

**INSPECTION RECORD**

**Region III**  
**License No.** 24-02564-02

**Inspection Report No.** 030-05083/2011-001(DNMS)  
**Docket No.** 030-05083

**Licensee:**  
Midwest Research Institute  
425 Volker Blvd.  
Kansas City, Missouri 64110-2299

**Licensee Contact:** James McHugh - RSO **Telephone No.** 816-753-7600

**Priority:** 5 **Program Code:** 3620

**Date of Last Inspection:** January 28, 2005

**Date of This Inspection:** January 6 and 7, with continuing review through  
February 22, 2011

**Type of Inspection:**       Initial       Announced       Unannounced  
    Routine       Special

**Next Inspection Date:** 1/2016       Normal       Reduced

**Summary of Findings and Actions:**

- No violations cited, clear U.S. Nuclear Regulatory Commission (NRC) Form 591 or regional letter issued
- Non-cited violations (NCVs)
- Violation(s), Form 591 issued
- Violation(s), regional letter issued
- Follow up on previous violations

**Inspector:**   
Michael LaFranzo, Health Physicist

**Date** 3/19/11

**Inspector:**   
Bill Lin, Health Physicist

**Date** 3/18/11

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

**Date** 3/21/11

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

**1. AMENDMENTS AND PROGRAM CHANGES:**

<u>Amendment No.</u>	<u>Date</u>	<u>Subject</u>
57	7/18/2005	Increase in possession limit
58	8/1/2006	Change in licensed activities
59	7/12/2007	Change in Authorized Users
60	12/16/2008	Change in Authorized Users
61	5/5/2009	Change in Authorized Users
62	1/29/2010	Change in Authorized Users

**2. INSPECTION AND ENFORCEMENT HISTORY:**

A routine inspection was conducted on January 28, 2005; no violations of NRC requirements were identified. A previous routine inspection was conducted on June 16, 1999; no violations of NRC requirements were identified.

**3. INCIDENT/EVENT HISTORY**

None

## PART II - INSPECTION DOCUMENTATION

### 1. ORGANIZATION AND SCOPE OF PROGRAM:

Director  
Manager  
Radiation Safety Officer

The licensee is a small research and development program, which, in the last 5 years, had been authorized to chemically synthesize radioactive material for commercial use utilizing multi-curies per activity. The licensee typically uses licensed material (carbon-14) 3-4 times per month. The licensee had not used other licensed material since the last inspection but stores curie quantities for research purposes. The licensee had numerous technicians and 14 authorized users. However, only 1-2 authorized users are active. The licensee also possesses a number of Electron Capture Detector (ECD) units, each possessing a generally licensed Ni-63 source.

### 2. SCOPE OF INSPECTION:

Inspection Procedure(s) Used: 87126  
Focus Areas Evaluated: 03.01 – 03.07

### 3. INDEPENDENT AND CONFIRMATORY MEASUREMENTS:

The licensee did not possess licensed material that had the radiological characteristics that would allow measurements with portable survey equipment the U.S. Nuclear Regulatory Commission (NRC) uses in the field. However, the NRC had the licensee demonstrate the use of a liquid scintillation counter; the detection system was adequate to determine radiological contamination. The NRC also had the licensee take and radiologically analyze wipes of controlled and uncontrolled areas; no elevated or abnormal contamination was identified.

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

A. Title 10 of the Code of Federal Regulations (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 10 CFR 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.

Title 10 CFR 20.1204 allows for the determination of internal exposure through the use of a bioassay program.

During the inspection, the licensee could not demonstrate that they addressed the physical and/or biochemical properties of the radionuclides taken into the body or the behavior of the material in the individual which could affect the determination of internal exposure. The licensee used licensed material in fume hoods which had adequate flow rates to reduce the possibility of radiological exposure. Through record reviews and interviews, the inspectors determined the licensee did not have a radiological incident which would have caused significant airborne contamination and, thereby, radiological intake. Therefore, the NRC does not believe that any licensee personnel had received a significant radiological exposure. The licensee committed to obtain the necessary internal and/or external resources to determine the physical and/or biochemical properties to ensure accurate bioassay exposure determinations. The licensee was looking into the specifics needed to comply with NRC requirements and will respond to the NRC as part of the Notice of Violation (NOV) response. The NRC will then determine if additional inspection activity is warranted.

10 CFR 20.1301(a) limits the total effective dose equivalent to individual members of the public from the licensed operation to 0.1 rem in a year. During the inspection, the licensee had not performed a radiological analysis or mathematical calculations to ensure individual members of the public did not receive in excess of 0.1 rem in a year from air effluents that contained carbon-14 and Tritium. The licensee had determined the air filtration system had collected carbon-14 and tritium through the air waste stream but had not determined the quantity of radioactive material released to the environment to ensure compliance with NRC regulations. The licensee committed to obtain the necessary internal and/or external resources to determine the quantity of licensed material being released to the environment and will submit the information to the NRC as part of the NOV response. The NRC will then determine if additional inspection activity is warranted.

- B. 10 CFR 20.1904(a) requires the licensee to ensure that each container of licensed material bears a durable, clearly visible label bearing the words "CAUTION, RADIOACTIVE MATERIAL," or "DANGER, RADIOACTIVE MATERIAL." The label must also provide sufficient information (such as the radionuclide(s) present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, etc.) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

During the inspection, the inspectors noted that the radioactive material filtration system, located in a container which contained a pre-filter, HEPA and Charcoal filters contaminated with carbon-14 and tritium, did not bear a label that identified the radionuclides or the quantity of radioactivity, nor did it otherwise bear sufficient information to permit individuals handling or using the container, or working in the vicinity of the container, to take precautions to avoid or minimize exposure. The licensee had determined that the filters did contain licensed material and had procedures in place to remove the filters as part of its chemical and biological handling system. The inspectors reviewed the procedures and found them adequate to ensure the safe handling and removal of radioactive contaminated filters. The

- C. Condition 20 of License 24-02564-02 states that the licensee shall conduct a physical inventory of all sealed and/or foil source at intervals not to exceed 3 months.

During the inspection, the inspectors identified an ECD containing approximately 139 millicuries of tritium that the licensee did not know they had in their possession since at least the 1980's and, as a result, did not conduct the required inventories of that source. After the site inspection, the licensee performed a complete physical check of all areas that could possess radioactive material and did not identify any additional sources they were not aware of. The licensee performed a leak test of the source and determined the source was not leaking. The licensee committed to placing the source on a three month inventory check and is looking into disposal of the source.

5. **PERSONNEL CONTACTED:**

- #\* Chris Bailey – Manager of Environmental Safety and Health Office
- #\* Eric Jeppeson – Manager
- #\*& James McHugh – Radiation Safety Officer

Use the following identification symbols:

# Individual(s) present at entrance meeting

\* Individual(s) present at site exit meeting

& Individual(s) present telephonic exit meeting on 2/23/11