NSF International

April 30, 2007

Material Radiation Protection Section
U. S. Nuclear Regulatory Commission, Region III
2443 Warrenville Road, Suite 210
Lisle, IL 60532-4352

Re: Termination of License No. 21-15209-01

Dear Madam/Sir,

The purpose of this letter is to request the termination of License No. 21-15209-01 (Docket 030-08793), issued to NSF International (NSF) by the U. S. Nuclear Regulatory Commission (USNRC). Included herein is our completed and signed NRC Form 314, "Certificate of Disposition of Materials". All remaining licensed radioactivity has been disposed of or transferred and a final status survey documenting that our only restricted area may be released for unrestricted use has been performed. A copy of the final status survey report, prepared for us by Integrated Environmental Management, Inc., is attached to NRC Form 314.[1]

If you have any questions or if I can provide you with additional information, please do not hesitate to call me at (734) 769-5345. I look forward to receiving confirmation of the termination of our radioactive materials license.

Sincerely,

Lori Bestervelt

Lori Bestervelt, Ph.D.,
Senior Vice President and Chief Technical Officer
NSF International
789 N. Dixboro Rd
Ann Arbor, MI 48105
Email: bestervelt@nsf.org
Phone: 734-769-5345

cc: Jamnes L. Cameron, Chief Decommissioning Branch, USNRC Region III

[1] IEM is licensed to perform decommissioning and related services by the Maryland Department of the Environment (License No. MD-31-281-01), although the work performed at the NSF site was pursuant to the conditions of License No. 21-15209-01 (i.e., reciprocity was not invoked).

1 License Termination Request

2 Copy of NSF International License
21-15209-01

3 NRC Form 314

4 Final Status Survey Report

5 Standards Transferred to GEL Labs

6 Electron Capture Detectors (ECD)

7

8

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
801 WARRENVILLE ROAD
LISLE, ILLINOIS 60532-4351

AUG 22 2003

Bruce P. DeMaine, Director
Corporate QA and Safety
789 N. Dixboro Road
Ann Arbor, MI 48105

COPY

Dear Mr. DeMaine:

Enclosed is Amendment No. 14 renewing your NRC Material License No. 21-15209-01 in accordance with your request.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region III office at (630) 829-9887 so that we can provide appropriate corrections and answers.

Please be advised that your license expires at the end of the day, in the month, and year stated in the license. Unless your license has been terminated, you must conduct your program involving byproduct materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers; Inspections," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.

2. Notify NRC, in writing, within 30 days:

   a. When the Radiation Safety Officer permanently discontinues performance of duties under the license or has a name change; or

   b. When the mailing address listed on the license changes.

3. In accordance with 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license:

   a. When you decide to terminate all activities involving materials authorized under the license; or

   b. If you decide not to complete the facility, acquire equipment, or possess and use authorized material.

4. Request and obtain a license amendment before you:

   a. Change Radiation Safety Officers;

   b. Order byproduct material in excess of the amount, or radionuclide, or form different than authorized on the license;

c. Add or change the areas of use or address or addresses of use identified in the license application or on the license; or

d. Change ownership of your organization.

5. Submit a complete renewal application or termination request at least 30 days before the expiration date of your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of byproduct material after your license expires is a violation of NRC regulations. A license will not normally be renewed, except on a case-by-case basis, in instances where licensed material has never been possessed or used.

In addition, please note that NRC Form 313 requires the applicant, by his/her signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or certifying official rather than a consultant.

You will be periodically inspected by NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation, or imposition of a civil penalty, or an order suspending, modifying or revoking your license as specified in the General Statement of Policy and Procedure for NRC Enforcement Actions. Since serious consequences to employees and the public can result from failure to comply with NRC requirements, prompt and vigorous enforcement action will be taken when dealing with licensees who do not achieve the necessary meticulous attention to detail and the high standard of compliance which NRC expects of its licensees.

Sincerely,

Kevin A. Null

Kevin G. Null
Materials Licensing Branch

License No. 21-15209-01
Docket No. 030-08793

Enclosure: Amendment No. 14

NRC FORM 374 U.S. NUCLEAR REGULATORY COMMISSION PAGE 1 OF 4 PAGES
Amendment No. 14

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with the application received March 3, 2003,
1. NSF International	3. License number 21-15209-01 is renewed in its entirety to read as follows:
2. 789 N. Dixboro Road Ann Arbor, MI 48105	4. Expiration date August 31, 2013
	5. Docket No. 030-08793 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Carbon-14	A. Any	A. 12 millicuries
B. Nickel-63	B. Plated or foil sources (contained in electron detector cells which have been evaluated and registered with the NRC or an Agreement State)	B. Six cells not to exceed 15 millicuries each
C. Americium-241	**C. Sealed Source**	**C. 1 source not to exceed .020 microcuries**
D. Cesium-137	**D. Sealed Source**	**D. 1 source not to exceed .020 microcuries**
E. Thorium-230	**E. Sealed Source**	**E. 1 source not to exceed .020 microcuries**
F. Strontium-89	**F. Liquid Standard**	**F. Not to exceed 10 microcuries**
G. Uranium-238	**G. Liquid Standard**	**G. Not to exceed 10 microcuries**

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
21-15209-01

Docket or Reference Number
030-08793

Amendment No. 14

9. Authorized Use:

A. For laboratory studies as described in the letter dated December 18, 1992.

B. To be used in gas chromatographs for sample analysis.

C. through G. For performing drinking water analysis for radionuclides.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at 789 Dixboro Road, Ann Arbor, Michigan.

11. Radiation Safety Officer: Bruce P. DeMaine.

12. Licensed material shall be used by, or under the supervision of, Jon McGaugh, Theresa Uscinowicz or Bruce A. Low.

13. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.

B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

C. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

D. Sealed sources need not be leak tested if:

(i) they contain only hydrogen-3; or

(ii) they contain only a radioactive gas; or

(iii) the half-life of the isotope is 30 days or less; or

(iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or

(v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
21-15209-01

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E. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region III, 801 Warrenville Road, Lisle, Illinois 60532-4351, ATTN: Chief, Nuclear Materials Safety Branch. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.

F. The licensee is authorized to collect leak test samples for analysis by Monitoring Services. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

14. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), of 10 CFR Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.

15. Detector cells containing licensed material shall not be opened or the sources removed from the detector cell by the licensee.

16. Except as otherwise specified in this license, the licensee shall have available and follow the instructions contained in the manufacturer's instruction manual for the chromatography device.

17. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 2 years from the date of each inventory.

18. Exhaust from detector cells containing foils shall be vented through a laboratory fume hood or other suitable means designed to reduce potential exposure to personnel to the lowest practicable level.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
21-15209-01

Docket or Reference Number
030-08793

Amendment No. 14

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application received March 3, 2003 (with enclosures).

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date AUG 2 2 2003

By Kevin G. Null
Kevin G. Null
Materials Licensing Branch
Region III

NRC FORM 314 (6-2004)
10 CFR 30.36(j)(1); 40.42(j)(1); 70.38(j)(1); and 72.54(j)(1)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0028 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 30 minutes. This submittal is used by NRC as part of the basis for its determination that the facility is released for unrestricted use. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0028), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

CERTIFICATE OF DISPOSITION OF MATERIALS

LICENSEE NAME AND ADDRESS	LICENSE NUMBER	DOCKET NUMBER
NSF International 789 N. Dixboro Road Ann Arbor, MI 48105	21-15209-01	030-08793
	LICENSE EXPIRATION DATE 08/31/2013	

A. LICENSE STATUS *(Check the appropriate box)*

☐ This license has expired. ☑ This license has not yet expired; please terminate it.

B. DISPOSAL OF RADIOACTIVE MATERIAL

(Check the appropriate boxes and complete as necessary. If additional space is needed, provide attachments)

The licensee, or any individual executing this certificate on behalf of the licensee, certifies that:

☐ 1. No radioactive materials have ever been procured or possessed by the licensee under this license.

☑ 2. All activities authorized by this license have ceased, and all radioactive materials procured and/or possessed by the licensee under this license number cited above have been disposed of in the following manner.

☑ a. Transfer of radioactive materials to the licensee listed below:

Sealed sources to GEL, 2040 Savage Rd., Charleston, SC, (843) 769-7378, DHEC License No. 362

☑ b. Disposal of radioactive materials:

1. Directly by the licensee:

☐ 2. By licensed disposal site:

☑ 3. By waste contractor:

ADCO Services
17650 Duvan Drive, Tinley Park, IL 60477, (708) 429-1660
IDNS License No. IL-01347-01

☑ c. All radioactive materials have been removed such that any remaining residual radioactivity is within the limits of 10 CFR Part 20, Subpart E, and is ALARA.

C. SURVEYS PERFORMED AND REPORTED

☑ 1. A radiation survey was conducted by the licensee. The survey confirms:

☐ a. the absence of licensed radioactive materials

☑ b. that any remaining residual radioactivity is within the limits of 10 CFR 20, Subpart E, and is ALARA.

☑ 2. A copy of the radiation survey results:

☑ a. is attached; or ☐ b. is not attached (Provide explanation); or ☐ c. was forwarded to NRC on: _____ Date

☐ 3. A radiation survey is not required as only sealed sources were ever possessed under this license, and

☐ a. The results of the latest leak test are attached; and/or b. No leaking sources have ever been identified.

The person to be contacted regarding the information provided on this form:

NAME	TITLE	TELEPHONE *(Include Area Code)*	E-MAIL ADDRESS
Lori Bestervelt, Ph.D.	Sr. Vice President and Chief Technical Officer	(734) 769-5345	bestervelt@nsf.org

Mail all future correspondence regarding this license to:
Lori Bestervelt, Ph.D., NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48105

C. CERTIFYING OFFICIAL

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE	SIGNATURE	DATE
Lori Bestervelt, Ph.D.	Lori Bestervelt	5/1/07

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECT. 18 U.S.C. SECTION 1001 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

Integrated Environmental Management, Inc.

April 26, 2007

Stephen Dauss
NSF International, Inc.
789 Dixboro Road
Ann Arbor, MI 48105

Re: Final Status Survey Report for the Radiation Laboratory (Report No. 2007008/G-1338)

Dear Mr. Dauss:

On April 9, 2007, Integrated Environmental Management (**IEM**) conducted the final status survey of the Radiation Laboratory at the NSF International, Inc. (NSF) facility in Ann Arbor, Michigan in order to determine whether the area may be released for unrestricted use (i.e., without regard for radiological issues) after the removal of all radioactive materials. The purpose of this letter is to provide you with the results of that survey. Included herein is a brief description of the facility, a statement of the release criteria applicable to the room, a description of the procedures used to perform the final status survey, the findings, and a statement as to whether the room may be released for unrestricted use.

Historical Assessment
At the NSF several different radioactive materials were stored and used in research operations authorized by U. S. Nuclear Regulatory Commission (USNRC) License No. 21-15209-01 (expiration date, August 31, 2013). The only restricted area listed on the license is the Radiation Laboratory that is the focus of the final status survey. For the duration of the license, NSF was authorized to possess the following:

Radionuclide	Form	License Limit
Carbon-14	Any	12 millicuries
Nickel-63	Plated or foil sources for electron capture detector cells	15 millicuries each, with a site limit of six (6) cells
Americium-241	Sealed source	0.020 microcuries per source, with a site limit of one (1) source
Cesium-137	Sealed source	0.020 microcuries per source, with a site limit of one (1) source
Thorium-230	Sealed source	0.020 microcuries per source, with a site limit of one (1) source
Strontium-89	Liquid standard	10 microcuries
Uranium-238	Liquid standard	10 microcuries

Work with licensed radioactivity ceased in CY 2000, thus NSF wishes to terminate License No. 21-15209-01. Therefore, all residual radioactivity was removed from the Radiation Laboratory, packaged and shipped for disposal, and the final status survey performed.

2705 N. Main Street, Suite 202
Findlay, OH 45840
Phone: (419) 423-4701
Fax: (419) 423-7462

1212 Peachcreek Road,
Dayton, OH
Phone: (937)
Fax: (937)

Release Criteria

The release criteria established for this survey were equivalent to the screening values presented in Table H.1 of NUREG-1757, Volume 2 and in Table 5.19 of NUREG-5512,Volume 3.[1,2] These screening values were established by the USNRC in order to ensure the maximum radiation dose potential for the critical population, using conservative assumptions, does not exceed 25 millirem total effective dose equivalent (TEDE) for the 1,000-year period after decommissioning is complete.

In the NSF Radiation Laboratory, the loose-form isotopes in the inventory that present the highest dose per unit activity (i.e., the most radiological limiting isotopes), as shown in Table 1 of the Survey Plan, are Thorium-230 (alpha emitter) and Radium-228 (beta emitter).[3,4] The screening values for these radionuclides translate into 33 disintegrations per minute (dpm) alpha per 100 square centimeters and 200 dpm (beta) per 100 square centimeters. The value for C-14 is 3.7×10^6 dpm (low-energy beta) per 100 square centimeters. Therefore, the following are the release criteria applicable to the Radiation Laboratory:

- Surface alpha activity (total) - 33 dpm per 100 square centimeters
- Surface beta activity (total) - 200 dpm per 100 square centimeters
- Surface low-energy (C-14) beta activity (total) - 3,700,000 dpm per 100 square centimeters

Final Status Survey Procedures

The final status survey in the Radiation Laboratory covered a room that measures approximate five (5) meters by five (meters), with a foot print, with open floor space of about five (5) meters by two (2) meters. Included as well in the survey were the lower two meters of walls, all counter tops and storage cabinets, the fume hood, the sink, and the former radiation source storage refrigerator. The Survey Plan was prepared, then IEM mobilized to the site.[5]

I served as the on-site surveyor, and my qualifications to complete this work on NSF's behalf are shown in Attachment A. A copy of the Field Activity Daily Log from the on-site portion of the work is shown in Attachment B. Assisting me in this effort, and providing peer review of this letter report was Bill R. Thomas, CHP, CIH of IEM's Ohio office. Mr. Thomas' qualifications are also shown in Attachment A.

The on-site work began in April 9, 2007 with the packaging and shipment of all remaining licensed radioactivity. The sealed sources were transferred to General Engineering Laboratory, a South Carolina Department of Health and Environmental Control (DHEC) licensee authorized to possess radioactivity under

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[1] U.S. Nuclear Regulatory Commission, *Consolidated Decommissioning Guidance Characterization, Survey, and Determination of Radiological Criteria*, Table H.1, NUREG 1757, Volume 2, Rev 1, September, 2006.

[2] U.S. Nuclear Regulatory Commission, *Residual Radioactive Contamination From Decommissioning - Parameter Analysis*, Table 5.19, NUREG 5512, Volume 3, Draft, October, 1999.

[3] Integrated Environmental Management, Inc., *Final Status Radiation Survey Work Plan*, Report No. 2007008/G-1337, March 28, 2007.

[4] No screening/release criteria are required for the sealed sources.

[5] Integrated Environmental Management, Inc., *Final Status Radiation Survey Work Plan*, Report No. 2007008/G-1337, March 28, 2007.

the terms/conditions of DHEC License No. 362.[6] The bulk radioactivity was transferred to ADCO Services, an Illinois Department of Nuclear Safety (IDNS) licensee authorized to use, store and transport radioactive material and maintains radioactive materials license number IL-01347-01 which expires on December 31, 2007.[7] The final status survey proceeded after removal and packaging of residual radioactivity was complete.

The instrumentation used to measure the total (fixed plus removable) radioactivity on the floors and walls was a plastic scintillator (Ludlum Model 2929 ratemeter coupled to a Ludlum Model 43-89 detector). The instrument was checked prior to use to ensure proper function, response checked to known quantities of radioactivity (NIST-traceable Thorium-230 and Technetium-99) for the purposes of efficiency determination, and inspected for physical damage. Surface of equipment and elevated areas were performed using a thin-window Geiger Mueller detector (Ludlum Model 44-9), which was also checked prior to use to ensure proper function, response checked using the NIST-traceable Technetiuim-99 source, and inspected for physical damage. Background measurements were made in a nearby location that was outside of the Radiation Laboratory. Attachment C contains the instrument calibration records and the pre-operational check results from this effort.

The surveys for residual radioactivity were conducted by scanning the surfaces with the aforementioned instruments held within 0.3 centimeters of the surface at a rate of two (2) to give (5) centimeters per second. The survey coverage was 100% of the floors, walls to a height of two (2) meters, counter tops, shelves and all accessible areas of the fume hood and refrigerator. The scans were performed to detect residual beta/gamma contamination, to be followed by more detailed surveys at those locations that exhibited elevated activity. The minimum detectable activity (MDA) for an instruments while operating in the count-rate mode was determined pursuant to the recommendations found in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), as follows:[8]

$$MDA = \frac{d' \times \sqrt{b_i} \times \frac{60}{i}}{E_i \times E_s \times \sqrt{p} \times \frac{A}{100}}$$

where MDA = the Minimum Detectable Activity (dpm per 100 square centimeters); d' = the decision error from MARSSIM Table 6-5 (assumed to be 1.38); i = the observation interval or scan speed divided by the detector width (assumed to be one detector width per second, or i = 1); b_i = background count per observation interval (for a background count rate of 80 counts per minute, $b_i = 80 \div 60 = 1.33$), E_i = the 2π detector efficiency (counts ÷ disintegrations = 0.1); E_s = the surface efficiency (0.25 for maximum beta energies between 0.15 and 0.4 MeV and 0.25 for alpha particles); p = the surveyor efficiency (assumed to be 50% or 0.5) and A = the area of the detector (15 square centimeters). The resulting MDA for the Ludlum 44-9 detector, moving at a pace of approximately five (5) centimeters per second is thus:

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[6] GEL Engineering, 2040 Savage Road, Charleston, SC 29407, Tel. (843) 769-7378, *www. gel.com.*

[7] ADCO Services, Inc., 17650 Duvan Drive, Tinely Park, IL 60477, (708) 429-1660, *www.adcoservices.com.*

[8] U. S. Nuclear Regulatory Commission, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, Equations 6-8, 6-9 and 6-10, NUREG-1575, Rev. 01, August, 2000.

$$MDA = \frac{1.38 \times \sqrt{1.33} \times \frac{60}{1}}{0.1 \times 0.25 \times \sqrt{0.5} \times \frac{15}{100}} = 36{,}000 \frac{dpm}{100\ cm^2}$$

In addition to the scans, the plastic scintillator was used for both alpha and beta radiation detection in a series of static (stationary) measurements. A total of 11 static measurements were made with the detector held in direct contact with the floor and counter tops in the Radiation Laboratory at locations where the presence of residual radioactivity was likely and where elevated count rates were noted on the surface scans. The following is the MDA for the static measurements:

$$MDA = \frac{2.71 + 4.65 \sqrt{BKG_{ave} \times t}}{t \times E \times \frac{A}{100}}$$

where MDA = the activity level (dpm/100 cm^2), BKG_{ave} = the background count rate for this measurement type (cpm), E = instrument efficiency, t = the measurement duration (min), and A = the area of the detector (cm^2). For stationary counts with a duration of 10 minutes, the MDAs for alpha and beta activity are 20 and 138 dpm per 100 square centimeters, respectively.

Results and Conclusions

Attachment D of this letter report contains a copy of the shipping manifests for the transfer of the sealed sources and bulk radioactivity. Attachment E contains the survey records from the Radiation Laboratory.[9] The scanning results were all indistinguishable from background, as were the results of the static counts for both alpha and beta radiation.[10] Because no residual radioactivity in excess of the aforementioned release criteria is present, the Radiation Laboratory may be released for unrestricted use.

Thank you for the opportunity of assisting you in the performance of this important license termination activity. I hope that our work has met with your satisfaction and that you will consider calling on us again on any radiation-related matters. In the meantime, please do not hesitate to call me at (865) 588-1693 if I can answer any questions or provide you with additional information. I look forward to hearing from you again soon.

Sincerely,

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

Jeffrey W. Sumlin, RRPT

cc: Bill R. Thomas, CHP, CIH
File 2007008.01

[9] The disposal records will be forwarded to you under separate cover immediately after their receipt by IEM.

[10] The mean alpha survey results were -119.4±73 dpm/100 cm^2 with an MDA of 20.1, and the mean beta/gamma survey results were -1011.1±789.1 dpm/100 cm^2 with an MDA of 137.5.

ATTACHMENT A
Personnel Qualifications

Jeffery W. Sumlin

Professional Qualifications

Mr. Sumlin has over 25 years of experience in the radiation protection field, with emphasis on decontamination, site surveillance and applied health physics. His extensive field and management experience, interpersonal skills, and technical abilities in the decontamination, decommissioning, and radiation protection fields are accompanied by excellent qualifications in project coordination, regulatory compliance, site characterization and radiological oversight and verification.

Education

AA, Nuclear Technology - University of Phoenix, 1991
AS, Liberal Arts - University of the State of New York, 1989
BS, Sociology and Nuclear Technology - University of the State of New York, 1990
Naval Nuclear Power School, 1980
Nuclear Power Training Unit (prototype), 1981
40-Hour OSHA HAZWOPER Training (29 CFR 1910.120), 1996
8-Hour OSHA Annual Refresher (29 CFR 1910.120), 2005
Confined Space Training, 2003
Fall Protection Training, 2005

Certifications and Licenses

Registered Radiation Protection Technologist (RRPT), National Registry of Radiation Protection Technologists
Qualified U. S. Department of Energy Health Physics Technician
Authorized User - Maryland Department of the Environment Radioactive Materials License No. MD-31-281-01.

Experience and Background

2006-Present *Project Manager and Health Physics Technician, Integrated Environmental Management, Inc., Knoxville, Tennessee* - Duties include surveillance activities, instrumentation usage/control, decontamination, site characterization, documentation, report preparation, cost/schedule assessment, research/analysis, and general health physics duties. Mr. Sumlin is also qualified as a Health Physics Technician pursuant to Radiation Safety Procedure No. RSP-006, "Training and Qualification of Radiation Protection Personnel".

2004-2005 *Lead Radiological Controls Technician, Oak Ridge National Laboratory, Oak Ridge, Tennessee* - Duties involved environmental remediation and transuranic legacy waste recovery.

2001-2004 *Radiological Controls Technician, Sandia National Laboratory, Albuquerque, New Mexico* - Duties included support for decommissioning and decontamination activities and the Mixed Waste Management Facility.

1995-2001 *Senior Health Physics Technician, Pacific Northwest National Laboratory, Hanford, Washington* - Served in the Hanford Site Health Physics Department as an ALARA

Coordinator, Radioactive Source Custodian, and first-line supervisor for various USDOE contractors and projects.

1980-1995 *U. S. Navy Nuclear Propulsion Program* - Duties included positions as Mechanical Operator, Engine Room Supervisor, Engineering Watch Supervisor, Radiological Controls Shift Supervisor, and Quality Assurance Supervisor.

Example Accomplishments

Senior Health Physics Technician during the initial emergency response, subsequent recovery and decontamination of the Hanford Plutonium Reclamation Facility after it was damaged from an explosion, Plutonium Finishing Plant, Hanford Nuclear Reservation, 1997.

Senior Health Physics Technician for the start up of Hanford Plutonium Finishing Plant Muffle Furnace for plutonium waste stabilization, Plutonium Finishing Plant, Hanford Nuclear Reservation, 1998.

Senior Health Physics Technician for the decontamination, decommissioning, and turn over of Hanford B Plant Canyon, Hanford Nuclear Reservation, 1998.

After selection as the ALARA Coordinator for the Hanford Plutonium Finishing Plant, rebuilt the ALARA program after five years of neglect resulting in an annual exposure reduction of 35%, Hanford Nuclear Reservation, 1997.

Radiological Controls Supervisor for the Hanford Tank Farms Required Surveillance Program and Radioactive Liquid Waste Cross-Site Transfer System at the Hanford Nuclear Reservation, 1999.

Extensive experience with alpha, low energy beta, beta and gamma contamination, high energy beta, gamma and neutron radiation, and airborne radioactivity.

As Radiological Control First Line Supervisor, revised and administered Hanford Tank Farms Environmental Surveillance Program, including stack emissions monitoring, contamination control and workplace air monitoring at the Hanford Nuclear Reservation, 1999.

Radiological Controls First Line Supervisor for several ground water migration wells at the Hanford Nuclear Reservation, 1999.

Lead Senior Health Physics Technician for the decommissioning and decontamination of several Cold War era plutonium producing reactors at the Hanford Nuclear Reservation, 2000.

Senior Radiological Controls Technician for the decommissioning and decontamination and final release of over 500,000 ft^2 of structures at Sandia National Laboratories, 2004.

Sandia National Laboratories Decommissioning and Decontamination Radiological Controls Technician authorized to act independently at the Tonopah Test Range, Nevada Test Site, 2003.

Lead Radiological Controls Technician for the remediation of radioactive injection wells and equipment at Oak Ridge National Laboratory, Tennessee, 2005.

Radiological Controls Technician for the recovery of 202 containers of transuranic waste buried over 30 years ago at Oak Ridge National Laboratory, Tennessee, 2005.

Billy R. Thomas

Professional Qualifications

Mr. Thomas has over 28 years of senior-level experience in radiological and industrial hygiene activities with emphasis on systems to minimize personnel exposures to radioactive and hazardous materials, compliance with federal and state regulations, site and facility audits. Mr. Thomas has developed and implemented comprehensive programs for radiation and chemical protection programs. Mr. Thomas is actively involved in all aspects of health and safety including regulatory compliance, site decommissioning, program evaluation, applied health physics, occupational safety, training and project management.

Education

M.S., Environmental Health, University of Oklahoma, 1981
B.S., Health Physics, Oklahoma State University, 1976

Certifications

Certified Health Physicist (Comprehensive Practice), American Board of Health Physics, 1988. Recertified: 1992, 1996, 2000 and 2004.

Certified Industrial Hygienist (Comprehensive Practice), American Board of Industrial Hygiene, 1984. Recertified : 1990, 1996 and 2002.

OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Training. Initial training 1987 and updated each year.

Lead Abatement Training for Supervisors, University of Cincinnati. 1996.

Asbestos Abatement Supervisor Course, Asbestos Consulting and Training Systems, 1997.

Authorized User - Maryland Department of the Environment Radioactive Materials License No. MD-31-281-01.

Experience and Background

2002-Present — *Vice President, Consulting Division, Integrated Environmental Management, Inc. Findlay, Ohio.* As the director of the company's consulting division, Mr. Thomas is responsible for selecting and coordinating the services of senior-level consultants in the areas of radiation safety and industrial hygiene. In addition, he maintains and ensures all members of the division maintain a track record of technical excellence, cost and schedule control, and innovation in solving environmental and health/safety problems for both government and commercial clients.

1999-2002 — *Senior Health Physicist, Integrated Environmental Management, Inc. Findlay, Ohio.* Provides high-quality radiation protection services to commercial and government clients. As a member of the client's response team, works with clients to promote an understanding of what is required to achieve and/or maintain compliance in the

eyes of all pertinent regulatory agencies, individually or jointly; develop and overall strategy for achieving compliance and reduce liabilities in a technically-sound, legally defensible, and fiscally-conservative business manner; recommend specific solutions that are compatible with the client's operating philosophy; and provide insights into future regulatory issues and their impact as input to the client's long-range business planning and cost forecasting process.

Mr. Thomas served as the task manager to develop a baseline human heath risk assessment for a confidential client who previously processed enriched uranium and manufactured fuel pellets. The risk assessment was developed for potential exposures both hazardous chemicals and radioactive materials found in soil and groundwater. The assessment incorporated the requirements of the USEPA Risk Assessment Guidance for Superfund (RAGS) as well as requirements established by the State authorities.

Mr. Thomas developed a Emergency Response and Preparedness Manual for a Canadian client who manufactured uranium pellets for nuclear power reactors. The manual was prepared in accordance with the guidance provided by the Canadian Nuclear Safety Commission (CNSC) and the U.S. Nuclear Regulatory Commission (USNRC). The manual addressed the resources to mobilize to an emergency, involving both hazardous chemicals and radioactive uranium in several different chemical forms. The manual was implemented by the client and approved by the CNSC.

A commercial client, licensed by the Nuclear Regulatory Commission, required an evaluation of their internal dosimetry program. Mr. Thomas prepared a procedure to measure both internal and external exposure. The procedure satisfied the recommendations established by the NCRP and ANSI as well as requirements established by the USNRC.

Mr. Thomas worked as pat of a project team to develop decommissioning plans for four (4) different facilities licensed to process radioactive materials. The decommissioning plans established the derived concentration guidelines levels for a variety of radioactive isotopes, including enriched uranium, thorium and byproduct radioactive materials. The potential exposures to future residents were limited to less than twenty-five millirem per year and evaluated over a period of 1,000 years. The plans were compliant with the requirements established by the USNRC and NUREG 1757. Each plan was approved by the USNRC and implemented by the client in order to decommission the facility and terminate the license.

A commercial client required a plan to survey, remediate and ultimately release the building surfaces for unrestricted use. Mr. Thomas established the release criteria using and developed a procedure to complete the radiation survey. The procedure was consistent with the requirements established by the USNRC and NUREG 1575, MARSSIM.

Mr. Thomas completed radiation surveys to evaluate potential exposures to electromagnetic frequency (EMF) radiation in commercial manufacturing facilities. The evaluation of personal exposures were compared to recommendations published by the ACGIH and OSHA. Recommendations were provided to the clients to limit personnel radiation exposures and verify that exposures were acceptable.

1993-1999 *Director of Health and Safety, The IT Group, Findlay, Ohio.* Originally joined OHM Remediation Services in 1993. The IT Group purchased OHM in 1998. Duties including conducting site and facility health and safety audits, determination of personal protective equipment and respiratory protection equipment, supervising the development and implementation of site specific health and safety plans, and providing industrial hygiene training and services. He had direct accountability for health and safety compliance, including regulatory compliance with federal, state and local agencies. He implemented a comprehensive health and safety program for demolition and remediation activities by the Midwest region, which accumulated 2.3 million man-hours from March, 1994 to July, 1997 without a single lost time injury.

Safety and Health Manager, Kansas City PRAC II, Kansas City District. Duties on this HTRW contract included the development of safety and health plans as well as procedures to be implemented at each of the KC PRAC projects. Developed SSHP for specific KC PRAC projects including, Ottawa, Illinois, Galena, Kansas, Mead Nebraska, and Fort Riley, Kansas. Mr. Thomas provided specific support on the KC PRAC projects including:

Project CIH, Project CHP, Ottawa Radiation Sites, Ottawa, Illinois September 1994 – August 1997. Developed the site specific health and safety plan and radiation protection plan to excavate soil contained radioactive radium generated by a luminous processing company. This project involved the excavation of radioactive contamination from nearby residences and selected sites in the city. Worked with State of Illinois and the EPA to implement an effective contamination control program, including air sampling and personnel monitoring for radium. Provided radiation worker training for the work crew and directed the on-site health physics and industrial hygiene program for the initial phases of the project. Conducted site inspections and project audits on a periodic basis.

Safety and Health Manager, USACE, Omaha District Rapid Response II. Duties on this HTRW contract included the development of program procedures and policies to work on multiple USACE projects. Developed SSHP for specific Rapid projects, including work at Joliet, Illinois, Ames, Iowa and Des Moines, Iowa. Mr. Thomas conducted site inspections and provided technical support for the implementation of the site safety and health program for RR/IR task orders. Mr. Thomas provided support on each Rapid project, including:

Project CIH, Project CHP; Ames Laboratory Chemical Disposal Site, Ames, Iowa. July 1994 – November 1994. Developed the site specific health and safety plan for the excavation and disposal of approximately 1,000 cubic yards of radioactive uranium wastes and contaminated soils. Developed the radiation protection program to be implemented by project employees to reduce exposures to ionizing radiation to as low as reasonable achievable. Contaminated materials were packaged and shipped for disposal in Clive, Utah.

Safety and Health Manager, USACE, TERC Number 1. Duties on this contract included the development of SSHP for work at Ellsworth AFB in Rapid City SD and KI Sawyer AFB in Michigan. Mr. Thomas provided support for some of the TERC projects including:

Project CIH, Ellsworth AFB, OU2 and OU7, Rapid City South Dakota. November 1996 – September 1997. Developed the site specific health and safety plan to excavate radioactive materials from disposal trenches at OU2 and OU 7. Developed radiation protection plan as

well as the release criteria to be implemented to document that the site was free of contamination. Worked with the USAF Radiation Safety Committee to establish protocols to identify plutonium in soil and verify that debris was handled correctly.

Project CIH, Tarracorp Industries, Granite City, Illinois April, 1993 – May, 1997. USACE Omaha PRAC II. Developed the site specific safety and health plan for this project to excavate and treat lead-contaminated soil from smelter emissions. Treatment was completed by stabilizing the soil using a pugmill. This process delists the soils to a "special waste" classification, resulting in key cost savings in disposal. To date, over 300 residential sites have been remediated, and over 100,000 tons of soil have been processed. Excavation, transportation, and disposal of wastes containing battery chips have also taken place. Developed the elements of the air monitoring program. The air monitoring program was sufficient to evaluate the personnel exposures to airborne lead dust, as well as the fugitive emission from the exclusion zone. Performed periodic site visits to review results of the air sampling program and confirm that exposures were acceptable.

Health and Safety Manager, Department of Energy, Weldon Spring Site Remedial Action Program (WSSRAP), April 1993 - July, 1995. OHM was contracted to excavate contaminated construction debris from the WSSRAP quarry. Materials in the quarry were accumulated from a munitions manufacturing facility at Weldon Spring, as well as the demolition of buildings from the Mallinckrodt site used during the Manhattan project. Personnel exposures to uranium and thorium were documented, as well as nitroaromatics and asbestos. Mr. Thomas completed site inspections to evaluate the effectiveness of the health and safety plan and review the results of employee exposure monitoring.

Health and Safety Manager during the demolition of selected manufacturing buildings at the WSSRAP. The demolition projects involved the controlled demolition of nine buildings. Employees encountered radioactive uranium as well as asbestos containing materials and cadmium based paints. Mr. Thomas evaluated the construction safety program as well as industrial hygiene program during the demolition tasks.

Health and Safety Manager during the remediation of facilities at the Piketon Gaseous Diffusion Plant in Portsmouth, Ohio. OHM was contracted to remediate a chromic acid tank, including the removal of the lead liner in Building X700. OHM also demolished the incinerator in Building X705A. Mr. Thomas prepared the health and safety plan to document the methods necessary to reduce employee exposure to hazardous materials, both chemical and radiation exposures. OHM employees encountered hot environments in Building X700 where chromic acid and uranium were present.

Health and Safety Manager during the remediation of mixed waste that was buried in several burial pits at the Ames Laboratory in Ames, Iowa. Mr. Thomas participated in the planning and execution of the project, including presentations at the public hearings that were provided by the DOE to the public. The waste in the burial pits contained a variety of hazardous materials, including radioactive uranium, thorium, and asbestos as well as volatile organics including methyl ethyl ketone and trichloroethylene. Mr. Thomas prepared the health and safety plan for the project which described the industrial hygiene practice, the construction safety requirements, and the elements of the health physics program. Mr. Thomas evaluated the controls that were implemented and verified that employee exposures

were reduced to as low as reasonably achievable.

1990 - 1993 *Health and Safety Manager, IT Corporation, St. Louis, Missouri.*
Provided direction day-to-day for laboratory operations in the areas of health physics, industrial hygiene, hazardous waste management, and laboratory safety. Served as the Radiation Safety Officer for the USNRC Broad Scope license for the use of by-product and source material at the laboratory .

Collateral assignment as Department Manager of a radiochemistry laboratory to analyze samples from a variety of commercial and government facilities, including facilities operated by the DOE. Services were provided to a variety of DOE facilities including Fernald, Idaho National Energy Laboratory, Lawrence Livermore National Laboratory, Nevada Test Site, Oak Ridge National Laboratory, Paducah Gaseous Diffusion Plant, Rocky Flats, WSSRAP, and the Y12 Production Facility. Supervised the analysis of various environmental media to be analyzed for specific radioactive isotopes including uranium, plutonium, thorium, and radium. Other analyses were performed for fission products and gross methods including alpha and beta analysis. Served as the RSO for the broad-scope license issued to the laboratory by the NRC.

Performed waste management assessment for four different DOE facilities. Principal investigator for hazardous and mixed waste policies, procedures and practices. Recommended program changes and upgrades. Worked at the following facilities, including: Portsmouth Gaseous Diffusion Plant, Piketon, Ohio; K25 Gaseous Diffusion Plant, Oak Ridge, Tennessee; Paducah Gaseous Diffusion Plant, Paducah, Kentucky; and Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Served as project manager for the Industrial Hygiene department at Los Alamos National Laboratory (HSE-5). Responsibilities included reviewing and making recommendations for several of the programs being implemented by HSE-5for the National Laboratory. These programs included asbestos controls, carcinogen control, sampling strategies and hazardous waste site characterization. Mr. Thomas also developed a sampling strategy to evaluate personnel exposures to hazardous materials. Mr. Thomas evaluated the asbestos management program at Los Alamos Laboratory. He reviewed the work performed by the IH department, including project oversight and air monitoring. He inspected work sites established by contractors including Pan American Services to assess compliance with LANL procedures and OSHA regulations.

Served as project manager to prepare mixed waste and radiative waste management plans and programs for waste generated during the remedial investigation at the Nevada Test Site. The programs required coordination between the Remedial Investigation contractor, the DOE Operations Area office and the facility receiving the waste for disposal.

1988 - 1990 *Director of Corporate Health and Safety, Burlington Environmental,*
Columbia, Illinois. Responsible for designing and implementing health and safety programs to limit exposures to hazardous chemicals and radioactive material during sampling and remediation activities. Developed procedures and conducted training classes for field service personnel to correctly use personal protective equipment and perform air monitoring to evaluate personnel exposures.

Mr. Thomas also served on several audit teams to review the health physics programs at DOE site, including Rocky Flats, Los Alamos and the Nevada Test Site. The criteria for the audits were based on the DOE Technical Safety Appraisal objectives. Mr. Thomas worked with the program personnel to correct deficiencies and measure the effectiveness of the programs.

Member of Technical Advisory Group for Martin-Marietta Energy Systems. The Advisory Group provided oversight of the Federal Facility Agreement regarding the operation of the Low Level Radioactive Waste Tank Systems implemented for Oak Ridge National Laboratory. Made recommendations to implement standard industry practices for the purposes of reducing personnel exposures to hazardous and radioactive materials. Reviewed the elements of the industrial hygiene relating to the engineering controls and administrative controls implemented to reduce exposures to hazardous materials. Evaluated the effectiveness of the health physics programs for the purposes of reducing personnel exposures to radiation to as low as reasonably achievable.

Mr. Thomas reviewed the industrial hygiene and health physics programs being implemented at each facility. Used the Technical Safety Appraisal guidelines developed by DOE to critique the effectiveness of the programs begin implemented. Worked with each respective program managers, responsible for the H&S program, to develop an action plan to upgrade the program and track the progress of the changes.

Member of the Management Advisory Team for Martin Marietta Energy Systems Gaseous Diffusion Plants. The Advisory team reviewed the effectiveness of the Health and safety programs being implemented including the health physics and industrial hygiene programs. The Advisory Group was responsible for reviewing each of the health and safety programs and making recommendations for areas of improvement.

1983 - 1988 *Senior Health Physicist, IT Corporation, Oak Ridge, Tennessee.* Provided health physics and industrial hygiene consulting to government and commercial clients. Served as the project manager for several remedial decontamination projects involving hazardous and radioactive materials. His experience included:

Project CIH, Fernald Feed Materials Production Center, US Department of Energy Cincinnati, Ohio. May, 1987 – June, 1988. Performed health-and-safety review of engineering improvements at DOE uranium metals production facility. Improvements included new ventilation systems, radioactive materials handling systems, and decontamination of the facility. Recommended health physics and industrial hygiene controls to minimize worker's exposure, and updated air monitoring programs for both workplace exposures and effluent sampling.

Task Manager, Fernald Feed Materials Production Center, US Department of Energy Cincinnati, Ohio. August, 1985 – June, 1986. Mr. Thomas developed and implemented the collection and analysis of radiation measurement to assess the concentration of uranium in the soil surrounding the manufacturing facility. This work was performed as part of the site wide Remedial Investigation/ Feasibility study.

Health Physics Supervisor, Joliet, Illinois, Commonwealth Edison, September, 1984 – December, 1985. Provided support for the chemical cleaning of the primary cooling system at Dresden Nuclear Power Station, Unit 1. Mr. Thomas was responsible for assessment of engineering controls to reduce personnel exposures to radiation. The techniques were successful to remove more than 750 curies of cobalt-60 and other activation corrosion products. Personnel exposures were less than 7 man-Rems for the total project.

Health Physics Supervisor, Confidential Client, August 1983 - July, 1984. Provided support to decommission a facility that manufactured neutron sources (Am-Be) for nuclear power plants and radiography applications. The hot cells and glove boxes were segmented and packages in Type B shipping containers; the TRU waste shipped to Idaho Falls for storage and ultimate disposal by the USDOE. Drums of remote handled TRU were repackaged and characterized in order to satisfy the waste acceptance criteria for the USDOE. All work was performed in containments designed to minimize the spread of radioactive contamination, both airborne and surface contamination. Exposures to remediation workers was maintained below 1,000 millirem per person for the 15 month project; external exposures to gamma and neutron radiation were minimized. Internal exposures to TRU, including plutonium and americium were evaluated and verified to satisfy the requirements of the USNRC.

1976-1983 *Senior Research Industrial Hygienist, Dow Chemical, Midland, Michigan and Tulsa, Oklahoma.* Provided health and safety support for employees in manufacturing facilities, including plastic and other intermediate chemical production. Assigned as lead health physicist for decontamination projects at several nuclear power plants. From 1977 to 1980, Mr. Thomas served as the radiation safety officer for a NRC broad scope license to authorize the use of mixed fission products and special nuclear material used in manufacturing and research applications at Dow Chemical. The program included a TRIGA reactor, two small accelerators, sealed radioactive sources and tracers for a variety of research programs. Mr. Thomas directed all elements of the health physics program including training, standard operating procedures, exposure assessment and documentation. Mr. Thomas later (1981 - 1983) served as the radiation safety officer for the field services division where sealed sources and mixed fission products were used in treatment systems. This assignment had responsibilities in 22 states for approximately 3,000 employees. Mr. Thomas directed the use of radioactive materials licenses in 16 different states and a NRC license for the use of these radioactive materials.

Professional Society Membership

Health Physics Society (Plenary member)

American Academy of Health Physics

American Industrial Hygiene Association

American Academy of Industrial Hygiene

Bibliography

Mr. Thomas has authored/coauthored a number of papers and technical reports. In addition, he has developed/presented training courses in the field of health physics, industrial hygiene and safety.

Other Appointments/Awards

Ohio Radiation Advisory Council. Appointed by Governor Taft in 2002. Elected Chair of the Council in 2004 and 2005.

Ohio Utility Radiological Safety Board, Citizen's Advisory Council. Elected Chair in 2001 and 2002.

Director of the State of Ohio Low Level Radioactive Waste Facility Development Authority Board. Appointment by the Speaker of the Ohio State Legislature in 1997.

Chairman's Award for Safety Excellence, OHM Remediation Services, 1996, 1997

Senior Technical Associate, International Technology Corporation, 1991.

Member of the People to People Ambassador Delegation visiting the People's Republic of China, 1987. Invited speaker to review health physics practices.

ATTACHMENT B
Field Activity Daily Log

FIELD ACTIVITY DAILY LOG

Facility: NSF INTERNATIONAL, INC	
Date: 09 APRIL 2007	Job/Task Number: 2007008.01
Client Name: NSF INTERNATIONAL, INC	
Address of Work Site: 789 DIXBORO ROAD ANN ARBOR, MI 48105	
Description of Work: SHIP SOURCES AND WASTE, SURVEY RAD LAB	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS

Arrived on site at (insert date and time): 4/9/07 0800

0800 MET SHIPPER BOB BASSETT IN PARKING LOT
0815 MET WITH STEVEN DAUSS, WENT TO RAD LAB
0830 BEGAN INSTRUMENT SET UP, SHIPPER PACKAGING WASTE
0910 BEGAN ROOM SURVEY, ALL WASTE PACKAGED. BEGAN STATIC MEASUREMENTS WITH 2929/43-89 AND SCANS WITH 12/44-9
1000 COMPLETED SCANS WITH 12/44-9, NO READINGS ABOVE BACKGROUND
1115 COMPLETED STATIC MEASUREMENTS WITH 2929/43-89
1145 BEGAN END OF SHIFT INSTRUMENT CHECKS, BRIEFING STEVEN DAUSS ON RESULTS OF SURVEY.
1200 OFF SITE

Departed site at (insert date and time): 4/9/07 / 1200

Changes from Plans and Specifications, and Other Special Orders and Important Decisions:
N/A

Weather Conditions: SUNNY, WARM	Important Telephone Calls and Interactions: N/A
Personnel on Site: Jeffrey Sumlin, STEVEN DAUSS, BOB BASSETT	
Name (print): Jeffrey W. Sumlin	Signature

ATTACHMENT C
Instrument Records

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
CONTAMINATION SURVEY INSTRUMENT DATA SHEET

Project No: 2007008.01			Detector			Meter		
Site Location/Background Location: NSF INTERNATIONAL FLOOR OUTSIDE B10 LAB			Type: Ludlum Model 43-89	Serial No. PR120411	Probe Area (cm^2) 100	Type: Ludlum Model 2929	Serial No: 126126	Operating Voltage: 600
Check Source No: 2399-98			Check Source No: 96TH4701640			Check Source No: N/A		
Radionuclide: Tc-99	Activity: 20,000	Date: 06 Aug 1998	Radionuclide: Th-230	Activity: 15,600	Date: 24 MAY 1996	Radionuclide: N/A	Activity: N/A	Date: N/A

Date	Start of Shift Background (cpm for a 10 minute count)								End of Shift Background (cpm for a 10 minute count)								Daily Source Check (α)		Daily Source Check (β)		MDA** - Scaler Mode (dpm) *		Bat. OK	HV OK	Initials
	Alpha				Beta				Alpha				Beta				Source (cpm)	Eff.	Source (cpm)	Eff.	α	β			
	1	2	3	Av.	1	2	3	Av.	1	2	3	Av.	1	2	3	Av.									
4/9/07	30	33	31	31.3	1345	1268	1402	1338.3	29	32	31	30.7	1346	1321	1417	1361.3	2563	13.78%	2514	12.57%	29.1	137.5	N/A	✓	S

** $MDA = \frac{2.71 + 4.65\sqrt{BKG_{avg} \times t}}{t \times E \times \frac{A}{100}}$

where MDA = the activity level ($dpm/100\ cm^2$), BKG_{avg} = the background count rate for this measurement type (cpm), t = the measurement duration (min), E = instrument efficiency, and A = probe area (cm^2).

* MDA IS FOR 10 MINUTE COUNT

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2929 SERIAL# 126126

Owner: IEM

DATE:	04/02/07	**LOCATION:**	Griffin Inst
TECH:	Joanne Glenn	**DATE LAST CAL EXPIRES:**	04/30/07

Reason For Calibration: (●) **Due For Calibration** ( ) **Repair (See Remarks)**

CABLE LENGTH: 39" ( ) **Other (See Remarks)** ( ) ***Due and Repair (See Remarks)***

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL:	M-500	**SERIAL #:**	114512	**CAL DUE:**	12/11/07
MODEL:		**SERIAL #:**		**CAL DUE:**	

Condition: (●) **Sat** ( ) **Unsat**

AF Mechanical Zero: 0

AL Mechanical Zero: 0

Beta Channel Window (4-50 mV):	4-50	A.F.		
Alpha Channel Window (175 mV, 120 for 3030):	175	A.F.		
Alpha Counts w/Pulser @ 10,000 CPM:	9,978	A.F.	**% Error:**	0.2%
Beta Counts w/Pulser @ 10,000 CPM:	9,987	A.F.	**% Error:**	0.1%

HIGH VOLTAGE CHECK (2929 only)

1 KV Reading (R-5 on HV Board):	1	A.F.		
Max HV (1500 V +):	(●) **Sat**	( ) **Unsat**		

REMARKS: Calibrated w/43-10-1 #PR132238.

Does Instrument Meet Final Acceptance Criteria?: (●) Yes ( ) No

Calibration Sticker Attached?: (●) Yes ( ) No

Date Instrument is Due For Next Calibration: **04/02/08**

Performed/Reviewed by: Joanne Glenn **Date:** 4/2/2007 **Entered by:** ____ **Initials**

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-89 PROBE # PR120411

Owner: IEM

DATE: 04/02/07 LOCATION: Griffin Inst
TECH: Joanne Glenn DATE LAST CAL EXPIRES: 10/13/07

REASON FOR CALIBRATION:

○ Due For Calibration ○ Repair (See Remarks) ◉ Other (See Remarks) ○ Due and Repair

CABLE LENGTH: 39" INPUT SENSITIVITY: dual

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2929	SERIAL #:	126126	CAL. DUE:	04/02/08
MODEL:		SERIAL #:		CAL. DUE:	

NIST TRACEABLE SOURCES USED

SOURCE #:	2695-00	SOURCE #:	
ISOTOPE:	Tc99	ISOTOPE:	
ACTIVITY(dpm):	18400	ACTIVITY:	
ASSAY DATE:	03/01/00	ASSAY DATE:	

Condition: ◉ Sat ○ Unsat Efficiency from last cal.: Pu: 18.07% Tc Ni: 16.27%
Th: 17.20% C-14:

	HV	Vernier		
Setpoints from last cal.:	550	2.31		
Source	**Alpha Response CPM**	**Beta Response CPM**		
Background:	0	131		
Pu-239:	2779	744	A-B XTLK:	18.1%
Tc-99 Ni:	5	2620	B-A XTLK:	<1%
As Found Efficiencies Pu, Tc:	16.02%	13.53%		
Th-230 / C-14	4146 /		13.82% /	
Background:				
Pu-239:			A-B XTLK:	
Tc-99 Ni:			B-A XTLK:	
As Found Efficiencies Pu, Tc:				
Th-230 / C-14	/		/	

Is as found efficiency within 20% of the efficiency from the last cal? ○ Yes ◉ No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.

GRIFFIN INSTRUMENTS

PROBE #: PR120411
Date: 04/02/07

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
550 / 2.31	5	2620	13.5%	2779	744	15.0%	0	131	18.1%	<1%
600 / 2.48	15	3799	19.1%	3268	1680	17.7%	1	286	29.9%	<1%

Alpha / Beta Bkg (cpm) 1 286

HV / Vernier		Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
600 / 2.48	**CPM:**	3268	3799	4868	5051		3350
	AL Efficiencies:	**17.66%**	**19.09%**	**12.28%**	**16.83%**		**29.79%**

Th-230 Source #99TH470-1815 4/11/06 30,000 dpm *Pu-239 Source #2696-00* 7/18/06 18,500dpm
Tc-99 on Stainless Steel Source #99TC470-1814 8/3/99 37,300 dpm, Sr90 Source #2697-00 3/1/00 12,200 dpm

REMARKS: Use only with 2929 listed. Client adk for cal with 2929. When using with 2224 previoulsy cal'ed with use that voltage and eff posted. Calibrated w/2929 #126126.

Does Instrument Meet Final Acceptance Criteria?: (●) Yes ( ) No

Calibration Sticker Attached?: (●) Yes ( ) No

Date Instrument is Due For Next Calibration: **04/02/08**

Performed/Reviewed by: Joanne Glenn **Date:** 4/2/2007 **Entered by:** ____ **Initials**

Calibrations performed to ANSI N323A-1997 standards.

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
CONTAMINATION SURVEY INSTRUMENT DATA SHEET

Project No: 2007008.01			Detector			Meter		
Site Location/Background Location: DSF INTERNATIONAL FLOOR OUTSIDE BIO LAB			Type: Ludlum Model 44-9	Serial No. PR151746	Probe Area (cm²) 15	Type: Ludlum Model 12	Serial No: 143593	Operating Voltage: 900
Check Source No: 2399-98			Check Source No: N/A			Check Source No: N/A		
Radionuclide: Tc-99	Activity: 20,000	Date: DEC 1998	Radionuclide: N/A	Activity: N/A	Date: N/A	Radionuclide: N/A	Activity: N/A	Date: N/A

Date	Start of Shift Background (cpm for a N/A minute count)								End of Shift Background (cpm for a N/A minute count)								Daily Source Check (α)		Daily Source Check (β)		MDA** - Scaler Mode (dpm)		Bat. OK	HV OK	Initials
	Alpha				Beta				Alpha				Beta				Source (cpm)	Eff.	Source (cpm)	Eff.	α	β			
	1	2	3	Av.	1	2	3	Av.	1	2	3	Av.	1	2	3	Av.									
7/6/07	N/A	—	—	—	50	50	50	50	N/A	—	—	/	80	80	80	80	N/A	N/A	2000	10%	N/A	N/A	√	√	S

** $MDA = \frac{2.71 + 4.65\sqrt{BKG_{avg} \times t}}{t \times E \times \frac{A}{100}}$

where MDA = the activity level (dpm/100 cm²), BKG_{avg} = the background count rate for this measurement type (cpm), t = the measurement duration (min), E = instrument efficiency, and A = probe area (cm²).

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 12 NS SERIAL# 143593

Owner: IEM

DATE: 10/12/06 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 10/05/06

Reason For Calibration: (●) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 11/14/06

MODEL: SERIAL #: CAL DUE:

[✓] Fast/Slow Switch working properly [✓] Audio Response [✓] Geotropism CABLE LENGTH 39"

CONDITION: Sat AF MECHANICAL ZERO: 0 AL MECHANICAL ZERO: 0

NEW BATTERIES: ( ) Yes (●) No BATTERY CHECK: Sat

HV RANGE 400 - 1500 VOLTS (●) N/A ( ) Sat ( ) Unsat

HV		AS FOUND HV	AS LEFT HV
500 V:		500	A.F.
1250 V:	1000 V for 177s	1240	A.F.
2000 V:	1500 V for 177s	1950	A.F.

AF INPUT SENSITIVITY (mV): 35 AL INPUT SENSITIVITY (mV) : A.F.

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.0%	A.F.					
	250	250	0.0%	A.F.					
	400	400	0.0%	A.F.					
x1 or x10	1000	1000	0.0%	A.F.					
	2500	2500	0.0%	A.F.					
	4000	4000	0.0%	A.F.					
x10 or x100	10K	10 K	0.0%	A.F.					
	25K	25 K	0.0%	A.F.					
	40K	40 K	0.0%	A.F.					
x100 or x1000	100K	100 K	0.0%	A.F.					
	250K	250 K	0.0%	A.F.					
	400K	400 K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?: (●) Yes ( ) No

Remarks: Married w/44-9 #PR151746.

Does Instrument Meet Final Acceptance Criteria?: (●) Yes ( ) No

Calibration Sticker Attached?: (●) Yes ( ) No

Date Instrument is Due For Next Calibration: **10/12/07**

Performed/Reviewed by: Joanne Glenn Date: 10/12/2006 Entered by: _____ Initials

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 44-9 PROBE # PR151746

Owner: IEM

DATE:	10/12/06	**LOCATION:**	Griffin Inst
TECH:	Joanne Glenn	**DATE LAST CAL EXPIRES:**	10/05/06

REASON FOR CALIBRATION:

(●) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 39" **INPUT SENSITIVITY:** 35 mV

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL:	12	**SERIAL #:**	178479	**CAL. DUE:**	12/22/06
MODEL:		**SERIAL #:**		**CAL. DUE:**	

NIST TRACEABLE SOURCES

SOURCE #:	99TC470-1814	**SOURCE #:**	
ISOTOPE:	Tc99	**ISOTOPE:**	
ACTIVITY (dpm):	37300	**ACTIVITY:**	
ASSAY DATE:	08/03/99	**ASSAY DATE:**	

PHYSICAL CONDITION: Sat **EFF. FROM LAST CAL.:** **AF BKG:** 36 HV 900V

3 ONE MINUTE COUNTS: 5344 5247 5170 **AVERAGE:** 5253.7

TC-99 EFFICIENCY: 13.99% **C-14 COUNT:** **C-14 EFF:**

AS LEFT ONE MINUTE COUNTS: **AVERAGE:**

TC-99 EFFICIENCY: **C-14 COUNT:** **C-14 EFF:**

Is the as found efficiency within 20% of eff. from last cal.?	( ) Yes	(●) No *See Remarks
Saturation Test Satisfactory	(●) Yes	( ) No
Reproducibility: Are the individual counts within 10% of the average?	(●) Yes	( ) No
Does the probe meet final acceptance criteria?	(●) Yes	( ) No
Calibration sticker attached?	(●) Yes	( ) No

Remarks: No previous cal data. Married w/12 #143593.

DATE PROBE IS DUE FOR NEXT CALIBRATION: 10/12/07

Performed/Reviewed by: Joanne Glenn **Date:** 10/12/2006 **Entered by:** ____ **Initials**

Geometry: Flat surface unless otherwise noted.

Calibrations performed to ANSI N323A-1997 standards

ATTACHMENT D
Waste/Source Shipping Manifests

RM 540 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

MERGENCY TELEPHONE NUMBER (Include Area Code)
734-827-5878

GANIZATION
NSF INTERNATIONAL

S THIS AN "EXCLUSIVE USE" SHIPMENT?
YES
NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? YES ☑ NO
If "Yes," provide Manifest Number ====>

EPA MANIFEST NUMBER
NONE REQUIRED

5. SHIPPER -- NAME AND FACILITY
NSF INTERNATIONAL/FOR THE ACCOUNT OF
ADCO SERVICES, INC.
789 DIXBORO ROAD
ANN ARBOR, MI 48015

SHIPPER I.D. NUMBER
61332
☐ COLLECTOR
☐ PROCESSOR

SC PERMIT
NA

SHIPMENT NUMBER
07-0097 L

☑ GENERATOR TYPE
(Specify) I

CONTACT
JEFF SUMLIN

TELEPHONE NUMBER (Include Area Code)
240-393-0755

6. CARRIER -- Name and Address
ADCOM EXPRESS, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

EPA I.D. NUMBER
ILD 047267364

SHIPPING DATE
04/09/2007

CONTACT
BOB BASSETT

TELEPHONE (Include Area Code)
708-429-3013

SIGNATURE -- *Authorized carrier acknowledging waste receipt*

DATE

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
07-0097 L

9. CONSIGNEE - Name and Facility
ADCO SERVICES, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 604771

CONTACT
LEN WARBIANY/FACILITY MGR

TELEPHONE (Include Area Code)
708-429-1660

SIGNATURE -- *Authorized consignee acknowledging waste receipt*

DATE

10. CERTIFICATION

This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE | TITLE | DATE

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	16. TOTAL PACKAGE ACTIVITY mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
2915, Radioactive material, Type A Package, 7	NA	NA	SOLID AQUEOUS LIQUID, SOIL	C-14	Ra-226	Ra-228	Sr-89	1.3329E+00	3.6025E-02	NA	25 LBS; 1.4 FT3	07-0097-01
				Th-228								

CONSIGNEE USE ONLY

20. Check appropaiate items:

___ Customer represents and warrents that all data set forth in this Univorm Low-Level Radioactive Manifest is true and correct in all respects.

___ Packages listed as "Limited Quantity of Radioactive Material" on this manifest conform to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material UN2910

___ Packages listed as "NON-REGULATED MATERIAL" on this manifest are classified in accorance with 49 CFR 173.403 (Definition of Radioactive Material). These Materials bust still be disposed of at a licensed facility.

RM 540 (08-03)

M 541 ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

ditional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 0.0396	kg 11.3398	NP	NP	NP	NP
	ft3 1.4000	lb 25.0000				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	1.3329E+00	NP	1.3320E+00	NP	NP	(kg)	NA
mCi	3.6025E-02	NP	3.6000E-02	NP	NP	(lbs)	NA

2. MANIFEST NUMBER 07-0097 L

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME NSF INTERNATIONAL/FOR THE ACCOUNT OF

SHIPMENT ID NUMBER 61332

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER							16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION		
:ONTAINER NTIFICATION JMBER/ S.C RANSPORT (MIT NUMBER	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (lb)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3 & Note 3A)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	MBq	mCi	
07-01/61332	4	0.0396	11.3398		NP	NP	25,22	0.0396	100	AQUEOUS LIQUID, SOIL/NP	0.00	C-14	1.8500E-01	5.0000E-03	AU
		1.4000	25.0000		NP	NP		1.4000				C-14	1.8500E-01	5.0000E-03	
												C-14	1.8500E-01	5.0000E-03	
												C-14	1.8500E-01	5.0000E-03	
												C-14	1.8500E-01	5.0000E-03	
												C-14	1.8500E-01	5.0000E-03	
												C-14	1.8500E-01	5.0000E-03	
												C-14	3.7000E-02	1.0000E-03	
												Ra-226	1.8500E-04	5.0000E-06	
												Ra-228	1.8500E-04	5.0000E-06	
												Ra-228	1.8500E-04	5.0000E-06	
												Sr-89	1.8500E-04	5.0000E-06	
												Th-228	1.8500E-04	5.0000E-06	
												Subtotal	1.3329E+00	3.6025E-02	
												Total	1.3329E+00	3.6025E-02	
ent Totals		0.0396	11.3398										1.3329E+00	3.6025E-02	
		1.4000	25.0000												

1: Container Description Codes. For containers/ requiring disposal in approved structural over- the numerical code must be followed by "-OP."

- ooden Box or Crate
- tal Box
- stic Drum or Pail
- tal Drum or Pail
- tal Tank or Liner
- ncrete Tank or Liner
- lyethlene Tank or Liner
- erglass Tank or Liner
- 9. Demineralizer
- 10. Gas Cylinder
- 11. Bulk, Unpackaged Waste
- 12. Unpackaged Components
- 13. High Integrity Container
- 19. Other. Describe in Item 6, or additional page

Note 1A: Barnwell Specific Container Description Codes. (Choose one code as may be applicable.)

- A High Integrity Container - Poly
- B High Integrity Container - Poly with Steel Shell
- C High Integrity Drum Overpack - Poly
- D High Integrity Container - Stainless Steel
- E High Integrity Container - Fiberglass
- F Liner - Steel

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

- 20. Charcoal
- 21. Incinerator Ash
- 22. Soil
- 23. Gas
- 24. Oil
- 25. Aqueous Liquid
- 26. Filter Media
- 27. Mechanical Filter
- 28. EPA or State Hazardous
- 29. Demolition Rubble
- 30. Cation Ion-exchange Media
- 31. Anion Ion-exchange Media
- 32. Mixed Bed Ion-exchange Media
- 33. Contaminated Equipment
- 34. Organic Liquid (except oil)
- 35. Glassware or Labware
- 36. Sealed Source/Device
- 37. Paint or Plating
- 38. Evaporator Bottoms/Sludges/ Concentrates
- 39. Compactible Trash
- 40. Noncompactible Trash
- 41. Animal Carcass
- 42. Biological Material (except animal carcass)
- 43. Activated Material
- 59. Other. Describe in item 11, or additional page

NOTE 2A: Barnwell Specific Waste Descriptor Codes. (Choose all applicable codes.)

- G Dewatered
- H Solid
- I Combustible
- J Non-combustible
- K Air Filtration Filters
- L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED. Solidification

- 90. Cement
- 91. Concrete (encapsulation)
- 92. Bitumen
- 93. Vinyl Chloride
- 94. Vinyl Ester Styrene
- 99. Other. Describe in item 13, or additional page
- 100. None Required.

Note 3A: Barnwell Specific Solidification and Stabilization Media Codes. (Choose this code if applicable)

- M Wax Binder

M 541 (08-03)

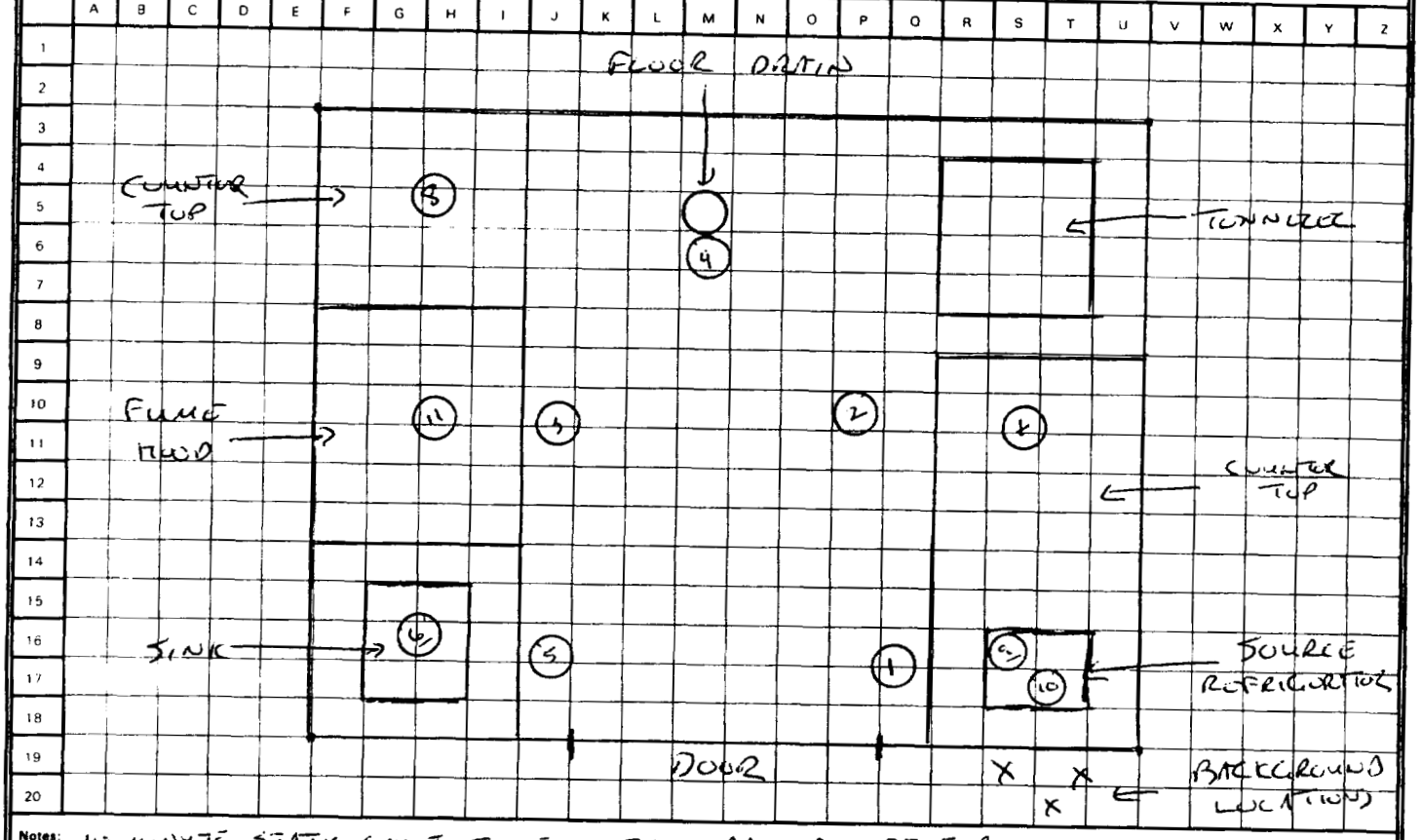
ATTACHMENT E
Survey Records

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

RADIOLOGICAL SURVEY FORM

Survey Number G-10207-1

Instrument/SN: 2929 (126126) w/ 43-89 (PR120411)	Calibration Due: 02 APR 2008	Site Name: NSF INTERNATIONAL	Date: 4/9/07	Time: 1115
Instrument/SN: 12 (143543) w/ 44-9 (PR151746)	Calibration Due: 12 OCT 2008	Location: RAD LAB		
Instrument/SN: N/A	Calibration Due: N/A	Purpose: RELEASE		
Survey Performed By (Print): JEFFREY W. SMELL		Survey Performed By (Signature):		
☒ Battery OK (MODEL 12 ONLY) ☒ HV OK ☒ Source Check OK		Grid Dimensions: 0.25 x 0.25 ☒ meters ☐ feet ☐ inches ☐ centimeters		



Notes: 10 MINUTE STATIC COUNT TIME WITH MDA OF 137.5 B AND 20.1 α

LOCATION	COUNTS α/B	DPM α/B	LOCATION	COUNTS α/B	DPM α/B
1	27/1199	<MDA/<MDA	7	4/1263	<MDA/<MDA
2	29/1141	<MDA/<MDA	8	4/1356	<MDA/140.8
3	27/1131	<MDA/<MDA	9	3/1361	<MDA/150.1
4	26/1166	<MDA/<MDA	10	5/1358	<MDA/156.7
5	23/1057	<MDA/<MDA	11	6/1298	<MDA/<MDA
6	6/1210	<MDA/<MDA			

SCAN WITH MODEL 12 W/44-9, NO READINGS > BKGD

NSF International

Memo

To: Radiological Lab File

From: Stephen Dauss

Date: 4/10/2007

Re: Radiological Standards Transferred to GEL Labs

On April 6, 2007, Darrell Williams transferred three radioactive sources from the laboratory at NSF International to GEL laboratories in Charleston, SC.

4/10/07

Mike Knichel
GEL Laboratories
2040 Savage Road
Charleston, SC 29407
843-556-8171

This letter is to confirm that NSF International is transferring to your control 3 sealed sources. According to your radioactive material license (line item H license enclosed), you can take position of these. Sources are flat and designated for use in a gas flow proportional counter.

The sources are as follows with estimated activity:

Cs-137: 30,800 dpm (0.014uCi)
Th-230: 4930 dpm (0.002 uCi)
Am-241: 35,900 dpm (0.016 uCi)

Please hold these in a secured location until such time that we reactivate our license.

Thank you

Darrell Williams

COPY

Inorganic Grouplead
NSF International
789 N. Dixboro
Ann Arbor, MI 48105

Jon McGaugh
RSO

Exempt Material Calculation Worksheet

Date:04/05/2007

Isotope	Activity (dpm)	Estimated mass (g)	Activity Conc. (uCi/g)	Activity Conc. (Ci/g)	Exempt Conc. Limit (Ci/g)	Exempt Concentration Fraction	Total Activity (uCi)	Exempt Consignment Limit (Ci)	Exempt Consignment Fraction
Am-241	35,900	5	3.23E-03	3.23E-09	2.70E-11	1.20E+02	1.62E-02	2.70E-07	5.99E-02
Cs-137	30,800	5	2.77E-03	2.77E-09	2.70E-10	1.03E+01	1.39E-02	2.70E-07	5.14E-02
Th-230	4930	5	4.44E-04	4.44E-10	2.70E-11	1.64E+01	2.22E-03	2.70E-07	8.22E-03
						1.46E+02			**5.96E-02**
						<1 exempt		**or**	**<1 exempt**

Prepared by: D. L. Williams

D. L. Williams

DOT Exempt Consignment, Not Regulated as a Class 7 (Radioactive) Hazardous Material

Material does not meet the DOT definition of "radioactive" in accordance with 49CFR 173.403.

Caution, Radiological Controls May be Required for Unpacking:

The sample material in this package contains radioactivity in small concentrations/quantities NOT regulated under U.S. DOT hazardous material regulations (49 CFR 173.403), and has been shipped as an exempt consignment. Radiological controls may be required for unpacking to comply with local requirements. Radiological data is available upon request.

Darrell Williams
NSF International
789 N. Dixboro Rd.
Ann Arbor, MI 48105
(734) 769-8010 X2338

Williams, Darrell

From: james westmoreland [jbw@gel.com]
Sent: Wednesday, March 07, 2007 4:02 PM
To: Williams, Darrell
Cc: David Setzer; Mike Knichel; george mcabee; Keith Doran; Angela Johnson
Subject: storage of sources


GEL_NRC License RAD.pdf


jbw.vcf

Hello Darryl,
This email is confirmation that GEL can accept the 3 sealed sources from NSF under the authority of our radioactive material license (line item H attached).

As I understand, the sealed sources are flat and will fit into a gas flow proportional counter. Estimated activities are:
Cs-137: 30,800 dpm (0.014 uCi)
Th-230: 4930 dpm (0.002 uCi)
Am-241: 35,900 dpm (0.016 uCi)

We will hold the sources in a secured area with our calibration sources until your license is established or you request return.

Please ship the sources to:

GEL Laboratories, LLC
Attn. Mike Knichel
2040 Savage Road
Charleston, SC 29407
843-556-8171

If you need any of the packing materials returned please include those instructions along with the return shipping address.

Best Regards
James

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
RADIOACTIVE MATERIAL LICENSE

Pursuant to the Atomic Energy and Radiation Control Act, Section 13-7-40 et.seq. of S.C. Code of Laws of 1976, as amended, and Supplements thereto, and the South Carolina Department of Health and Environmental Control Regulation 61-63, Radioactive Material (Title A), and in reliance on statements and representations heretofore made by the applicant, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules and regulations of the South Carolina Department of Health and Environmental Control now or hereafter in effect and to any conditions specified below.

Amendment No. 19 amends

LICENSEE	3. License Number:
1. Name: General Engineering Laboratories	362 in its entirety.
2. Address: 2040 Savage Road Charleston, SC 29414	4. Expiration Date: April 30, 2004

5. Radioactive Material (Element & Mass No.)	B. Chemical and/or Physical Form	C. Maximum Radioactivity and/or quantity of material which licensee may possess at any one time.
A. Any radioactive material with Atomic Numbers 2 through 83.	A. Any	A. 100 millicuries.
B. Any radioactive material with Atomic Numbers 84 through 98.	B. Any	B. 10 millicuries.
C. Any radioactive material with Atomic Numbers 99 through 100.	C. Any	C. 10 millicuries.
D. Uranium 235	D. Any	D. 50 grams.
E. Uranium 233	E. Any	E. 2 grams.
F. Plutonium	F. Any	F. 2 grams.
G. Hydrogen 3	G. Any	G. 1.0 Curie.
H. Any radioactive material with Atomic Numbers 1 through 98.	H. Any	H. No single source to exceed 2.0 millicuries.
I. Cadmium 109	I. Sealed source (Amersham Model CUC.D1, Isotope Products Model XFB Series-3204 and 3205, NEN Model NER 467, NEN Model NER 465, NAS Model IND 1602)	I. No single source to exceed 14 millicuries.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License No. 362
Amendment No. 19

J. Nickel 63	J. Foils (U.S. Radium Lab 784 or NEN Model NER-004)	J. No single source to exceed 20 millicuries.
K. Nickel 63	K. Foils (Amersham Corp. Models NBCD)	K. No single source to exceed 15 millicuries.
L. Technetium 99m	L. Any	L. No single source to exceed 5 millicuries.

8. Authorized Use:

A. through G. As contaminants in environmental waste samples of unknown chemical composition.

H. To be used as calibration and reference standards.

I. To be used in Berthold Gamma-Tech, Inc. Model LK-3 portable x-ray fluorescence device for detection of lead-based paint.

J. To be used in Tracor Model 115500 detector cell for use in Tracor Model 540 and 560 gas chromatograph.

K. To be used in Hewlett Packard Model G1223A detector cell for use in Hewlett Packard Model [illegible] gas chromatograph.

L. To be used as calibration and reference standards.

Conditions:

9. Radioactive material may only be used at the licensee's address listed in Item 2 above and temporary jobsites of the licensee anywhere in South Carolina, subject to the jurisdiction of the S.C. Department of Health and Environmental Control. This condition does not prohibit use in Agreement States or in U.S. Nuclear Regulatory Commission jurisdiction states under reciprocity procedures which may be established by those states or the U.S. Nuclear Regulatory Commission.

10. The licensee shall comply with the provisions of Title A, State of South Carolina *Rules and Regulations for* Radiation Control; Part I - General Provisions; Part II - Licensing of Radioactive Materials; Part III - Standards for Protection Against Radiation; and Part VI - Notices, Instructions, and Reports to Workers; Inspections.

11. Radioactive material shall be used by, or under the supervision of: Joe Davis (RSO), Carey Bocklet, James Westmoreland or Scott Smith.

12. Radioactive material listed in Items 5.I., 6.I, and 7.I. shall be used by, or under the supervision of, and in the physical presence of: Patrick Snodgrass.

13. Sealed sources containing radioactive material shall not be opened or removed from their respective source holders by the licensee.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License No. 362
Amendment No. 19

14. A. Each sealed source containing radioactive material, other than Hydrogen-3, with a half-life greater than thirty (30) days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed three (3) years, except for 5.I and 5.K which shall be tested at intervals not to exceed six (6) months. In the absence of a certificate from a transferor indicating that a test has been made within six (6) months prior to the transfer, the sealed source shall not be put into use until tested.

B. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Department.

C. If the test reveals the presence of 0.005 microcuries or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department regulations. A report shall be filed within five (5) days of the test with the Chief, Bureau of Radiological Health, South Carolina Department of Health & Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201, describing the equipment involved, the test results, and the corrective action taken.

15. Except for plutonium contained in a medical device designed for individual human application, no plutonium in any form shall be delivered to a carrier for shipment by air transport or transported in an aircraft by the licensee except in packages the design of which the U.S. Nuclear Regulatory Commission has specifically approved for transport of plutonium by air.

16. The licensee shall perform surveys of all incoming samples. Records of these surveys shall be maintained for review by the Department.

17. The licensee shall maintain a current inventory log of all samples received. This log shall be maintained for review by the Department.

18. The licensee shall conduct a physical inventory every six (6) months to account for all radioactive material received and possessed under the license. The records of the inventories shall be maintained for inspection by the Department and shall include the quantities and kinds of licensed material, location of radioactive material, and the date of the inventory.

19. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in RHA 3.21.1 of Part III, the licensee is hereby authorized to label detector cells and cell baths, containing radioactive material and used in gas chromatograph devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.

20. Tests for leakage and/or contamination shall be performed by persons specifically authorized by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such service.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License No. 362
Amendment No. 19

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21. The licensee shall dispose of all radioactive samples and wastes by return to the sample generator or by transfer to persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to receive and dispose of these radioactive samples and waste.

22. The licensee shall maintain itemized disposal records for review by the Department.

23. The licensee shall transport and dispose of low-level radioactive waste in accordance with Department Regulation 61-63 and applicable disposal site requirements. Any mixed low-level radioactive waste defined as waste that contains radioactivity and, either listed hazardous waste in Subpart D, 40 CFR 261, or, 2) waste that exhibits any of the hazardous waste characteristics identified in Subpart C, 40 CFR 261, shall be returned to the sample generator or accumulated and transported in accordance with applicable regulatory requirements to a licensed/permitted mixed waste facility for recycling, treatment, and/or disposal.

24. Radioactive material listed in Items 5.I., 6.I. and 7.I. shall be transported in accordance with requirements of 49 CFR 172 - Transportation of Radioactive Materials, Department Regulation 61-63, Part IV, Table A.

25. The licensee shall maintain a utilization log indicating the date, name of person, and place where radioactive material listed in Items 5.I., 6.I., and 7.I. is used.

26. Except as specifically provided otherwise, the licensee shall possess and use radioactive material described in Items 5, 6, and 7 of this license in accordance with statements, representations, and procedures contained in the following documents.

    A. Renewal application dated March 10, 1999, signed by Darren M. Boone.

    B. Additional information letter dated October 29, 1999, signed by James Westmoreland.

Date of Issuance January 11, 2000

For the South Carolina Department
of Health and Environmental Control

By: _____
Bearce O'Kelley, Chief
Radiological Health Branch

DHEC/BRH/121799

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License No. 362
Amendment No. 20

General Engineering Laboratories
2040 Savage Road
Charleston, SC 29414

In accordance with letter dated January 29, 2001, signed by James B. Westmoreland, S.C. Radioactive Material License No. 362 is hereby AMENDED:

TO ADD:

5. Radioactive Material (Element & Mass No.)	6. Chemical and/or Physical Form	7. Maximum Radioactivity and/or quantity of material which licensee may possess at any one time.
M. Nickel 63	M. Foils (Amersham Corp. Model NBCD or Dupont Merck Pharmaceutical Model NER-004P)	M. No single source to exceed 15 millicuries.

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8. Authorized Use:

M. To be used in Hewlett Packard Model G2397A detector cell for use in Hewlett Packard Model 6890 gas chromatograph.

TO CHANGE:

8. Authorized Use:

I. To be used in Niton XL-309 dual detector spectrum analyzer for detection of lead-based paint.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License No. 362
Amendment No. 20

TO CHANGE:

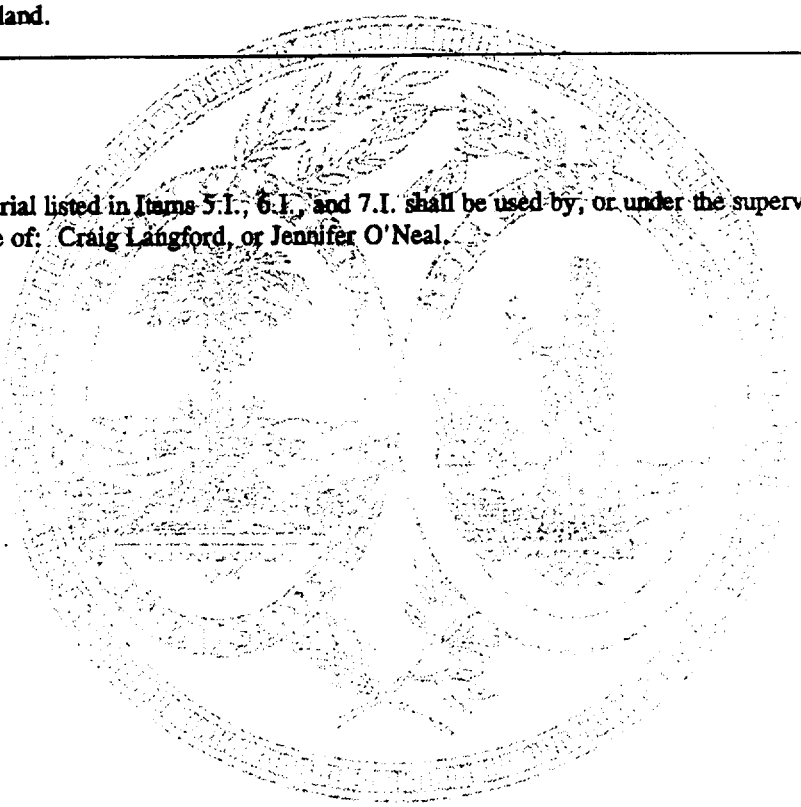
Condition 11.

11. Radioactive material shall be used by, or under the supervision of: Charles M. Knichel (RSO), Carey Bocklet, or James Westmoreland.

TO CHANGE:

Condition 12.

12. Radioactive material listed in Items 5.I., 6.I., and 7.I. shall be used by, or under the supervision of, and in the physical presence of: Craig Langford, or Jennifer O'Neal.



For the South Carolina Department
of Health and Environmental Control

BY: _____
T. Pearce O'Kelley, Chief
Bureau of Radiological Health

Date of Issuance: March 6, 2001

DHEC 812 (11/81)

NSF International

Memo

To: NRC License Termination File

From: Stephen Dauss

Date: 5/1/2007

Re: Electron Capture Detectors (ECD)

NSF International currently holds seven gas chromatographs with electron capture detectors. The detectors are sealed Ni-63 sources. To ensure that the detectors are covered by the general use license, the quality department compared the model numbers of the detectors to the "Registry of Radioactive Sealed Sources and Devices Active Vendors/Active Products by Vendors Name" list on the NRC website (http://www.nrc.gov/materials/miau/ssd/obtain-reports/active-products.html). The model numbers of the detectors were found on the NRC list and are covered under the general use license.

Manufacturer	Model Number	Quantity
Agilent	G2397A	3
Agilent	19233	2
Agilent	G1533A	1
Perkin Elmer	N610-0063	1

Stephen Dauss 5/1/07

http://www.nrc.gov/materials/miau/ssd/obtain-reports/active-products.html

Registry of Radioactive Sealed Sources and Devices Active Vendors/Active Products by Vendor Name

3/9/2007

Distributor	Registry Number	Date of Issuance	Model Number
Agilent Technologies, Inc.	**NR-348-D-109-B**	**7/27/1995**	**19233 (GENERAL LICENSE)**
Agilent Technologies, Inc.	NR-348-D-109-B	7/27/1995	19235 (SPECIFIC LICENSE)
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G1223A (GENERAL LICENSE)
Agilent Technologies, Inc.	**NR-348-D-111-B**	**10/24/1990**	**G1533A (GENERAL LICENSE)**
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G2310A (GENERAL LICENSE)
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G2330A (GENERAL LICENSE)
Agilent Technologies, Inc.	**NR-348-D-111-B**	**10/24/1990**	**G2397A (GENERAL LICENSE)**
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G2398A (GENERAL LICENSE)
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G2404A (GENERAL LICENSE)
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G2405A (GENERAL LICENSE)
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G1224A (SPECIFIC LICENSE)
Agilent Technologies, Inc.	NR-348-D-111-B	10/24/1990	G1536A (SPECIFIC LICENSE)
Perkin-Elmer Corporation LAS, Inc.	**NR-536-D-110-B**	**7/26/1990**	**N610-0063**
Perkin-Elmer Corporation LAS, Inc.	NR-536-D-110-B	7/26/1990	N610-0134

Information taken from NRC website on April 30, 2007

4/30/07

148
252

RECIPIENT: PEEL HERE

FedEx. USA Airbill FedEx Tracking Number 816259078290

1 From This portion can be removed for Recipient's records.

Date 5/1/07 FedEx Tracking Number 816259078290

Sender's Name Stephen DAUSS (QUALITY) Phone 734 769-8010

Company NSF INTERANTIONAL

Address 789 N DIXBORO RD

Dept./Floor/Suite/Room

City ANN ARBOR State MI ZIP 48105

2 Your Internal Billing Reference

3 To

Recipient's Name James Cameron Phone 630 829-9500

Company U.S. NRC Region III

Address Decommissioning Branch Suite 210

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Recipient's Copy

4a Express Package Service — Packages up to 150 lbs. Delivery commitment may be later in some areas.

- [ ] FedEx Priority Overnight — Next business morning
- [X] FedEx Standard Overnight — Next business afternoon
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations*
- [ ] FedEx 2Day* — Second business day
- [ ] FedEx Express Saver* — Third business day

* FedEx Letter Rate not available. Minimum charge: One-pound rate

4b Express Freight Service — Packages over 150 lbs. Delivery commitment may be later in some areas.

- [ ] FedEx 1Day Freight* — Next business day
- [ ] FedEx 2Day Freight — Second business day
- [ ] FedEx 3Day Freight — Third business day

* Call for Confirmation:

5 Packaging — * Declared value limit $500

- [ ] FedEx Letter*
- [X] FedEx Pak*
- [ ] Other Pkg. Includes FedEx Box, FedEx Tube, and customer pkg.

6 Special Handling

- [ ] Saturday Delivery — Available for FedEx Priority Overnight and FedEx 2Day to select ZIP codes
- [ ] Sunday Delivery — Available for FedEx Priority Overnight to select ZIP codes
- [ ] HOLD Weekday at FedEx Location — Not available with FedEx First Overnight
- [ ] HOLD Saturday at FedEx Location — Available for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods? One box must be checked.

- [ ] No
- [ ] Yes — As per attached Shipper's Declaration
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____
- [ ] Cargo Aircraft Only

Dangerous Goods cannot be shipped in FedEx packaging.

7 Payment Bill to:

- [X] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Enter FedEx Acct. No. or Credit Card No. below.

- [ ] Obtain Recipient Acct. No.

Total Packages: 1 Total Weight: 1 lbs

†Our liability is limited to $100 unless you declare a higher value. See the FedEx Service Guide for details.

8 Release Signature — Sign to authorize delivery without obtaining signature.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify FedEx from any resulting claims.

Questions? Call 1-800-Go-FedEx® 800-463-3339.

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Align bottom of **Peel and Stick Airbill** or **Pouch** here.

This pouch is resealable.