1,800 dpm/100 cm². All other laboratory areas surveyed did not identify any alpha, beta, or gamma levels greater than the ambient laboratory background levels.

The NRC has established radiological screening values for assessing and determining suitability of buildings with surface contaminations for unrestricted use. These screening values correspond to levels of radionuclide contamination that would be deemed in compliance with the unrestricted use dose limit in 10 CFR 20.1402 (i.e., 25 millirem per year). The NRC screening process is discussed in NUREG-1757, Volumes 1 and 2, *Consolidated NMSS Decommissioning Guidance Decommissioning Process for Materials Licensees*. The screening value for thorium-232 is 6 dpm/100 cm².

Purdue University's license renewal application dated November 19, 2004, Section 9.2 *Decommissioning of Facilities*, states in part that "Facilities or rooms at Purdue University are usually not permanent places of use for radioactive material. However when a Principal Investigator decides to terminate the use of licensed material in a particular area, the facility is "closed out." This consists of an extensive direct radiation survey with the appropriate instrument followed by wipe tests throughout the facility." The November 19 renewal application is referenced in Condition 31.A of the Licensee's License.

By failing to perform an adequate survey on April 18, 2007, in a laboratory released for unrestricted use on April 20, 2007, the licensee was not able to demonstrate compliance with Section 20.1402 of 10 CFR. The failure to make adequate surveys to determine the presence and extent of residual radioactivity constitutes a violation of 10 CFR 20.1501. This is a Severity Level IV violation (VIO 030-00696/07-001-02).

2.3 Conclusion

The inspectors determined that the licensee had an active program for the survey and release of buildings, individual laboratories, and former storage areas. However, the inspectors identified one violation for a failure to conduct adequate radiation surveys to demonstrate compliance with 10 CFR Part 20.1402, the exposure criteria for release for unrestricted use, prior to releasing a laboratory unrestricted use.

3.0 Exit Meeting Summary

The inspectors presented preliminary inspection findings to the licensee's Radiation Safety staff at the conclusion of onsite inspection activities. The licensee did not identify any documents or processes reviewed by the inspectors as proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

- * J. Schweitzer, Ph.D., Radiation Safety Officer
- * M. Handy, Assistant Radiation Safety Officer
- * M. Pslug, Health Physicist
- * D. Smith, Health Physicist
- * S. Rudolph, Health Physicist Technician

*Persons present at the exit meeting on June 1, 2007.

INSPECTION PROCEDURES USED

IP 83890 Closeout Inspections and Surveys
IP 83822 Radiation Protection

ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	<u>Type</u>	<u>Summary</u>
VIO 030-00696/07-001-01	VIO	Failure to account for formerly designated restricted areas.
VIO 030-00696/07-001-02	VIO	Failure to make or cause to be made surveys necessary to demonstrate compliance with Part 20.

Closed

None

Discussed

None

PARTIAL LIST OF DOCUMENTS REVIEWED

Licensee documents reviewed and utilized during the course of this inspection are specifically identified in the "Report Details" above.

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
RASTA	Radiation Safety Tracking Application
RITS	Radioisotopes Inventory Tracking System
VIO	Violation