



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

October 1, 2009

EA-09-188

William F. Broglie  
Chief Administrative Officer  
Department of Commerce  
National Oceanic and Atmospheric Administration  
1305 East West Highway, Room 8431  
Silver Spring, MD 20910

**SUBJECT: NRC SPECIAL INSPECTION REPORT 030-03746/2008-001, NRC INVESTIGATION REPORT 04-2009-003 AND NOTICE OF VIOLATION**

Dear Mr. Broglie:

This refers to the special inspection and investigation of the Department of Commerce, National Oceanic and Atmospheric Administration facility in Boulder, Colorado, conducted between October 30, 2008, and August 18, 2009. The purpose of the inspection was to review the circumstances related to the National Oceanic and Atmospheric Administration's report of two lost gas chromatography devices containing three discrete sources of licensed material (nickel-63, 15 millicuries (mCi) each). The required telephonic report was made to the U.S. Nuclear Regulatory Commission (NRC or Commission) Operations Center on September 16, 2008, and a written report was submitted to the NRC, Region IV office, on September 17, 2008.

An entrance meeting was held with Dr. Alexander MacDonald, Director, Earth System Research Laboratory, and preliminary inspection findings were discussed with Mr. John Schneider, Deputy Director, Earth System Research Laboratory, at the conclusion of the onsite inspection on October 31, 2009. A subsequent telephone conversation among you, several other National Oceanic and Atmospheric Administration managers, and NRC representatives was held on November 7, 2008. During that conversation, we informed you that we would be issuing a Confirmatory Action Letter to you, requesting that the National Oceanic and Atmospheric Administration take specific actions to address NRC concerns and provide information regarding the National Oceanic and Atmospheric Administration's investigation and resolution of these concerns. Confirmatory Action Letter 4-08-003 was issued to you on November 12, 2008. Your responses to Confirmatory Action Letter 4-08-003, in letters dated December 12, 2008, and January 14, 2009, were reviewed and found to adequately address our concerns; therefore, this Confirmatory Action Letter is considered closed. A final exit meeting was conducted telephonically with you on August 18, 2009.

This special inspection examined activities associated with the lost gas chromatography devices, as well as activities conducted under the license as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of the NRC license. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel. During the inspection, the inspectors discovered that the National Oceanic and Atmospheric Administration had not confined its use of licensed material to that authorized by its NRC license, but had engaged in unauthorized activities involving the assembly of custom-made gas chromatography devices.

In a telephone conversation on August 18, 2009, Mr. Anthony Gaines of my staff informed you that the NRC was considering escalated enforcement for apparent violations of NRC requirements. The apparent violations involved failures to maintain security of radioactive material used in gas chromatography devices and to confine the use of licensed material to that authorized by your NRC license. Mr. Gaines also informed you that we had sufficient information regarding the apparent violations and your corrective actions to make an enforcement decision without the need for a predecisional enforcement conference or a written response from you. You indicated that the National Oceanic and Atmospheric Administration in Boulder, Colorado, did not believe that a predecisional enforcement conference or written response was needed.

Based on the information developed during the inspection, the NRC has determined that violations of NRC requirements occurred. 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. As noted above, the violations involved failures to (1) maintain security of radioactive material stored in Buildings 4 and 33, and (2) confine the use of licensed material to that authorized on the license, which did not include assembly of custom-made gas chromatography devices.

The NRC considers these violations significant because the security requirement provides a reasonable assurance that radioactive material contained in gas chromatography devices will be secure from unauthorized access or theft. In addition, customization of devices without review by and explicit authorization from the NRC to conduct such operations prevents the NRC from completing its regulatory responsibility to review significant radiological or programmatic changes in licensed activities to ensure the safety of licensee staff and members of the public. Therefore, the security violations have been categorized in accordance with the NRC Enforcement Policy as a Severity Level III problem and the use authorization violation has been categorized in accordance with the NRC Enforcement Policy at Severity Level III. The NRC Enforcement Policy may be found on the NRC's Web site, which is located at [www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html](http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html).

In accordance with the NRC Enforcement Policy, a base civil penalty in the amount of \$3,500 is considered for a Severity Level III problem or violation.

The NRC has also determined that a Severity Level IV violation of NRC requirements occurred. This violation was also evaluated in accordance with the NRC Enforcement Policy and is cited in the enclosed Notice. The circumstances surrounding it are described in detail in the subject inspection report. The violation involved the failure to conduct a public dose assessment at locations where licensed material is used or stored. The violation is being cited because it was identified by the NRC, rather than being identified by the licensee.

Because your facility has not been the subject of escalated enforcement actions within the last two inspections, the NRC considered whether credit was warranted for *Corrective Action* in accordance with the civil penalty assessment process in Section VI.C.2 of the Enforcement Policy. Based on your prompt and comprehensive corrective actions, the NRC has determined that *Corrective Action* credit is warranted. Your corrective actions for the security violations included an exhaustive review of disposal and transfer records to try to locate the sources, contacting and questioning present and past employees, the manufacturer, and other possible purchasers or buyers of excess material, and implementing comprehensive security enhancements. The security enhancements included: removal of all sources containing radioactive material from Building 4 and putting them in secure storage, immediately re-keying some doors, consolidating radioactive material into fewer storage areas, performing confirmatory checks on doors to ensure they remained secured, reconciling all pertinent records (leak test, inventories, receipt, etc.) to account for all electron capture detectors, instituting a web-based electron capture detector location database, having all personnel that will have access to radioactive material take a new safety and security course, and adding keypad locks to all storage locations. Your corrective actions for the unauthorized use of licensed material violation included the immediate submittal of radiation safety procedures for NRC review and approval to allow the assembly of electron capture detectors into custom-made gas chromatography devices for research and development. Further, your corrective actions for the failure to show compliance with public dose limits included performing public dose assessments for each location specified on your license and demonstrating compliance with the applicable limits in 10 CFR Part 20.

Therefore, to encourage prompt and comprehensive correction of violations, and in recognition of the absence of previous escalated enforcement action, I have been authorized, after consultation with the Director, Office of Enforcement, not to propose a civil penalty in this case. However, significant violations in the future could result in a civil penalty. In addition, issuance of this Severity Level III problem and Severity Level III violation constitutes escalated enforcement action that may subject you to increased inspection effort.

The NRC has concluded that information regarding the reason for the violations, the corrective actions taken and planned to correct the violations and prevent recurrence, and the date when full compliance was achieved is already adequately addressed on the docket in letters from you dated September 17, November 3, and December 12, 2008, and January 14, 2009. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice. The

information provided in the excerpt from the NRC Information Notice 96-28 may be helpful when preparing your response, if you do respond.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to provide one, 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's Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response 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, 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 information, 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). The NRC also includes significant enforcement actions on its Web site, which can be located on line at [www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html](http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html).

Should you have any questions concerning this inspection or the enclosed Notice of Violation, please contact Mr. Anthony Gaines at (817) 860-8252.

Sincerely,

/RA/

Elmo E. Collins  
Regional Administrator

Docket: 030-03746  
License: 05-11997-01

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 030-03746/2008-001
3. Excerpt from NRC Information Notice 96-28

cc (w/enclosures):

Alexander E. MacDonald, Ph.D.  
Director, Earth System Research Laboratory  
National Oceanic and Atmospheric Administration  
325 Broadway, R/ESRL  
Boulder, CO 80305-3328

Department of Commerce  
National Oceanic and  
Atmospheric Administration

- 5 -

John Schneider Deputy Director  
Global Systems Division  
National Oceanic & Atmospheric Administration  
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325 Broadway, DSRC-3B121  
Boulder, CO 80305-3328

cc (w/Enclosure 1):  
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Management Division  
Dept. Public Health & Environment  
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Denver, CO 80246-1530

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RIV Materials Docket File (5th Floor)

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RC	D: DNMS	RA/DRA	OE	RA/DRA
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## NOTICE OF VIOLATION

Department of Commerce  
National Oceanic and  
Atmospheric Administration  
Boulder, Colorado

Docket 030-03746  
License 05-11997-01  
EA-09-188

During an NRC inspection conducted October 30, 2008, through August 18, 2009, violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

- A. 10 CFR 20.1801 requires that the licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas. As defined in 10 CFR 20.1003, *controlled area* means an area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason; and *unrestricted area* means an area, access to which is neither limited nor controlled by the licensee.

Contrary to the above, from September 2002 until November 2008, the licensee did not secure from unauthorized removal or access licensed materials that were stored in controlled or unrestricted areas. Specifically, the licensee stored gas chromatography devices containing nickel-63 sources in quantities greater than 100 millicuries, in Building 4 on the National Oceanic and Atmospheric Administration campus, which is an unrestricted area, and did not secure the sources from unauthorized removal or access. Additionally, on October 30, 2008, the licensee used and stored gas chromatography devices containing nickel-63 in quantities greater than 100 millicuries in Building 33 on the National Oceanic and Atmospheric Administration campus, which is a controlled area, and did not secure the sources from unauthorized removal or access.

Contrary to the above, from September 1, 2002, until September 17, 2008, the licensee stored two gas chromatography devices containing three 15 millicurie nickel-63 sources in Building 4 on the National Oceanic and Atmospheric Administration campus, which was an unrestricted area, and did not secure the sources from unauthorized removal or access.

This is a Severity Level III problem (Supplement IV).

- B. 10 CFR 30.34(c) requires, in part, that each licensee confine his possession and use of byproduct materials to the locations and purposes authorized in the license. Condition 9.A of Amendment 39 to NRC License 05-11997-01 limits, in part, the use of licensed materials to sample analysis in compatible gas chromatography devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State.

Contrary to the above, from 1993 to 2008, the licensee did not confine its use of byproduct materials authorized in Condition 9.A of Amendment 39 to NRC License 05-11997-01 to sample analysis in compatible gas chromatography devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State.

Specifically, the licensee used authorized nickel-63 sources in custom-made, unregistered gas chromatography devices, a use not authorized in the license.

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

- C. 10 CFR 20.1301(a)(1) requires, in part, that licensees shall conduct operations so that the total effective dose equivalent to individual members of the public from licensed operations does not exceed 0.1 rem (1 mSv) in a year.

10 CFR 20.1302(b)(1) requires that the licensee shall show compliance with the annual dose limit in 10 CFR 20.1301 by demonstrating compliance by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit.

Contrary to the above, as of October 30, 2008, the licensee failed to show compliance with the annual dose limit in 10 CFR 20.1301 by demonstrating compliance by measurement or calculation that the total dose equivalent to the individual likely to receive the highest dose from the licensed operation did not exceed the annual dose limit. Specifically, the licensee did not perform a dose assessment for members of the public to ensure that the total dose equivalent to the individual likely to receive the highest dose from activities associated with the assembly and use of its custom-made gas chromatography devices was within the dose limits in 10 CFR 20.1301.

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

The NRC has concluded that information regarding the reason for the violations, the corrective actions taken and planned to be taken to correct the violations and prevent recurrence, and the date when full compliance was achieved, is already adequately addressed on the docket in NRC Inspection Report 030-03746/2008001; and letters dated September 17, November 3, and December 12, 2008, and January 14, 2009. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation, EA 09-188," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region IV, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you choose to respond, 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's Web site at [www.nrc.gov/reading-rm/pdr.html](http://www.nrc.gov/reading-rm/pdr.html) or [www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html). Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within 2 working days.

Dated this 1st day of October 2009



U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 030-03746  
License: 05-11997-01  
Report: 030-03746/2008-001  
EA: 09-188  
Licensee: Department of Commerce  
National Oceanic and Atmospheric Administration  
Locations: Boulder, Colorado, and Idaho Falls, Idaho  
Dates: October 30, 2008, through August 18, 2009  
Inspectors: Lawrence Donovan, Health Physicist  
Roberto J. Torres, Senior Health Physicist  
Approved By: Anthony D, Gaines, Chief  
Nuclear Materials Safety Branch A

## **EXECUTIVE SUMMARY**

Department of Commerce, National Oceanic and Atmospheric Administration  
NRC Inspection Report 030-03746/2008-001

This was a special inspection of licensed activities involving the use of byproduct material in the form of nickel-63 and hydrogen-3 (tritium) used in gas chromatography devices and/or chemical ionization mass spectrometers and polonium-210 used in chemical ionization mass spectrometers at the licensee's corporate office in Boulder, Colorado, as well as field stations in Barrow, Alaska; Idaho Falls, Idaho; Hilo, Hawaii; Pago-Pago, American Samoa; and temporary jobsites throughout the United States where the NRC maintains jurisdiction. The scope of the inspection included a review of records maintained at the corporate office in Boulder, Colorado, and the field office in Idaho Falls, Idaho, action items as specified in the Confirmatory Action Letter dated November 12, 2008, and discussions with licensee personnel in Boulder, Colorado. This report describes the findings of the inspection.

### **Program Overview**

The National Oceanic and Atmospheric Administration was a licensee authorized to use registered gas chromatography devices and chemical ionization mass spectrometers for sample analysis. As a result of the NRC special inspection conducted on October 30, 2008, through August 18, 2009, the National Oceanic and Atmospheric Administration requested an amendment to their license to expand their authorization to include research and development to allow the assembly of electron capture detectors into custom-made gas chromatography devices. On February 24, 2009, the NRC issued Amendment 40 to NRC License 05-11997-01, adding the use of licensed material for research and development. (Section 1)

### **Violations Considered for Escalated Enforcement**

- The licensee failed to maintain security of licensed radioactive material at their Boulder facility. Building 4, in which licensed material was stored and which was also used as a temporary post office, was routinely accessed by unauthorized personnel (individuals other than licensee staff). This lack of security and control of licensed material in storage contributed to the loss of three nickel-63 sources used in gas chromatography devices, as reported by the licensee on September 17, 2008 (Event Notice 44494). Several laboratories in Building 33 where nickel-63 sources used in gas chromatography devices were used and stored were visited at random during the on site inspection of October 30-31, 2008. A number of these labs were found open and unattended, demonstrating a lack of security and control of licensed material. This was identified as a violation of 10 CFR 20.1801. (Section 2.2)
- The licensee engaged in activities involving the assembly of electron capture detectors into custom-made gas chromatography devices, activities which were outside the scope of the authorization granted by NRC License 05-11997-01 (Amendment 39 and previous amendments). This was identified as a violation of 10 CFR 30.34(c). (Section 2.2)

### Violations Not Considered for Escalated Enforcement

- The licensee failed to perform a public dose assessment, either by measurement or calculation, to confirm that the total dose equivalent, to members of the public, from licensed activities did not exceed the applicable annual dose limit in 10 CFR Part 20. This was identified as a violation of 10 CFR 20.1302(b)(1). (Section 2.3)

### Corrective Actions

- Corrective actions for the failure to maintain security of radioactive material included moving the post office out of Building 4 on September 17, 2007. Further, the licensee no longer stores gas chromatography devices in this location, as all devices and sources were removed on November 6, 2008. All rooms containing nickel-63 sources in Building 33 have been secured. (Section 3.1)
- Corrective actions for the failure to receive NRC authorization prior to assembly of electron capture detectors into custom-made gas chromatography devices included the licensee's submission, for NRC review, of radiation safety procedures to allow the assembly of electron capture detectors into custom-made gas chromatographs. The NRC approved these procedures and issued Amendment 40 to NRC License 05-11997-01 on February 24, 2009, adding the authorization for licensed material use in research and development. (Section 3.2)
- Corrective actions for the failure to perform a public dose assessment included performance of public dose assessments for each of the locations specified on the license, by radionuclide and type of device. The results of these assessments were provided to NRC on May 1 and 29, 2009. (Section 3.3)

## **REPORT DETAILS**

### **1 Program Overview (87126)**

#### **1.1 Inspection Scope**

The scope of the inspection included a tour of locations on the Boulder campus where radioactive material is used or stored, reviews of records, and interviews of licensee personnel. The on-site inspection was conducted at the licensee's corporate office on October 31, 2008, in Boulder, Colorado, and at the licensee's field office in Idaho Falls, Idaho, on December 3, 2008.

#### **1.2 Observations and Findings**

The Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) is authorized under NRC License 05-11997-01 to possess and use nickel-63 and tritium contained in electron capture detectors used in gas chromatography devices and mass spectrometers and polonium-210 for use in mass spectrometers at Boulder, Colorado, as well as at field stations in Hilo, Hawaii; Barrow, Alaska; Idaho Falls, Idaho; and Pago-Pago, American Samoa. A comprehensive record review was conducted at the main office in Boulder, Colorado, as well as a follow-on inspection of activities at the field office in Idaho Falls, Idaho. It was determined during that portion of the inspection at the Idaho Falls Field office that all of the uses at the Idaho Field office were conducted under the general license of 10 CFR 31.5. Amendment 40 on February 24, 2009, removed the Idaho Falls field office from NOAA's specific license. Past and present storage locations of gas chromatography devices on the Boulder campus were visited.

### **2 Inspection Findings (87126)**

#### **2.1 Inspection Scope**

The inspection included a review of NOAA records related to the documentation of the radiation safety program to determine compliance with the terms and condition of their license. Records reviews and interviews with licensee personnel were conducted at Boulder, Colorado, and Idaho Falls, Idaho.

#### **2.2 Observations and Findings Considered For Escalated Enforcement**

The licensee is authorized to use and store radioactive materials at their location at 325 Broadway Street, Boulder, Colorado. This address, as listed on their NRC license, is the main campus address and encompasses (and authorizes) all buildings on the campus. Thus, radioactive material may be used and stored at any facility on the campus. Most of the gas chromatography devices are used or stored in Building 33, the Earth System Research Laboratory. This building has a coded key pad entry system. Building 4 is a large long-term storage facility used by all of the Department of Commerce Laboratories, including NOAA staff. On September 17, 2008, in a letter to the NRC, the licensee reported the loss of two gas chromatography devices containing

three 15 millicurie nickel-63 sources that were stored in Building 4 prior to their disappearance. The licensee informed NRC that the post office temporarily moved into Building 4 on February 8 until September 17, 2007. Some of the licensee's material may have been moved around by postal employees to other locations within the building in order to make room for their operation. From the licensee's inventory records, it appears that there were various amounts of nickel-63 contained in gas chromatography devices stored in Building 4 from May 1998 until October 2008. Each gas chromatography device contains between 10 and 15 millicuries of nickel-63. Therefore, the total activity of nickel-63 in gas chromatography devices in this location varied from zero on May 27, 1998, to a maximum activity of approximately 180 millicuries in April 2003, then dropped to 170 millicuries from January 2004 to July 2005. The total activity of nickel-63 stored in Building 4 decreased further, but remained constant, at 100 millicuries from April 2006 until removal of all gas chromatography devices in November 2008. The sources stored in Building 4 were not exclusively segregated through the use of administrative controls by the licensee nor were they secured by physical means such as a fenced area or separate room within the building, to preclude unauthorized access by other NOAA nonauthorized user personnel, Department of Commerce Laboratory staff, or postal employees that were working in or had access to Building 4. Since the building was a general use warehouse for several organizations on campus that all had the security access code for the building, the licensee should have instituted additional security measures, either administrative or physical in nature, to preclude unauthorized entry in the area(s) where licensed material was stored. Such measures were not evident. Although a 6-month inventory of licensed material in storage in Building 4 was conducted, as required by license condition, in February 2006, the individual source inventory logs for each of the three missing sources list the sources as "excessed." An explicit records review to find where these sources went as "excessed" revealed no positive results and these sources were considered lost when a physical inventory of all licensed material on the NOAA campus was conducted in September 2008.

Building 33 is the primary location for all laboratories using gas chromatography devices containing nickel-63 and polonium-210 at NOAA. During the onsite inspection on October 30-31, 2008, several laboratories were visited at random and interviews were conducted with licensee research personnel. Approximately 25 percent of these laboratories were found to be unsecured. When interviewed, the staff from these laboratories stated that they believed security was adequate because Building 33 is controlled through keyed entry and there is a security guard in the front lobby. However, an inspector was able to gain entry into the building behind a NOAA employee and was not challenged by this employee or the security guard. Further, NOAA staff such as custodial and housekeeping personnel could have access to Building 33 in the normal course of their work duties and would be able to enter laboratories containing radioactive material without proper clearance or authorization. 10 CFR 20.1801 states that the licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas. The licensee's failure to control access to the radioactive material in Building 4 and in the laboratories where gas chromatography devices are used and stored in Building 33 was identified as a violation of 10 CFR 20.1801. (030-03746/2008-001)

Amendment 39 of NRC License 05-11997-01 authorized the licensee to use nickel-63 sources, contained in electron capture detectors, only in compatible gas chromatography devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State. The inspectors gathered data and observed current processes that demonstrated that the licensee had expanded its program scope and was engaged in research and development activities involving the assembly of electron capture detectors into custom-made (not registered) gas chromatography devices, activities which were outside the scope of the use authorization granted by the NRC license. These unauthorized research and development activities started in 1993 and continued through the date of the inspection according to licensee staff statements.

10 CFR 30.34(c) requires, in part, that each licensee confine his possession and use of byproduct materials to the locations and purposes authorized by the license. Condition 9.A of Amendment 39 to NRC License 05-11997-01 limits the use of licensed materials to compatible gas chromatography devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with an NRC or Agreement State specific license authorizing distribution to persons specifically authorized by an NRC or Agreement State license to receive, possess, and use the devices. From 1993 to 2008, the licensee used nickel-63 sources, contained in electron capture detectors, installed in custom-made gas chromatography devices that had not been registered either with NRC under 10 CFR 32.210 or with an Agreement State, a use not authorized by the license. This action constituted a failure by the licensee to identify that a major programmatic change in its radiation safety program, that required NRC review and prior approval, had occurred. The use of nickel-63 sources in electron capture detectors in custom-made unregistered devices was identified as a violation of 10 CFR 30.34(c). (030-03746/2008-002)

### 2.3 Observations and Findings Not Considered for Escalated Enforcement

The licensee engaged in operations outside the scope of its license, specifically the customization of gas chromatography devices as discussed above in paragraph 2.2. 10 CFR 20.1302 requires, in part, that the licensee show compliance with the annual dose limit in 10 CFR Part 20 by showing either by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit. The licensee did not perform a prior analysis to ensure that the limits as specified in 10 CFR 20.1301(a)(1) would not be exceeded from the activities associated with the assembly of its custom-made gas chromatography devices, namely that members of the general public would not exceed 100 millirem total dose equivalent in a year. The licensee performed the analysis required by 10 CFR 20.1302 after the inspection and submitted the results to NRC in a letter submitted on May 1, 2009, which clearly demonstrated compliance with 10 CFR 20.1301. The failure to conduct a public dose assessment was identified as a violation of 10 CFR 20.1302(b)(1). (030-03746/2008-003).

### **3 Corrective Actions (87126)**

- 3.1 Security: An exhaustive review of disposal and transfer records to try to locate the three missing sources, contacting and questioning present and past employees, the manufacturer, and other possible buyers of excessed material was performed. Effective September 17, 2007, the post office no longer occupied Building 4. Effective November 6, 2008, all remaining sources containing radioactive material were removed from storage in Building 4 and secured in Building 33. All other materials are secured under lock and key in Building 33 within designated research laboratories or in a Main Storage Room. The main storage room is key-pad lock controlled by the radiation safety office staff. Also, the licensee performed confirmatory checks on doors to ensure they remained secured, reconciled all pertinent records (leak test, inventories, receipt, etc.) to account for all of their electron capture detectors, instituted a Web based electron capture detector location database, had all personnel that will have access to radioactive material take a new safety and security course, and added keypad locks to all storage locations.
- 3.2 Customization: The licensee submitted radiation safety procedures, for NRC review and approval, to allow the assembly of electron capture detectors into custom-made gas chromatography devices under the auspices of research and development. NRC approved these procedures and issued Amendment 40 to NRC License 05-11997-01 on February 24, 2009, authorizing the use of licensed material for research and development (Program Code 03620).
- 3.3 Public dose assessment. The licensee submitted public dose assessments for NRC review on May 1, 2009, which demonstrated compliance with 10 CFR 20.1301. The licensee submitted two assessments, one representative analysis for a 15 millicurie nickel-63 source and the other for a 30 millicurie polonium-210 source.

### **4 Exit Meeting Summary (87126)**

Preliminary inspection findings were discussed with Mr. John Schneider, Deputy Director, Earth System Research Laboratory, at the conclusion of the onsite inspection on October 31, 2008. A telephonic exit interview was conducted on August 18, 2009, with the licensee staff at Boulder, Colorado, and upper-level management in Silver Spring, Maryland. The licensee acknowledged the findings as identified by the inspection team. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

William F. Broglie, Chief Administrative Officer  
Alexander MacDonald, Director, Earth System Research Laboratory  
Donald Mock, Executive Director, Earth System Research Laboratory  
John Schneider, Deputy Director, Earth System Research Laboratory  
Rhonda S. Carpenter, Radiation Safety Officer  
Michael O' Neill, Associate Scientist  
Ann Middlebrook, Research Chemist

INSPECTION PROCEDURES USED

87126 Industrial/Academic/Research programs

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

030-03746/2008-001	VIO	A violation involving the failure to secure radioactive material against unauthorized removal and the loss of radioactive materials
030-03746/2008-002	VIO	A violation involving the failure to confine use of byproduct material to the purposes authorized in the license
030-03746/2008-003	VIO	A violation involving the failure to perform a public dose assessment

Closed

None

Discussed

None

LIST OF ACRONYMS USED

EA	enforcement action
NOAA	National Oceanic and Atmospheric Administration
VIO	violation