

INSPECTION RECORD

Region III Inspection Report No. 030-35805/12-01  
License No. 24-32339-01 Docket No. 030-35805

Licensee (Name and Address):  
Donald Danforth Plant Science Center  
975 N. Warson Road  
St. Louis, MO 63132

Licensee Contact: Howard F. Beittenmiller, RSO Telephone No. 314-587-1051

Priority: 5 Program Code: 03620

Date of Last Inspection: 7/18/2007 Date of This Inspection: 3/22-23/2012 with continued in-office review until 3/30/2012 to evaluate the licensee's survey requirements

Type of Inspection: ( ) Initial ( ) Announced (X) Unannounced  
(X) Routine ( ) Special

Next Inspection Date: 3/2017 (X) Normal ( ) Reduced

Summary of Findings and Actions:

- ( ) No violations cited, clear U.S. Nuclear Regulatory Commission (NRC) Form 591 or regional letter issued
- (X) Non-cited violation (NCV)
- ( ) Violation(s), Form 591 issued
- ( ) Violation(s), regional letter issued
- ( ) Followup on previous violations

Inspector Andrew M. Bramnik  
Andrew M. Bramnik, Health Physicist

Date 4/4/2012

Approved Tamara E. Bloomer  
Tamara E. Bloomer, Chief, Materials Inspection Branch

Date 4/5/12

## PART I-LICENSE, INSPECTION, INCIDENT/EVENT, AND ENFORCEMENT HISTORY

### 1. AMENDMENTS AND PROGRAM CHANGES:

<u>Amendment No.</u>	<u>Date</u>	<u>Subject</u>
13	3/13/2012	License renewed in entirety

### 2. INSPECTION AND ENFORCEMENT HISTORY:

One NCV was identified during the previous NRC inspection on July 18, 2007, involving the licensee's failure to use shipping papers on two occasions: (1) when transporting approximately ten microcuries of hydrogen-3 and one microcurie of carbon-14 on June 15, 2005; and (2) when transporting approximately 20 microcuries of hydrogen-3 on June 16, 2005. No violations were identified during a previous NRC inspection on May 2 and 3, 2002.

### 3. INCIDENT/EVENT HISTORY:

None

## PART II - INSPECTION DOCUMENTATION

### 1. ORGANIZATION AND SCOPE OF PROGRAM:

#### Management Structure:

James C. Carrington, Ph. D – President and Principal Investigator  
Sam Fiorello – Chief Operating Officer and Senior Vice President  
Howard F. Beittenmiller – Director, Facilities & Support Services  
and Radiation Safety Officer (RSO)

The licensee was authorized to possess millicurie quantities of hydrogen-3, carbon-14, iodine-125, phosphorus-32, phosphorus-33, and sulfur-35 for research and development activities. Specifically, the licensee used licensed materials for plant studies such as: tracer studies and labeling reactions in bacteria, yeast, and fungus; *in vitro* labeling of tissue culture cells; and *in vivo* labeling of plants. 14 Authorized Users (AUs) were approved on the NRC license; however, only eight AUs possessed licensed material and only two of those AUs were actively using material at the time of the inspection. The licensee primarily used carbon-14 and phosphorus-32 in microcurie quantities for plant studies as described in their license application. Two individuals worked with the RSO to conduct radiation safety operations.

### 2. SCOPE OF INSPECTION:

Inspection Procedure(s) Used: 87126

Focus Areas Evaluated: 03.01 – 03.07

The inspectors toured the licensee's facility, including two active laboratories, the licensee's materials containment building (for waste storage), and the licensee's

previous waste storage facility (released for unrestricted use on May 4, 2011). Interviews conducted with available staff revealed an adequate level of understanding of emergency and materials handling procedures and techniques. Licensee AUs, technicians, and radiation safety staff demonstrated or described package receipt surveys, transfer of licensed materials from radiation safety staff to individual AUs, and other comprehensive safety measures. A radiation safety staff member demonstrated how the licensee identified, surveyed, inventoried, and packaged waste for disposal by transfer to a licensed waste handler or by decay-in-storage. The inspectors also observed how the licensee conducted daily and/or weekly surveys for contamination using a liquid scintillation counter.

AUs were required to complete an "Isotope Use Form" every time they used any amount of licensed material. The RSO conducted a quarterly inventory of all licensed materials by collecting and tabulating these forms and entering them into a database. The RSO also used this database to inventory material being held in storage for disposal. Additionally, the RSO used this data to determine whether the AU or staff members were required to conduct a daily or a weekly survey for contamination. This item will be discussed in Section 4, below. The licensee's radiation safety staff conducted monthly wipe and/or direct surveys in all areas where licensed materials are used or stored, at all transition points connecting these areas with unrestricted areas, and in common-use areas outside of restricted areas (such as lunch rooms, break areas, and restrooms). AUs and technicians working with isotopes other than P-32 were not required to wear dosimetry. The licensee provided documentation to the inspectors demonstrating that unmonitored individuals were not likely to receive, in one year, greater than 10 percent of the allowable dose limit in Title 10 of the Code of Federal Regulations (CFR) Part 20. The inspectors observed that radiation safety staff as well as AUs and researchers using P-32 were required to wear whole body and extremity dosimetry badges. A records review indicated that the maximum whole body and extremity doses since 2009 were 36 millirem and 470 millirem, respectively.

All new staff members at the licensee's facility were required to complete a two-to-four hour training course on radiation safety, regardless of whether or not they worked with radioactive materials. Staff members completed refresher training annually. The licensee's RSO also conducted an annual audit of the radiation safety program that was documented in a formal report to the licensee's President and Radiation Safety Committee (RSC). The RSC met two-to-four times every year.

### **3. INDEPENDENT AND CONFIRMATORY MEASUREMENTS:**

The inspectors performed independent measurements in restricted and unrestricted areas within and around the licensee's facilities. The inspectors did not identify any readings that were distinguishable from background. The licensee possessed a variety of survey meters that were calibrated, operational, and performed comparably to readings from an NRC survey meter.

**4. VIOLATIONS, NCVs, AND OTHER SAFETY ISSUES:**

Condition 20.A of License No. 24-32339-01 states, in part, that the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the Application dated February 24, 2012.

Item 7 of the Application dated February 24, 2012 states, in part, that a contamination survey will be performed and documented by laboratory personnel each day after licensed material is used in the lab in quantities greater than 200 microcuries. For quantities less than 200 microcuries, weekly surveys will be required.

Contrary to the above, on multiple occasions between 2010 and March 23, 2012, the licensee failed to conduct contamination surveys as required. Specifically, licensee AUs failed to conduct 11 daily and/or weekly surveys out of 56 opportunities in 2011, and failed to conduct 32 daily and/or weekly surveys out of 179 opportunities in 2010. The licensee's annual audit reports indicated that the licensee missed surveys on several occasions every year between 2007 and 2011.

The root cause of the violation was isolated failures to conduct surveys as required by laboratory staff and AUs. Specifically, some staff members that were required to conduct only one or two surveys during a calendar year did not complete surveys. AUs and staff members who were required to conduct more frequent surveys did so with a higher completion percentage.

This issue was self-identified by the licensee in their annual radiation safety program audits. The corrective actions for this violation included instituting a zero-tolerance policy for AUs who do not conduct daily or weekly surveys when required. This policy became effective in calendar year 2011 and granted authority to the RSO to penalize users who do not conduct surveys when required, including temporary or permanent removal of their status to use radioactive materials. One AU relinquished his status during calendar year 2011 based in part on the RSO's feedback to the President that the AU had not completed one required survey. Ongoing corrective actions included highlighting the importance of surveys during annual refresher training, and scaling-back the number of radionuclides and AUs listed on the NRC license. Additionally, as mentioned in Section 2, above, licensee radiation safety staff conducted monthly surveys to verify that no contamination had been spread. During the final telephone exit meeting on March 30, 2012, the RSO stated that the RSC would consider a license amendment to modify the survey requirements during their next meeting. Based on the information above, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy.

**5. PERSONNEL CONTACTED:**

\* & Howard F. Beittenmiller, RSO

\* Toni M. Kutchan, Ph. D, Vice President for Research

& Sam Fiorello, Senior Vice President

\* Individuals present at March 23, 2012 preliminary exit meeting

& Individual present at March 30, 2012 final telephone exit meeting

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