UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

MSS-12J

July 8, 2009

Ms. Katherine Streit
U. S. Nuclear Regulatory Commission, Region 3
2443 Warrenville Road, Suite 210
Lisle, IL 60532

SUBJECT: Environmental Protection Agency, Region 5
License No. 12-10243-01, Docket No. 030-04192
Responses to License Termination Visit of March 6, 2009

Dear Ms. Streit:

This responds to the list of questions I received from you during the subject visit of March 6, 2009. For your reference, I have attached your signed copy of the questions along with a letter to me from our FOH contractor, Scott R. Meyer that completely addresses each of the questions. A majority of the information in Mr. Meyer's letter responds to the first three, which provides a historical site assessment and information relating to close out surveys for the permitted use and storage locations. His responses to the first three questions are referenced to his "Attachment A" and "Attachments B.1 – B.3."

In response to No. 4 from your list, the value of 29.65 mCi is a summation of the activity of C-14 liquid wastes disposed from August 27, 1993 to June 14, 2005. This does not include the value of 1.640 mCi from a disposal during 1992. The value of 9.482 mCi that I provided in my January 29, 2008 responses to Ms. Colleen Casey corresponds to the inventory report that I received on January 16, 2008 from our FOH consultant and our Radiation Safety Officer. This final report updates and corrects the value of 10.86 mCi that had been previously reported. This inventory report is provided for your review as "Attachment C" to Mr. Meyer's letter.

Should you need any additional information or have any further questions, please do not hesitate to contact me at your earliest convenience.

Sincerely,

C. Marcom "Marc" Colvin, CSP
U. S. EPA Region 5 SHEM Manager

Attachments (VIA ELECTRONIC ONLY)
cc: Edward Watters
Michael Murphy
John Glover

RECEIVED JUL 1 3 2009

Licensee: Environmental Protection Agency, Region V
License No. 12-10243-01
Docket No. 030-04192

Subject: LICENSE TERMINATION SITE VISIT QUESTIONS FOR ENVIRONMENTAL PROTECTION AGENCY, REGION V, LICENSE TERMINATION

1. The current release surveys are not adequate to demonstrate or support the release of facilities. To terminate the license, a survey complying with 10 CFR 30.36(j) must be preformed and reported. This survey should include all areas where unsealed licensed materials were used and/or stored and should be reproducible and defendable. Acceptable guidance on surveys can be found in Figure 8.1 and Section 15.4 of NUREG 1757 Vol. 1, rev. 2 and Appendices A and B of NUREG 1757 Vol. 2. Areas noted which need to be addressed are discussed as follows:

   a. For the final status survey of past locations of use, each building must be described, including number of floors and rooms where licensed material was used and/or stored. Describe if unsealed material was used in the area. Each location of use (e.g. laboratories, process areas, storage areas, sinks, hold-up tanks, etc.) must be specified with enough detail to understand size, equipment and associated ventilation and sanitary/sewer discharge systems.

   b. Clarify if a one hundred percent scan of all surfaces in the area of the facility where unsealed licensed material was used or stored was preformed, using an appropriate radiation detection instrument. The type of instrument used should be specified with their associated scan sensitivities, discussion of calibration, and certified calibration sources used. Provide results in dpm using correction for instrument efficiency and area factors.

   c. Describe the method used to identify individual measurement/swipe points on each surface in the facilities where licensed material was used and stored. Describe basis for frequency of wipes based on area classification and determination of fixed versus removable contamination. NUREG 1757 Figure 8.1 provides guidance.

   d. Final status survey data must be tabulated in a report form, which correlates area dose measurements, direct survey meter results and tests for removable contamination keyed to an attached detailed diagram for each area. The survey report should indicate findings in individual sections according to location, buildings and areas. The report should also have a section, which discusses instrumentation, analytical procedures (MDC, MDCsr), calibration and instrument efficiencies, conversion factors, and QA.

   e. Provide details of evaluations and/or surveys, analysis of samples collected from drains, hold-up tanks, leaks via sewer lines, reconcentration of radionuclides release to the sanitary or septic fields (if any), air vents, or other fixtures or equipment that may have become contaminated during licensed material use. This is especially significant in situations where renovations have occurred and potentially contaminated areas may be inaccessible under current conditions.

f. Form 314 needs to be completed to show that the radiation survey confirms that any remaining residual radioactivity is within the limits of 10 CFR 20, Subpart E, and is ALARA.

2. To demonstrate that you have adequately assessed all areas where licensed material was used, you should perform a historical site assessment (HSA). The HSA involves comprehensive description of past locations of use, including buildings, mobile laboratories, outdoor areas (if any), and rooms in each building where materials were used. The HSA should address the type of activity performed in each area, quantities and form of materials possessed and used (flow through) for each area. The response needs to be a comprehensive document, which list sites of use, past buildings located at each site, rooms, and facilities where licensed radioactive materials were used, since the base license was issued on August 20, 1964. The staff reviewed past license amendments issued to your agency and predecessor agencies. Information, not necessarily limited to the above (refer to NUREG 1757 Vol. 1) should be addressed regarding the following past locations:

   a. 1819 Pershing Road, Chicago, Illinois. This location was approved in Condition 10 in the original license and removed in Amendment 10. Describe what close out survey, if any, was completed when this location was released.

   b. Amendment No. 21 issued on December 5, 1995, Condition 10 adds TAT Mobile laboratory located at 203 Sangamon, Chicago, IL and 1701 S. State St., Chicago, IL. These locations were removed from the license in Amendment 27. Verify that only Ni-63 sealed sources listed in the sealed source inventory provided to the NRC in the responses to NRC requests for information provided on January 29, 2008 were used or stored at these locations. If additional sources were ever used in these facilities, provide their leak test results.

   c. Amendment No. 9 issued on January 18, 1979, Condition 10 adds 536 South Clark Street, Chicago, Illinois. As indicated above, a comprehensive historical site assessment of the building including a list of all rooms and locations within the building where C-14 and licensed sealed sources were used. The HSA must address the type of activity performed in each area, quantities and form of materials possessed and used (including disposal activities) for each area. Additionally, verify that the only licensed sealed sources are those listed in the sealed source inventory provided to the NRC in the responses to NRC requests for information provided on January 29, 2008.

   d. Amendment No. 18 issued on August 26, 1992, Condition 10 adds the research vessel, "R.V. Lake Guardian." Provide a comprehensive historical site assessment for the ship including a list of locations on the ship where C-14 was used. The HSA must address the type of activity performed in each area, quantities and form of materials possessed and used (including disposal activities) for each area.

3. Close-out swipe survey report was provided for room 728 in 536 S. Clark St., Chicago, IL.

   a. Provide a list of activities using licensed material from that room.

b. When was C-14 last removed from that room? What date was the actual close out survey and wipes were conducted.

c. Response to additional information provided on October 9, 2008 states efficiency of survey instrument, model STG-ABS44, was found to be 0.42 using a Sr-90 source. However, the survey was looking for C-14, which has a much lower efficiency than Sr-90 with this instrument. Provide updated survey results for the highest location in the room taking C-14/Sr-90 sensitivity differences into account.

d. Explain where the background sample was taken.

4. C-14 close-out report survey provided on August 28, 2008 states total activity of materials that were disposed of since the spring of 1993 is 10.86 mCi. However, the C-14 liquid waste disposal records provided on January 29, 2008 shows 29.65 mCi was disposed since August 1993. Additionally, response to a request of additional information dated January 29, 2008 states1.848 mCi of dry active waste was stored, and 9.482 millicuries of liquid waste was disposed of. Explain the difference.

5. Where is The Guardian currently located? Is there any C-14 currently in storage at the Guardian?

6. Staff review indicates that liquid discharges were conducted to dispose of C-14 at 536 South Clark Street, Chicago, Illinois. The licensee needs to discuss evaluations of potential environmental contamination resulting from all licensed material liquid discharges. The licensee must determine and indicate whether there were any potential for contamination in hold-up tanks, leach or septic fields, sewer lines, or in-house plumbing. Consideration for surveys in suspect or non-impacted areas, which could have had potential for contamination, should also be considered.

7. The licensee license approved a wider range of materials than that inferred in the licensee's current responses. Explain if any additional licensed materials were ever possessed under this license, including those approved by past license amendments, including:

a. H-3 gas chromography foils in 130 millicuries per cell approved in the original license. If material was used, provide the most recent leak test results and disposal records.

b. Byproduct material with Atomic numbers between 3 through 83 in 2 millicuries approved in amendment 7 and reapproved in amendment 23. If any material of this nature was possessed, explain where the sources were used and if the sources were sealed or unsealed. If material was sealed, provide the most recent leak test results.

8. Provide a copy of the ADCO manifest form from your December 26, 2007 shipment of C-14 waste, signed by an appropriate ADCO representative as an "acknowledgement of receipt" for your radioactive waste.

WENT TO COLLEEN

Katie Stein

3/6/09

NRC/RIII/DNMS/MCID

HSA
821 Chestnut Street
Western Springs, IL 60558
708-246-5252 Fax 708-246-5010
srmeyer@comcast.net wsboslett@comcast.net
Health & Safety Associates, Inc.
Industrial Hygiene and Safety Consulting

July 6, 2009

C. Marcom Colvin
SHEM Manager
U.S. Environmental Protection Agency
77 West Jackson Blvd.
Chicago, Illinois 60604

Dear Marc:

At your request, I have reviewed the Nuclear Regulatory Commission (NRC) license, amendments, and associated files and records with respect to the pending termination of the Central Regional Laboratory (CRL) license.

The following provides additional responses to selected questions raised in the NRC informal memorandum dated 3/6/09 (Katie Streit). This response information was developed by a review of records and interviews with USEPA employees.

Response to Questions 1, 2 and 3: Close Out Surveys and Historical Site Assessments.

The following provides a draft Historical Site Assessment and any available information relating to close out surveys for the permitted use and storage locations identified in Table 1 (Attachment A):

A. Central Regional Laboratory, 1819 West Pershing Road, Chicago, Illinois

The original NRC (AEC) License Number 12-10243-1 was issued 08/20/64 to the Department of Health, Education and Welfare, U.S. Public Health Service, Great Lakes-Illinois River Basins Project, located at 1819 West Pershing Road, Chicago, Illinois. The original sources authorized were tritium foils used in gas chromatography detectors. Amendment N° 1 changed the licensee to the U.S. Department of the Interior, Federal Water Pollution Control Agency. Amendment

N° 3 (09/09/69) added Nickel-63 sealed sources (electron capture detectors). Amendment N° 4 changed the licensee to the U.S. Environmental Protection Agency, Illinois District Office, with only Nickel-63 sealed sources authorized.

The first reference to the "Central Regional Laboratory" appears in the application for Amendment N° 5 (03/30/73). All subsequent Amendments through Amendment N° 24 (06/29/99) identify the licensee as the U.S. Environmental Protection Agency, Central Regional Laboratory.

1819 West Pershing Road is one of three six-story buildings that constitute a large warehouse complex which was originally built for the War Department. Later, the complex housed a variety of federal agencies, including what would eventually become the Central Regional Laboratory.

Following departure of the federal agencies, the complex was used for many years as office and warehouse space for the Chicago Board of Education. Currently, 1819 W. Pershing building is being used by the City of Chicago, Department of Streets and Sanitation.

License documents identify three laboratories where sources were used or stored. Sealed Nickel-63 sources (in gas chromatographs) were used in the Organic Chemistry Laboratory (Room 16) and the Radiochemistry Laboratory (Room 14), while unsealed Carbon-14 (for Primary Productivity analyses) was used exclusively in the Biology Branch, Microbiology Laboratory. Presumably, C-14 labeled dissolved inorganic carbon solutions were prepared in this lab, and the liquid scintillation counter was also located there. It is not known if sink disposal of samples occurred in this location.

A recently retired Biology Section employee, whose tenure with EPA dates back to the Pershing Road days, and who was an authorized user under the license, reports that the Microbiology Laboratory was located on "the second floor, North middle" (Pershing Road side) of the 1819 West Pershing building. It is not known if these laboratories remain extant, or if they have been subsequently remodeled for other uses.

There is no evidence in the record of any close out surveys having been performed at this location.

B. "On board ship in waters of the Great Lakes in the states of OH, IL, MI, IN, MN and WI"

Amendment N° 8 (10/21/76), which authorized the use of unsealed Carbon-14 for Primary Productivity analyses, also authorized use on ships. There is no evidence in the record to suggest which ship or ships were intended to be used, nor is there any record of any such use occurring. Likewise, there is no record of any close out surveys having been performed on ships for this time period.

C. Central Regional Laboratory, 536 South Clark Street, Chicago, Illinois

The move of the Central Regional Laboratory from Pershing Road to the present facilities at 536 South Clark Street occurred in November, 1977. The CRL occupies the entire tenth floor, and portions of the seventh floor at 536 South Clark Street, Chicago, Illinois.

Sealed Nickel-63 sources in gas chromatographs were used in several rooms, primarily in the Organics Section, Rooms 1030, 1031, 1032A, 1032B and, more recently, Room 1033 (created by Phase II remodeling in 2003).

Because only sealed sources were involved in these locations, no close out surveys were performed.

All Nickel-63 sealed sources used or stored in these locations were licensed sealed sources which were included in the sealed source inventory which was provided to the NRC with the Marc Colvin response dated January 29, 2008. All sources were leak checked by wipe testing every six months.

The only unsealed source used or stored in the CRL at 536 South Clark Street was Carbon-14 for use in Primary Productivity analyses. Carbon-14 storage and use was confined to Room 1037 (Autoclave Room) and Room 728.

Amendment N° 8 (10/21/76) authorized the use of unsealed Carbon-14 in the CRL (at that time, at the 1819 West Pershing location), while Amendment N° 9 (01/18/79) transferred authorization to the 536 South Clark Street location.

Room 1037 housed the liquid scintillation counter, which was used to analyze Primary Productivity samples being produced on the R/V Roger Simons, and later on the R/V Lake Guardian. Analyzed samples containing low levels of aqueous Carbon-14 were archived in Rooms 1037 and 728.

Primary Productivity analyses were discontinued in the mid-1990's. On September 11, 1996, 77 gallons of Carbon-14 low level aqueous waste (archived samples and unused stock solutions) were disposed of in the sink in Room 1037.

On September 13 and 23, 1996, a close out wipe survey was conducted in Room 1037. Following cleaning and re-sampling of one location, all locations wiped were well below the 200 dpm per 100 square centimeters removable contamination limit as specified by the CRL Radiation Safety Manual (See report dated 10/04/96—Attachment B1). After September 1996, Carbon-14 was no longer used or stored in Room 1037, and the Room was demolished in 2003 as part of the CRL Phase II Remodeling Project.

In 2005, the archived Primary Productivity samples (about 35 gallons) and one ampoule of Carbon-14 labeled sodium bicarbonate solution stored in Room 728

was disposed of down the sink. In 2008, a close out survey was conducted in Room 728. However, the report of that survey has been unacceptable to the NRC for various reasons. Accordingly, Radiation Safety Services, Inc. was subcontracted to perform a close out survey of Room 728 (See report dated 07/02/09—Attachment B2). All locations wiped were well below the 200 dpm per 100 square centimeters removable contamination limit as specified by the CRL Radiation Safety Manual.

D. R/V "The Crockett" on waters of the Great Lakes in the states of OH, IL, MI, IN, MN and WI

Amendment Nº 9 (01/18/79) authorizes the use of unsealed Carbon-14 on board the R/V Crockett. There is no evidence in the record that any such use occurred, nor is there any record of close out surveys having been performed.

E. R/V "The Roger Simon" on waters of the Great Lakes in the states of OH, IL, MI, IN, MN and WI

Amendment Nº 13 (02/27/85) authorizes the use of unsealed Carbon-14 on board the R/V Roger Simon. Use on the Simon was confined to the Biology Lab and a removable container lab (this does not appear to be the same container lab which was later in use on the R/V Lake Guardian). Use in this location was discontinued prior to September, 1992. A Close out survey was performed at this location on or about September 18, 1992 (See report dated 10/08/92—Attachment B3). All wipe results were well below the 200 dpm per 100 square centimeters removable contamination limit as specified by the CRL Radiation Safety Manual.

F. R/V Lake Guardian upon the navigable waters of the Great Lakes

Amendment Nº 18 (08/26/92) authorizes the use of unsealed Carbon-14 on board the R/V Lake Guardian. Use on the Lake Guardian was confined to the Primary Productivity container lab. Activities performed in the Primary Productivity lab included: Storage of stock ampoules of Carbon-14 labeled sodium bicarbonate solution; preparation of Carbon-14 labeled sodium carbonate stock solution; dosing of samples with labeled sodium carbonate solution prior to incubation; filtering of samples after incubation, and; placing of samples and filters in scintillation vials. Any Carbon-14 waste generated by these procedures was brought back to the CRL for storage or disposal.

Primary Productivity analyses were discontinued in the mid-1990's. Radiation Safety Services, Inc. was subcontracted to perform a close out survey of the Primary Productivity container lab (See report dated 07/02/09—Attachment B2). All locations wiped were well below the 200 dpm per 100 square centimeters removable contamination limit as specified by the CRL Radiation Safety Manual.

G. Temporary Job Sites

This location was authorized to permit field use of portable gas chromatographs and x-ray fluorescence spectrometers containing sealed sources. Because only sealed sources were involved in this location, no close out surveys were performed.

All sealed sources used or stored in this location were licensed sealed sources which were included in the sealed source inventory which was provided to the NRC with the Marc Colvin response dated January 29, 2008. All sources were leak checked by wipe testing every six months.

H. TAT Mobile Laboratory

The TAT Mobile Laboratory was a Ford 7000 truck fitted out for use as a mobile laboratory. When not in the field, the mobile laboratory was housed at the TAT warehouse located at 203 Sangamon Street, Chicago, Illinois. At various times, the mobile laboratory housed one or more gas chromatographs with electron capture detectors containing Nickel-63 sealed sources.

Several years ago, the TAT Mobile Laboratory was decommissioned and transferred to the Superfund Division at Grosse Ile, Michigan where it was refitted for use as a mobile command center. Prior to transfer, gas chromatographs containing sealed sources were relocated to other laboratories.

Because only sealed sources were involved in this location, no close out surveys were performed.

All Nickel-63 sealed sources used or stored in this location were licensed sealed sources which were included in the sealed source inventory which was provided to the NRC with the Marc Colvin response dated January 29, 2008. All sources were leak checked by wipe testing every six months.

I. ESAT Mobile Laboratory

The ESAT Mobile Laboratory was also a Ford 7000 truck fitted out for use as a mobile laboratory. When not in the field, the mobile laboratory was originally housed at the ESAT warehouse located at 1701 South State Street, Chicago, Illinois. The laboratory was later stored at one of the other ESAT warehouse facilities located at 5801 North Kimberly Avenue, Chicago, Illinois or 1900 North Austin Boulevard, Oak Park, Illinois. At various times, the mobile laboratory housed one or more gas chromatographs with electron capture detectors containing Nickel-63 sealed sources.

Approximately two years ago, the ESAT Mobile Laboratory was decommissioned, designated as excess property, and transferred to the Argonne

National Laboratory, Lemont, Illinois. Prior to transfer, gas chromatographs containing sealed sources were relocated to other laboratories.

Because only sealed sources were involved in these locations, no close out surveys were performed.

All Nickel-63 sealed sources used or stored in this location were licensed sealed sources which were included in the sealed source inventory which was provided to the NRC with the Marc Colvin response dated January 29, 2008. All sources were leak checked by wipe testing every six months.

Summary of Use and Storage of Unsealed Sources

Although authorized for other radioisotopes, the historical review of documents indicates that Carbon-14 for Primary Productivity analyses was the only unsealed source possessed, stored or used under NRC License Number 12-10243-1.

The following table recaps the locations where unsealed Carbon-14 may have been stored or used:

Location	Room	Close Out Survey
CRL, 1819 W. Pershing	Microbiology Lab	[None]
Ships on the Great Lakes	—	[None]
CRL, 536 S. Clark	1037	Report dated 10/04/96 [Attachment B1]
CRL, 536 S. Clark	728	Report dated 07/02/09 [Attachment B2]
R/V Crockett	—	[None]
R/V Roger Simon	Container Lab; Biology Lab	Report dated 10/08/92 [Attachment B3]
R/V Lake Guardian	Primary Productivity Lab	Report dated 07/02/09 [Attachment B2]

Response to Question 4: Conflicting Responses Regarding Waste Disposal

The amount of liquid disposal stated in the close out report previously submitted to NRC was in error. The "CRL Revised Carbon-14 Master Inventory" memorandum dated 01/16/08, indicates the correct amounts, and agrees with the statements in the January 29, 2008 NRC response.

Response to Question 5: Location of the R/V Lake Guardian.

When not conducting surveys or other activities on the waters of the Great Lakes, the R/V Lake Guardian is located at the Port of Milwaukee, Wisconsin. There is presently no storage of Carbon-14 on the Lake Guardian.

Response to Question 6: Possible Contamination Related to Sink Disposal of Carbon-14.

Sink disposal of low level Carbon-14 aqueous wastes was performed in Rooms 1037 and 728 of the Central Regional Laboratory, 536 South Clark Street, Chicago, Illinois.

All of the drains on the tenth floor of CRL pass through acid neutralization basins which are filled with limestone chips. This arrangement creates a potential for retention of Carbon-14 when disposed of by sink. However, as part of the CRL Phase II Remodeling Project in 2003, the neutralization basin serving the drain from Room 1037 was cleaned-out, refurbished and refilled with fresh limestone chips, and therefore any opportunity of performing close out surveys of this location has been lost.

The drains serving the sink in Room 728 do not pass through acid neutralization basins, and the potential for retention of Carbon-14 waste is low.

Response to Question 7: Additional Licensed Materials.

The Hydrogen-3 foils were authorized by the Base License (08/20/64), and were removed from the license as of Amendment N° 4 (07/27/72), which is also the first amendment showing U.S. EPA as the licensee (the Tritium sources predate EPA involvement). There is no information in the record regarding leak testing and/or disposal of the Tritium sources.

Amendment N° 7 (12/29/75) authorizes possession of any byproduct material with atomic numbers 3 through 83 with an aggregate limit of 2 millicuries. It is my understanding that this authorization was sought to facilitate possible research studies at the CRL. The authorization was removed by Amendment N° 21 (03/12/96). There is no evidence in the record to suggest that any materials were ever possessed or used under this authorization.

Authorization to possess any byproduct material with atomic numbers 3 through 83 with an aggregate limit of 6 millicuries was reinstated by Amendment N° 23 (03/09/99). It is my understanding that this authorization was sought at the Request of the Superfund Division, who from time to time encounter radioactive materials in the course of remediation, removal and emergency removal work. Superfund Division wanted license authorization to temporarily store such materials pending proper disposal. In practice, however, any such materials encountered in removal and remediation work are stored and disposed of under the NRC licenses of the START and ERRS contractors. There is no evidence in the record to suggest that any materials were ever possessed or used under this authorization. The authorization was removed by Amendment N° 27 (09/30/08), in preparation for license termination

Response to Question 8: ADCO Manifest

A copy of the manifest in question showing the "acknowledgement of receipt" signature is provided as Attachment D.

Please contact me if you have any questions.

Sincerely,
HEALTH & SAFETY ASSOCIATES, INC.

Scott R. Meyer, MPH, CIH
President

Attachments

ATTACHMENT A

Table 1:
History of Radioisotope Use and Storage Locations Permitted Under NRC License Number 12-10243-1

ID	Location	Authorized by License	Removed from License	Source Types	Close Out Survey
A	Central Regional Laboratory 1819 W. Pershing Rd. Chicago, IL	Original License; Amendment N° 8 10/21/76 (Carbon-14)	Amendment N° 10 03/01/79	Sealed Sources; Unsealed Carbon-14 (Microbiology Lab)	None
B	"On board ship in waters of the Great Lakes in the states of OH, IL, MI, IN, MN and WI"	Amendment N° 8 10/21/76	Superseded by Amendment N° 9 01/18/79	Unsealed Carbon-14	None
C	Central Regional Laboratory 536 S. Clark St. Chicago, IL	Amendment N° 8 10/21/76	—	Sealed Sources; Unsealed Carbon-14 (Rooms 728 and 1037)	Report Dated 07/02/09 (Room 728); Report Dated 10/04/96 (Room 1037)
D	R/V "The Crockett" on waters of the Great Lakes in the states of OH, IL, MI, IN, MN and WI	Amendment N° 9 01/18/79	Superseded by Amendment N° 13 02/27/85	Unsealed Carbon-14	None
E	R/V "The Roger Simon" on waters of the Great Lakes in the states of OH, IL, MI, IN, MN and WI	Amendment N° 13 02/27/85	Superseded by Amendment N° 19 10/27/92	Unsealed Carbon-14	Report Dated 10/08/92

Table 1, Continued:
History of Radioisotope Use and Storage Locations Permitted Under NRC License Number 12-10243-1

ID	Location	Authorized by License	Removed from License	Source Types	Close Out Survey
F	R/V Lake Guardian upon the navigable waters of the Great Lakes	Amendment N° 18 08/26/92	—	Unsealed Carbon-14 (Primary Productivity Container Lab)	Report Dated 07/02/09
G	Temporary Job Sites	Amendment N° 20 12/21/94	—	Sealed Sources Only	None
H	TAT Mobile Laboratory	Amendment N° 21 03/12/96	Amendment N° 27 09/30/08	Sealed Sources Only	None
I	ESAT Mobile Laboratory	Amendment N° 21 03/12/96	Amendment N° 27 09/30/08	Sealed Sources Only	None

ATTACHMENT B 1

RADIATION (CARBON-14) WIPE SAMPLING

Conducted on September 13 and 23, 1996

at

CENTRAL REGIONAL LABORATORY
536 South Clark Street
Chicago, Illinois

for

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 West Jackson
Chicago, Illinois 60604

prepared by:

UNITED STATES PUBLIC HEALTH SERVICE
Division of Federal Occupational Health
Region V
105 West Adams
Chicago, Illinois 60603

October 4, 1996

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APPENDIX

EXECUTIVE SUMMARY

At the request of the United States Environmental Protection Agency (EPA), the United States Public Health Service (PHS), Division of the Federal Occupational Health (DFOH), Region V, conducted radiation wipe sampling at the Central Regional Laboratory (CRL), located at 536 South Clark Street, Chicago, Illinois on September 13 and 23, 1996. Radiation sampling was commissioned as part of a mandatory program requirement to maintain the proper license furnished by the United States Nuclear Regulatory Commission (NRC). According to the NRC license requirements, the discharge point after disposal of Carbon-14 waste must be decontaminated to less than 200 disintegrations per minute (dpm).

FINDINGS

The results of wipe samples obtained on September 13, 1996 indicate that all surfaces, with the exception of the sink basin, had removable Carbon-14 (C-14) contamination less than the NRC licensing requirement of 200 dpm. As a result of these findings, it was recommended that the sink basin be thoroughly cleaned and re-sampled.

The sink basin was re-sampled on September 23, 1996. The wipe sample result indicated removable C-14 contamination less than the NRC licensing requirement of 200 dpm.

These results indicate that the discharge point and adjacent surfaces in Room 1037 of the CRL are decontaminated to less than the NRC licensing requirement of 200 dpm. Room 1037 can be released for unrestricted access.

RECOMMENDATIONS

No recommendations can be made at this time.

I. INTRODUCTION

The United States Public Health Service (PHS), Division of Federal Occupational Health (DFOH), Region V, conducted radiation wipe sampling for the United States Environmental Protection Agency's (EPA) at the Central Regional Laboratory (CRL) located at 536 South Clark Street, Chicago, Illinois. This survey was requested by Mr. James Finn, Safety Manager for the U.S. EPA, Region 5. Mr. Alan Crnich, industrial hygienist representing the DFOH, conducted the radiation wipe sampling on September 13 and 23, 1996 under the supervision of Mr. Phillip G. Pekron CIH, CSP.

II. BACKGROUND

There were 77 gallons of Carbon 14 low level aqueous waste disposed of via the sink in Room 1037 of the CRL on September 11, 1996. The total activity for the 77 gallons of waste was 2.66 millicuries. Access to Room 1037 has been restricted until all radiation wipe sample results indicate removable Carbon 14 (C-14) contamination less than 200 disintegrations per minute (dpm).

The safety and health concern is the possibility of laboratory personnel at the CRL being exposed to elevated levels of C-14 when working in Room 1037 near the discharge point.

III. EVALUATION METHODS

Due to safety and health concerns, the EPA requested the DFOH conduct radiation wipe sampling. Wipe sampling kits, provided by the National Leak Test Center (NLTC), were used to obtain dry wipe samples from the discharge point; the sink basin and drain. Additionally, adjacent surfaces were also sampled which include the splash board, faucet handles, counter top and floor. All wipe samples were submitted to the NLTC, P.O. Box 1480, North Tonawanda, NY, to be analyzed for alpha/beta contamination using a windowless proportional counter.

IV. BRIEF SUMMARY OF STANDARDS/CRITERIA

According to the Nuclear Regulatory Commission (NRC) license requirements, the discharge point after disposal of C-14 waste must be decontaminated to less than 200 dpm. Also, it should be noted that a Chicago Metropolitan Sewer Ordinance allows the CRL to dispose a total of one curie of C-14 per year.

V. RESULTS AND CONCLUSIONS

The following summarizes the radiation wipe sampling performed on September 13, 1996:

Sample Number	Test Location	Result (dpm)
1	Faucet Handles	<31.1
2	Sink Basin	492.8
3	Sink Drain	91.0
4	Splash Board	53.3
5	Counter Top	<31.1
6	Floor	<31.1

C-14 wipe sample results indicate that all surfaces, with the exception of the sink basin, had removable contamination less than the NRC licensing requirement of 200 dpm. As a result of these findings, it was recommended that the sink basin be thoroughly cleaned and re-sampled.

The sink basin was re-sampled on September 23, 1996. The wipe sample result indicated <33.0 dpm of removable C-14 contamination which is less than the NRC licensing requirement of 200 dpm. Results are attached as an Appendix.

The results indicate that the discharge point and adjacent surfaces in Room 1037 of the CRL are decontaminated to less than the NRC licensing requirement of 200 dpm. Room 1037 can be released for unrestricted access.

VI. RECOMMENDATIONS

No recommendations can be made at this time.

APPENDIX

Laboratory Results

NATIONAL LEAK TEST CENTER

NLTC Industries, Inc.
P.O. Box 1480, N. Tonawanda, NY 14120
Phone 716-693-0550 TIN 16-1234141

DATE: 9/18/96

INVOICE NO. 18930

CUSTOMER NUMBER: 11452

PURCHASE ORDER: 3010 Job# 960913

SHIP TO:
MR ALAN CRNICH

KETER ENVIRONMENTAL
17201 WESTVIEW
SOUTH HOLLAND IL 60473

BILL TO:
ACCTS PAYABLE

KETER ENVIRONMENTAL
17201 WESTVIEW
SOUTH HOLLAND IL 60473

* * WIPE SURVEY * *

NUMBER OF SAMPLES: 6

TEST METHOD: DRY WIPE

RADIONUCLIDE AS IDENTIFIED BY CUSTOMER IS CARBON-14

ANALYSED FOR BETA CONTAMINATION USING WINDOWLESS PROPORTIONAL COUNTER

SAMPLES TAKEN BY CUSTOMER

ANALYSED BY L KEATING

* * TEST RESULTS * *

DEVICE I D	SAMPLE I D	MICROCURIES/SAMPLE	PASS/FAIL
Fuacet Handles	Sample #1	< 14 x 10E-6	PASS
Sink Basin	Sample #1	222 x 10E-6	PASS
Sink Drain	Sample #1	41 x 10E-6	PASS
Splash Board	Sample #1	24 x 10E-6	PASS
Counter Top	Sample #1	< 14 x 10E-6	PASS
Floor	Sample #1	< 14 x 10E-6	PASS

LIMIT IS 5000 x 10E-6 MICROCURIES PER DEVICE

TESTED UNDER NYS DOL LICENSE #2323-3164

DATE: 9/18/96

SIGNED BY _____
HEALTH PHYSICIST

TOTAL P.01

NATIONAL LEAK TEST CENTER

NLTC Industries, Inc.
P.O. Box 1480, N. Tonawanda, NY 14120
Phone 716-693-0550 TIN 16-1234141

INVOICE NO. 18975

DATE: 9/30/96

PURCHASE ORDER: SAMPLES REC'D 9/27/96

CUSTOMER NUMBER: 11452

SHIP TO:
MR ALAN CRNICH

KETER ENVIRONMENTAL
8270 ARCHER AVE
WILLOW SPRINGS IL 60480

BILL TO:
ACCTS PAYABLE

KETER ENVIRONMENTAL
8270 ARCHER AVE
WILLOW SPRINGS IL 60480

* * WIPE SURVEY * *

NUMBER OF SAMPLES: 1

TEST METHOD: DRY WIPE

RADIONUCLIDE AS IDENTIFIED BY CUSTOMER IS UNKNOWN

ANALYSED FOR ALPHA/BETA CONTAMINATION USING WINDOWLESS PROPORTIONAL COUNTER

SAMPLES TAKEN BY CUSTOMER

ANALYSED BY L KEATING

* * TEST RESULTS * *

DEVICE I D	SAMPLE I D	MICROCURIES/SAMPLE	PASS/FAIL
Sink basin	Sample #1	< 15 x 10E-6	PASS

LIMIT IS 5000 x 10E-6 MICROCURIES PER DEVICE

TESTED UNDER NYS DOL LICENSE #2323-3164

DATE: 9/30/96

SIGNED BY Larry Keating
HEALTH PHYSICIST

ATTACHMENT B2

SURVEY ACTIVITIES
IN
THE RESEARCH VESSEL LAKE GUARDIAN LABORATORY
AND
IN ROOM 728 AND THE STORAGE ROOM
AT
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS

PERFORMED FOR

HEALTH AND SAFETY ASSOCIATES, INC.
WESTERN SPRINGS, ILLINOIS

BY

RSSI
6312 W. OAKTON STREET
MORTON GROVE, ILLINOIS

JULY 2, 2009

INTRODUCTION

United State Environmental Protection Agency (USEPA) used small quantities of Carbon-14 (C-14) for research purposes in laboratories on the research vessel (R.V.) Lake Guardian and at 536 South Clark Street in Chicago, Illinois. This material was used under the authorization of a license issued by the United States Nuclear Regulatory Commission (NRC). USEPA reported that routine and close out surveys had previously been performed in the laboratory on the R.V. Lake Guardian, and in room 728 at 536 South Clark Street, Chicago, Illinois. Surveys were performed to determine if the laboratory on the R.V. Lake Guardian, and the room 728 and a storage room at 536 South Clark Street in Chicago, Illinois, could be released for unrestricted use and the USEPA's NRC radioactive material license could be terminated.

The NRC has published several guidance documents containing release limits for C-14. This guidance is in NUREG 1757 Vol 1, rev 2, Appendices A and B of NUREG 1757 Vol 2, and Regulatory Guide (RG) 1.86. The lowest limit for removable activity for C-14, 1,000 dpm per 100 square centimeters (dpm/100 cm^2) is in RG 1.86.

METHODOLOGY

Instrumentation

Accessible surfaces were surveyed for total surface contamination using a Ludlum model 3(Model 3) with a Ludlum model 44-9 pancake probe (44-9). The model 3 is a general purpose portable survey instrument. The 44-9 is sensitive to charged particle radiation, such as alpha and beta radiation, and has limited sensitivity to photons.

Removable activity was measured by wiping approximately 100 cm^2 areas with wipe collection media that were counted in a Nuclear Chicago Model 1152 (Model 1152) gas flow internal proportional planchette counter.

The Model 1152 counting system has a PC controlled sample changer. Anti-coincidence and graded shielding minimize background. The Model 1152 has alpha and beta/gamma

discrimination and measures alpha emitting radionuclides and beta emitting radionuclides separately.
Calibration certificates for the model 3 and the model 1152 are in Appendix B.

The laboratory in the R.V. Lake Guardian

On May 28, 2009, RSSI surveyed the laboratory in the R.V. Lake Guardian where it was docked in Milwaukee, Wisconsin. The Model 3 with a 44-9 was used to detect and quantify C-14 beta particles emitted from contamination that may have been present on accessible surfaces. Surfaces were surveyed with the 44-9 moving at a rate of approximately 0.2 meters per second (m/s). Instrument background for the Ludlum model 3 with the 44-9 was 50 counts per minutes (cpm). After the instrument surveys, wipes were collected from accessible surfaces including drains to determine if removable contamination was present.

536 South Clark Street, Chicago, Illinois

On June 1, 2009, RSSI surveyed the liquid waste disposal sink in room 728 and a shelf unit in a storage room where wastes were stored prior to shipping. Surface contamination was measured using a Ludlum 3 with the 44-9, and wipes were collected to determine if removable contamination was present.

RESULTS

The R.V. Lake Guardian laboratory

No activity was detected above the background in the laboratory on the R.V. Lake Guardian by direct measurement using the Ludlum 3 with a 44-9. With one exception, no removable activity above minimum detectable activity (MDA), 16.4 dpm/100 cm^2 for C-14, was detected on wipes samples collected in the laboratory. One wipe from a cabinet identified as survey location 13 in Appendix A was 27 dpm/100 cm^2. This removable activity is below the NRC's limit in RG 1.86, 1,000 dpm/100 cm^2. The survey and surface wipe count results are in Appendix A.

536 South Clark Street, Chicago, IL

No activity was detected above the background at 536 South Clark Street, Chicago, Illinois, by direct measurement using the Ludlum 3 with a 44-9. No removable activity above MDA, 16.4

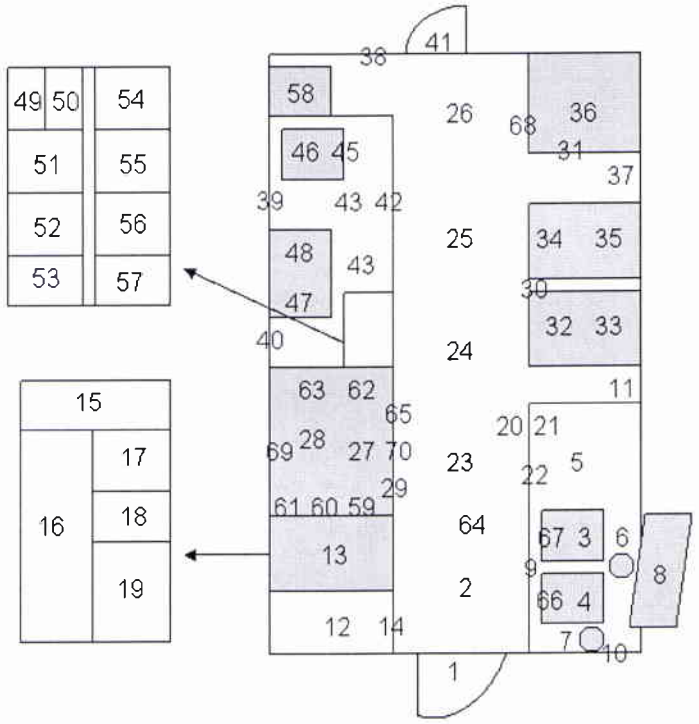
dpm/100 cm^2 for C-14, was detected on wipe samples collected in the liquid waste disposal sink in room 728 or on the shelf unit in the storage room at 536 South Clark Street.

CONCLUSION

The USEPA reported that only C-14 was used in these areas. The highest removable activity, 27 dpm/100 cm^2, was found on a storage shelf in the R.V. Lake Guardian laboratory. The contamination is below the NRC's contamination limits in RG 1.86. No activity above the MDA, 16.4 dpm/100 cm^2, was detected in the liquid waste disposal sink in room 728 or on the shelf unit in the storage room at 536 South Clark Street.

APPENDIX A

Removable activity results



Survey Locations

Lake Guardian lab survey

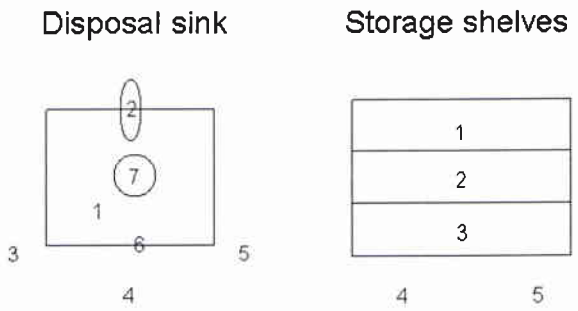
Survey Instrument: Ludlum 3 (S/N 114040) with a 44-9 probe
Counting Instrument: Nuclear Chicago Planchette Counter, Model 1152, S/N 28458
C-14 efficiency: 0.21 (21%)
Background: 3.8 counts per minutes (cpm)

Survey Location	Direct reading (cpm)	Gross counts (C/5min)	Net counts (C/5min)	Removable activity (dpm/100 cm^2)
1. Door	50	32	13	< MDA*
2. Floor	50	26	7	< MDA
3. Left sink	50	30	11	< MDA
4. Right sink	50	21	< bkgd*	< MDA
5. Right bench	50	22	< bkgd	< MDA
6. Faucet	50	19	< bkgd	< MDA
7. Eye wash station	50	26	7	< MDA
8. Drying rack	50	27	8	< MDA
9. Under the sinks	50	18	< bkgd	< MDA

10. Fire control box	50	22	< bkgd	< MDA
11. Wall above the "5" bench	50	23	4	< MDA
12. Left front bench	50	24	5	< MDA
13. Cabinet	50	29	10	< MDA
14. Under the "12" bench	50	18	< bkgd	< MDA
15. Inside the "13" cabinet	50	33	14	< MDA
16. Inside the "13" cabinet	50	25	6	< MDA
17. Inside the "13" cabinet	50	22	< bkgd	< MDA
18. Inside the "13" cabinet	50	47	28	27
19. Inside the "13" cabinet	50	19	< bkgd	< MDA
20. Gas tanks	50	24	5	< MDA
21. Under the "5" bench	50	27	8	< MDA
22. "5" bench drawer	50	24	5	< MDA
23. Floor	50	26	7	< MDA
24. Floor	50	22	< bkgd	< MDA
25. Floor	50	23	4	< MDA
26. Floor	50	26	7	< MDA
27. Hood	50	14	< bkgd	< MDA
28. Inside the hood	50	33	14	< MDA
29. Under the hood	50	26	7	< MDA
30. Under incubators	50	18	< bkgd	< MDA
31. Under a ventilation system	50	20	< bkgd	< MDA
32. Right incubator	50	28	9	< MDA
33. Inside the right incubator	50	17	< bkgd	< MDA
34. Left incubator	50	20	< bkgd	< MDA
35. Inside the left incubator	50	28	9	< MDA
36. Ventilation System	50	21	< bkgd	< MDA
37. Wall between the ventilation system and incubators	50	20	< bkgd	< MDA
38. Wall next to emergency exit door	50	23	4	< MDA
39. Wall on the right of the overhead cabinet	50	26	7	< MDA
40. Wall on the left of the overhead cabinet	50	21	< bkgd	< MDA
41. Emergency exit	50	33	14	< MDA

42. Bench	50	20	< bkgd	< MDA
43. Bench	50	17	< bkgd	< MDA
44. Under the "45" bench	50	16	< bkgd	< MDA
45. Refrigerator	50	27	8	< MDA
46. Inside the refrigerator	50	24	5	< MDA
47. Overhead cabinet	50	22	< bkgd	< MDA
48. Inside the overhead cabinet	50	26	7	< MDA
49. A drawer on the "44" bench	50	34	15	< MDA
50. A drawer on the "44" bench	50	17	< bkgd	< MDA
51. A drawer on the "44" bench	50	31	12	< MDA
52. A drawer on the "44" bench	50	29	10	< MDA
53. A drawer on the "44" bench	50	26	7	< MDA
54. A drawer on the "44" bench	50	29	10	< MDA
55. A drawer on the "44" bench	50	17	< bkgd	< MDA
56. A drawer on the "44" bench	50	29	10	< MDA
57. A drawer on the "44" bench	50	17	< bkgd	< MDA
58. Electrical box	50	22	< bkgd	< MDA
59. Air chute in the hood	50	26	7	< MDA
60. Nitrogen chute in the hood	50	23	4	< MDA
61. Vacuum chute in the hood	50	30	11	< MDA
62. A chute on the left in the hood	50	34	15	< MDA
63. Cold water chute on the right in the hood	50	16	< bkgd	< MDA
64. Air vent on the ceiling	50	22	< bkgd	< MDA
65. Air vent on the ceiling above the hood	50	29	10	< MDA
66. Right sink drain	50	21	< bkgd	< MDA
67. Left sink drain	50	24	5	< MDA
68. Air vent on the ventilation system	50	23	4	< MDA
69. Vent in the hood	50	23	4	< MDA
70. Vent above the sash on the hood	50	10	< bkgd	< MDA

* bkgd: Background
* MDA: Minimum Detectable Activity



Survey Locations

1. Disposal Sink

Survey Location	Direct reading (cpm)	Gross counts (C/5min)	Net counts (C/5min)	Removable activity (dpm/100 cm^2)
1. Sink	50	26	7	< MDA
2. Faucet	50	33	14	< MDA
3. Floor	50	33	14	< MDA
4. Floor	50	31	12	< MDA
5. Floor	50	30	11	< MDA
6. Under the sink	50	25	6	< MDA
7. Sink drain	50	28	9	< MDA

2. Storage shelves

Survey Location	Direct reading (cpm)	Gross counts (C/5min)	Net counts (C/5min)	Removable activity (dpm/100 cm^2)
1. Top shelf	50	24	5	< MDA
2. Middle shelf	50	24	5	< MDA
3. Bottom shelf	50	32	13	< MDA
4. Floor	50	27	8	< MDA
5. Floor	50	31	12	< MDA

APPENDIX B

Calibration Information

RSSI

CERTIFICATE OF CALIBRATION

6312 West Oakton Street
Morton Grove, IL 60053-2723
Telephone: 847-965-1999
Fax: 847-965-1991
www.rssi.us

Certificate No. 044590

RSSI
Attention: Eli A. Port, Rso
6312 West Oakton Street
Morton Grove, IL 60053-2723

Manufacturer: LUDLUM
Model: 3
Serial No.: 114040
Probe(s): Eberline HP-270
Ludlum 44-9, Sn: PR023205

CALIBRATION DATA

SOURCE*	SCALE	FIELD (mR/hr)	READING (mR/hr)	FIELD (mR/hr)	READING (mR/hr)
5	x0.1	0.05	0.05	0.15	0.15
5	x1	0.5	0.5	1.5	1.5
2	x10	5.0	5.0	15	15
1	x100	50	51	150	150

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Ludlum 44-9 Efficiencies: α; 0.11 c/α (Pu-239) β; 0.14 c/β (Tc-99)

Check Source: Ba-133 **Reading:** 0.6 mR/hr **Probe Window:** closed

Temperature: 24.5 °C **Relative Humidity:** 51 % **Barometric Pressure:** 992 mbar

Comments: The x0.1, x1 scales were electronically referenced to the x10 scale at 1 mR/hr = 1327 cpm.

Calibrated by: Timothy Hall **Date:** 8/27/08

Calibration Frequency: Annual **Recalibrate by:** 8/27/09

***SOURCE**	**1. Cs-137**	**2. Cs-137**	**3. Am-241**	**4. Cf-252**	**5. Electronic**	**6. Other**
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham		
Model	CCs-D-20E	64-764	AMC 13446	100		
Serial Number		722	7510 LA	FTC-CF-001		
Activity	11.5 Ci	100 mCi	100 mCi	1801 µg		
Date	1/1994	5/2/78	6/3/84	10/8/85		

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.
Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

PREVENTIVE MAINTENANCE PERFORMED

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	902 VOLTS
SENSITIVITY MEASURED	✓	34 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

Lab Reference: 93

MINIMUM DETECTABLE ACTIVITIES (MDA)
FOR NUCLEAR CHICAGO MODEL 1152 COUNTING SYSTEM

Alpha BKG:	0.96	cpm	B/G BKG:	3.80	cpm	
Sample Count Time:		5	minutes			
Lc (A):	0.57	cpm (net)	Ld (A):	2.01	cpm (net)	
Lc (B/G):	1.13	cpm (net)	Ld (B/G):	3.45	cpm (net)	
Gross alpha counts to exceed Lc:		7.7	gross counts			
Gross beta counts to exceed Lc:		25	gross counts			
Gross alpha counts to exceed Ld:		14.9	gross counts			
Gross beta counts to exceed Ld:		36.2	gross counts			

Reference nuclide	Nuclides	Decay Mode	Energy (MeV)	Intensity	Efficiency (cpm/uCi)	Efficiency (cpm/dpm)	MDA (uCi)
Pu-239	Am-241	A	5.478	1.000	966955	0.4356	2.1E-06
	Ba-133	IT	see effic2001. xls		152626	0.0688	2.3E-05
	C-14	B	1.161	1.000	463638	0.2088	7.4E-06
	Cd-109	EC	see effic2001. xls		279145	0.1257	1.2E-05
	Ce-139	EC	see effic2001. xls		95189	0.0429	3.6E-05
Pu-239	Cf-252	A, SF	6.100	0.970	937946	0.4225	2.1E-06
	Cl-36	B	0.710	0.990	1230380	0.5542	2.8E-06
Pu-239	Cm-244	A	5.800	1.000	966955	0.4356	2.1E-06
	Co-57	EC	see effic2001. xls		17877	0.0081	1.9E-04
	Co-60	B	0.318	1.000	840213	0.3785	4.1E-06
	Cs-137	B,B	0.512	1.000	945948	0.4261	3.6E-06
	Eu-152	B	see effic2001. xls		328493	0.1480	1.0E-05
	Fe-55	EC	0.005	0.61	193327	0.0871	1.8E-05
	H-3	B	0.0186	1.000	266991	0.1203	1.3E-05
	Hg-203	B	0.212	1.000	750420	0.3380	4.6E-06
	Ho-166m	B	see effic2001. xls		594480	0.2678	5.8E-06
	I-125	B	see effic2001. xls		38859	0.0175	8.9E-05
	I-131	B	see effic2001. xls		1293945	0.5829	2.7E-06
	Ir-192	B	see effic2001. xls		1293356	0.5826	2.7E-06
	Kr-85	B	0.687	0.996	1011477	0.4556	3.4E-06
	Na-22	B+	0.546	0.898	960226	0.4325	3.6E-06
	Ni-63	B	0.066	1.000	490444	0.2209	7.0E-06
	Pb-210	B	1.161	0.920	923473	0.4160	3.7E-06
	Pm-147	B	0.225	1.000	638036	0.2874	5.4E-06
Pu-239	Po-210	A	5.305	1.000	966955	0.4356	2.1E-06
Pu-239	Pu-238	A	5.500	1.000	966955	0.4356	2.1E-06
Pu-239	Pu-239	A	5.148	1.000	966955	0.4356	2.1E-06
Pu-239	Ra-226	A	4.800	1.000	966955	0.4356	2.1E-06
	Sn-113	EC	0.020	0.128	11376	0.0051	3.0E-04
	Sn-119m	IT	see effic2001. xls		247035	0.1113	1.4E-05
	Sr-85	EC	0.011	0.291	12906	0.0058	2.7E-04
	Sr-90	B	1.415	2.000	2295846	1.0342	1.5E-06
	Tc-99	B	0.294	1.000	1032844	0.4652	3.3E-06
Pu-239	Th-230	A	4.677	1.000	966955	0.4356	2.1E-06
	Y-88	B+	0.755	0.002	1032381	0.4650	3.3E-06

ATTACHMENT 83

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

OCT 8 1992

REPLY TO THE ATTENTION OF:

United States
Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

ATTN: Peter J. Lee, Ph.D.
Materials Licensing Section

Dear Dr. Lee,

Enclosed are the close-out survey results for the R/V Roger Simons in accordance NRC License No. 12-10243-01 and with your request dated August 26, 1992.

The following information has been provided for your review:

a. A diagram of the R/V Roger Simons with wipe tests keyed to specific locations: See Attached.

b. Name of the person performing the survey: Paul Ronczkowski, U. S. Public Health Representative, Region 5.

c. The date the survey was performed: September 11, 1992.

d. The instrument (s) used for exposure rate measurements and for analysis of the wipes: Windowless Proportional Counter.

e. Background readings: 32.4 CPM.

f. The date the survey instrument was last calibrated: 9/21/92.

Please note the sampling locations that are indicated on the attached diagram. All wipe samples were taken at areas where Carbon-14 was actively handled on the R/V Roger Simons.

Please provide written notification that the close-out of the R/V Roger Simons has been conducted accordance with your specifications and has been approved.

If you have any questions or require additional information, please contact me at (312) 353-9604.

Sincerely,

James H. Adams, Jr.

James H. Adams, Jr.
CRL Radiation Safety Officer

Enclosure

NATIONAL LEAK TEST CENTER

NLTC Industries, Inc.
P.O. Box 486, N. Tonawanda, NY 14120
Phone 716-693-0550 TIN 16-1234141

DATE: 9/20/92

INVOICE NO. 11568

CUSTOMER NUMBER: 11452

PURCHASE ORDER: Samples rec'd 9/18/9

SHIP TO:
MR. ALAN CRNICH

KETER ENVIRONMENTAL
17201 WESTVIEW
SOUTH HOLLAND, IL 60473

BILL TO:
ACCTS PAYABLE

KETER ENVIRONMENTAL
17201 WESTVIEW
SOUTH HOLLAND, IL 60473

---

* * WIPE TEST CERTIFICATE * *

NUMBER OF SAMPLES: 15

TEST METHOD: DRY WIPE

RADIONUCLIDE AS IDENTIFIED BY CUSTOMER IS CARBON-14

ANALYSED FOR BETA CONTAMINATION USING WINDOWLESS PROPORTIONAL COUNTER

SAMPLES TAKEN BY CUSTOMER

ANALYSED BY L KEATING

* * TEST RESULTS * *

DEVICE I D	SAMPLE I D	MICROCURIES/SAMPLE	PASS/FAIL
Sink Drain	RS-01	< 13 x 10E-6	PASS
Counter Top	RS-02	< 13 x 10E-6	PASS
Flr under removed inc.	RS-03	< 13 x 10E-6	PASS
Flr under removed inc.	RS-04	< 13 x 10E-6	PASS
Counter Top	RS-05	< 13 x 10E-6	PASS
Sink Drain	RS-06	< 13 x 10E-6	PASS
Fume Hood	RS-07	< 13 x 10E-6	PASS
Floor Drain	RS-08	< 13 x 10E-6	PASS
Cab. under Sink Drain	RS-09	17 x 10E-6	PASS

LIMIT IS 5000 x 10E-6 MICROCURIES PER DEVICE

TESTED UNDER NYS DOL LICENSE #2323-3164

DATE: 9/20/92

SIGNED BY

HEALTH PHYSICIST

CONTINUATION OF PO Samples rec'd 9/18/92 CONTINUATION OF INV NO. 11568

* * TEST RESULTS * *

DEVICE I D	SAMPLE I D	MICROCURIES/SAMPLE	PASS/FAIL
Cab. under Sink Drain	RS-10	< 13 x 10E-6	PASS
Deck under cont. lab	RS-11	< 13 x 10E-6	PASS
Sink Drain	RS-12	< 13 x 10E-6	PASS
Cabinet under sink	RS-13	< 13 x 10E-6	PASS
Counter Top	RS-14	< 13 x 10E-6	PASS
Floor	RS-15	< 13 x 10E-6	PASS

CALIBRATED 9/21/92

BETA BKGD = 32.4 CPM

LIMIT IS 5000 x 10E-6 MICROCURIES PER DEVICE

TESTED UNDER NYS DOL LICENSE #2323-3164

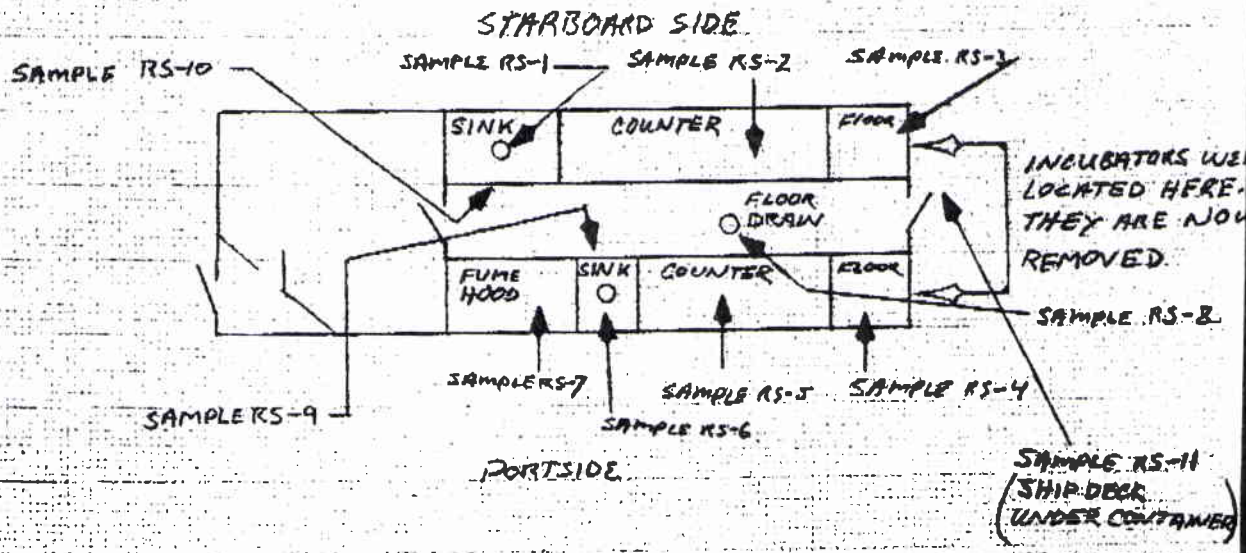
DATE: 9/20/92

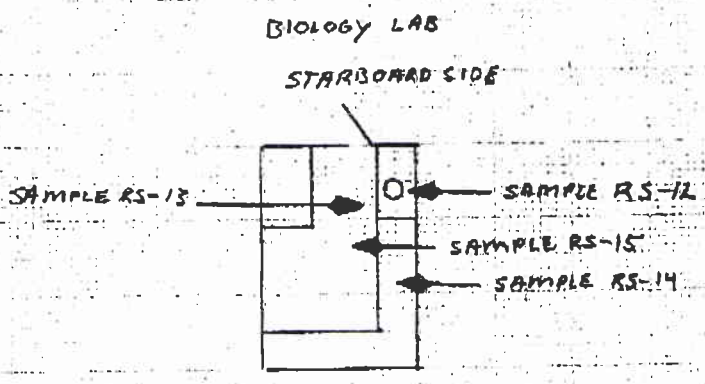
SIGNED BY _____ HEALTH PHYSICIST

KETER
ENVIRONMENTAL CONSULTANTS

SURVEY: Radiation WIPE SAMPLES FOR ROGER S. SIMONS DONE Sept. 11, 19

CONTAINER LAB, ROGER S. SIMONS





ATTACHMENT C

MEMORANDUM

To: Marc Colvin
Region 5 Safety & Health

From: Karen Fugate
Industrial Hygienist

Subject:: CRL Revised Carbon-14 Master Inventory

Date: January 16, 2008

On January 16, 2008, the CRL Carbon-14 (C-14) Master Inventory File report was updated and revised as required. All C-14 procured since the Spring 1992 GLNPO surveys has been accounted for and has been properly managed. Attached for your review and files is a copy of the report.

It should be noted that CRL's NRC license specifies that CRL may not exceed a total inventory of 30 mCi at any one time. CRL is currently managing a total of 0.0 mCi of dry waste. All dry waste was transferred to a Broker for Treatment and/or Disposal on December 26, 2007.

If there are any questions or comments, please contact me.

Attachment

cc: Michelle Stemmons
John Glover
HSA files

CRL C-14 MASTER INVENTORY

DATE OF INVENTORY: January 16, 2008

INVENTORY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael D. Murphy

I. C-14 Currently Stored at CRL (there is no C-14 stored on the R/V Lake Guardian)

C-14 Unused Vials at CRL - none

Primary Productivity Samples - none

Dry Active Waste - none

Liquid Waste – none

Standards - none

Total Activity of C-14 in Storage at CRL is none

II. C-14 Tracking Since Spring 1992

1. Activity of C-14 Procured to date since Spring 1992 is **32.0 mCi**.

2. Activity of C-14 (unused vials) in storage this date is **none.** Activity of C-14 (unused vials) disposed to date is **1.0 mCi.**

3. Activity of Dry Active Waste Disposed to date since Spring (April) 1992 is **2.348 mCi**.

4. Activity of Dry Active Waste in storage this date at CRL is **none**.

5. Activity of Liquid C-14 Waste disposed to date since Spring 1992 is **17.73 mCi.**

   Note: 2.68 mCi disposed August 1993, 3.62 mCi disposed April 1994, 5.0 mCi disposed November 1994, 3.18 mCi disposed May 1996, 2.66 mCi disposed September 1996 and 0.59 disposed June 2005 for a total of 17.73 mCi.

6. Activity of Liquid C-14 Waste in storage this date at CRL is **none**.

7. Activity of Primary Productivity Samples in Storage this date at CRL is **none**.

8. Activity of Primary Productivity Samples Disposed to date that were generated since Spring 1992 is **10.92 mCi**.

III. CRL C-14 Balanced Inventory Tracking Formula

1 = 2 + 3 + 4 + 5 + 6 + 7 + 8 (taken from 1-8 above in Part II)

IV. CRL C-14 Balanced Inventory Tracking Formula Calculation

32 = 1.0 + 2.348 + 0 + 17.73 + 0.0 + 0.0 + 10.92

Result: 32 mCi Procured (Since Spring 1992) = 32 mCi Accounted

INVENTORY OF PRIMARY PRODUCTIVITY SAMPLES CONTAINING C-14

DATE OF INVENTORY: January 16, 2008

INVENTORY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael D. Murphy

There are no Primary Production Samples (PPS) in storage in CRL Room 1045.

Total Activity of C-14 PPS in storage at CRL is none.

INVENTORY OF C-14 IN ORIGINAL CONTAINERS (UNUSED)

An inspection of the C-14 storage areas (Shipping/Receiving Room and Room 1045) was conducted on January 16, 2008. No vials were found in the Receiving Room. No vials were found in Room 1045.

DATE OF INVENTORY: January 16, 2008

INVENTORY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael D. Murphy

QUANTITY OF C-14 RECEIVED AT CRL SINCE SPRING 1992

Based on previous shipping and receiving records, previous inventory surveys, and documentation provided by GLNPO contract personnel, the following quantities of C-14 have been ordered since Spring 1992:

1. Spring 1992 - 5.0 mCi/ml
2. Summer 1992 - 0.0 mCi/ml
3. Spring 1993 - 5.0 mCi/ml
4. Summer 1993 - 2.0 mCi/ml
5. Spring 1994 - 1.0 mCi/ml
6. Summer 1994 - 6.0 mCi/ml
7. Spring 1995 - 9.0 mCi/ml
8. Spring 1996 - 2.0 mCi/ml
9. Summer 1996 - 2.0 mCi/ml

The total activity of C-14 received at CRL since Spring 1992 is 32.0 mCi./ml.

DATE OF INVENTORY: January 16, 2008

INVENTORY SURVEY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael S. Murphy

C-14 PROCUREMENT INVENTORY (as of 06/14/05)

DATE/SURVEY	LOCATION	IN STOCK C-14 AMPOULES	RECEIVED (LOT #)	TOTAL	COMMENTS
Post Summer Survey 1992	CRL	2	0	2	
Post Summer Survey 1992	Guardian	0	0	0	
March 2, 1993	CRL	2	5(2777-126)	7	
March 22, 1993	CRL	7	0	3	transported 4 amps to Guardian for Spring 1993 Survey
March 22. 1993	Guardian	0	0	4	
April 27, 1993	CRL	3	0	3	
April 27, 1993	Guardian	4	0	2	used 2 amps for Spring 1993 Survey
July 29, 1993	CRL	3	0	3	
July 29, 1993	Guardian	2	2(2056-094)	4	
August 30, 1993	Guardian	4	0	2	used 2 amps for Summer 1993 Survey
Post Summer Survey 1993	Guardian	2	0	0	transported 2 ampls to CRL
Post Summer Survey 1993	CRL	3	0	5	
February 1994	CRL	5	0	4	used 1 am p for method development
March 23, 1994	CRL	4	1(2777-253)	5	transported 5 amps to Guardian for April 1994 Survey
April 1994 Survey	Guardian	0	0	5	
April 1994 Survey	CRL	0	0	0	
Post April 1994	Guardian	5	0	3	used 2 amps for April 1994

Survey					Survey
June 1994 Survey	Guardian	3	0	2	used 1 amp for June 1994 Survey
July 18, 1994	Guardian	2	6(3105-002)	8	
August 1994 Survey	Guardian	8	0	5	used 3 amps for August 1994 Survey
October 1994 Survey	Guardian	5	0	3	used 2 amps for October 1994 Survey
January 1995 Survey	Guardian	3	0	2	used 1 amp for January 1995 Survey
February 28, 1995	CRL	0	9(3136-111)	9	will transport 9 amps to Guardian
March 20, 1995	Guardian	2	0	11	used 6 amps for surveys
Post Summer Surveys 1995	Guardian	5	0	0	Stored 5 amps thru winter at CRL
October 18, 1995	CRL	0	0	5	
April 8, 1996	CRL	5	2(3105-133)	7	
Spring 1996 Survey	CRL	7	0	2	transported 5 amps to Guardian on April 10, 1996
Spring 1996 Survey	Guardian	0	0	5	
Post Spring 1996 Survey	Guardian	5	0	1	used 4 amps for Spring 1996 survey
Post Spring 1996 Survey	CRL	2	0	2	
July 23, 1996	CRL	2	2(3136-123)	4	
Summer 1996 Survey	CRL	4	0	0	transported 4 amps to Guardian on Aug 2, 1996
Summer 1996 Survey	Guardian	1	0	5	as of August 2, 1996
Post Summer 1996 Survey	Guardian	5	0	1	used 4 amps for Summer 1996 Survey
Post Summer 1996 Survey	Guardian	1	0	0	transported 1 amp to CRL
Post Summer 1996 Survey	CRL	0	0	1	
June 2005 Survey	CRL	0	0	0	Disposed 1 amp in drain at CRL

C-14 DRY ACTIVE WASTE INVENTORY

I. Activity of Dry Active Waste in CRL Storage (January 16, 2008)

There are no containers of C-14 dry active waste stored in CRL Room 1045.

There are no containers of C-14 empty PPS, ampoules and standards vials stored in CRL Room 1045.

The total activity of all dry active wastes in CRL storage is **none.**

II. Activity of C-14 Dry Active Waste Disposed by Adco Services since April 1992

The total activity of CRL C-14 Dry Active Waste Disposed between 4/92 and 5/94 is reported to be **0.5 mCi.**

The total activity of CRL C-14 Dry Active Waste Disposed between 5/94 and 12/07 is reported to be **1.848 mCi.**

DATE OF SURVEY: January 16, 2008

INVENTORY SURVEY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael D. Murphy

C-14 LIQUID WASTE DISPOSAL RECORDS

1. On August 27, 1993, 57.5 gallons of C-14 liquid waste water was disposed locally via MWRD ordinance. The wastes were generated since the Spring of 1992. The total activity of materials disposed was **2.68 mCi**.

2. On April 19, 1994, 53.3 gallons of C-14 liquid waste water was disposed locally via MWRD ordinance. The wastes were generated since the August 27, 1993 C-14 disposal. The total activity of materials disposed was **3.62 mCi**.

3. On November 22, 1994, 91.3 gallons of C-14 liquid waste water was disposed locally via MWRD ordinance. The wastes were generated since the April 19, 1994 C-14 disposal. The total activity of materials disposed was **5.0 mCi**.

4. On January 6, 1995, 13.2 gallons of primary productivity samples were disposed locally via MWRD ordinance. The wastes were generated since Spring 1990. The total activity of materials disposed was **3.03 mCi.**

   Note: The total activity of C-14 Primary Productivity Samples disposed that were generated after Spring 1992 (for inventory purposes) is **1.640 mCi**.

5. On May 2, 1996, 48.8 gallons of C-14 liquid waste water was disposed locally via MWRD ordinance. The wastes were generated since November 22, 1994 C-14 disposal. The total activity of materials disposed was **3.18 mCi**.

6. On September 11, 1996, 77 gallons of C-14 liquid waste water was disposed locally via MWRD ordinance. The wastes were generated since May 2, 1996 C-14 disposal. The total activity of materials disposed was **2.66 mCi**.

7. Between April 14 and June 14, 2005, 35 gallons of C-14 liquid waste water, Primary Productivity Samples, standards and one ampoule of C-14 source was disposed locally via MWRD ordinance. The waste was generated since the spring of 1993. The total activity of materials disposed was **9.482 mCi**.

DATE OF INVENTORY: January 16, 2008

INVENTORY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael S. Murphy

C-14 LIQUID WASTES IN STORAGE (NON-SAMPLES)

There are no non-sample C-14 liquid wastes in storage at CRL.

DATE OF INVENTORY: Janaury 16, 2008

INVENTORY PERFORMED BY: Karen Fugate

Name Sign: Karen Fugate

RADIATION SAFETY OFFICER: Michael Murphy

Name Sign: Michael S. Murphy

C (14) Sources at CRL
01/16/2008

Samples (1993-2005)

SURVEY	ACTIVITY (mCi)
None	None
LIQUID WASTE	
None	None
SOLID WASTE	
Dry waste	None
C(14) AMPOULES	None
C(14) STANDARDS	None
TOTAL AT CRL	None
TOTAL AT GUARDIAN	0.00
GRAND TOTAL	None

ATTACHMENT D

07-0359 SB

FORM 540 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 630-660-9555

ORGANIZATION: US EPA REGION V

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [X] YES [ ] NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 2

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [X] NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER: NA

5. SHIPPER – NAME AND FACILITY
US EPA REG V/FOR THE ACCOUNT OF ADCO SERVICES
536 S. CLARK
CHICAGO, IL 60604

SC PERMIT: N/A

SHIPMENT NUMBER: 07-0359 SB

CONTACT: KAREN FUGATE

TELEPHONE NUMBER (Include Area Code): 630-660-9555

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

CONTACT: ADCOM EXPRESS, INC.

TELEPHONE NUMBER (Include Area Code): 708-429-1660

SIGNATURE – *Authorized carrier acknowledging waste receipt*

DATE: 12/26/07

SHIPMENT I.D. NUMBER: 61453

[ ] COLLECTOR
[ ] PROCESSOR
[X] GENERATOR TYPE (Specify) G

EPA I.D. NUMBER: ILD047267364

SHIPPING DATE: 12/26/07

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): 07-0359 SB

9. CONSIGNEE - Name and Facility Address
ADCO SERVICES, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

CONTACT: LEN WARBIANY-FACILITY MANAGER

TELEPHONE NUMBER (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: Reg DH

DATE: 12/26/07

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	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Radioactive Material, Type A Package, 7, UN2915 ERG#163	NA	NA	Solid SEALED SOURCES	~~Cd-109~~ H-3 542	Ni-63	1.3394E+04	3.6200E+02	NA	25. LBS; 1.4 FT3	07-0359-01
Radioactive Material, Type A Package, 7, UN2915 ERG#163	NA	NA	Solid SEALED SOURCE	Am-241 CD 109 541		1.1100E+03	3.0000E+01	NA	25. LBS; 1.4 FT3	07-0359-02

FOR 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.

FORM 540 (10-96)

FORM 541 ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional 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
2	m3 0.0792	kg 22.6796	NP	NP	NP	NP
	ft3 2.8000	lb 50.0000				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE	
MBq	1.4504E+04	7.4000E+03	NP	NP	NP	(kgs)	NA
mCi	3.9200E+02	2.0000E+02	NP	NP	NP	(lbs)	NA

2. MANIFEST NUMBER: 07-0359 SB

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME: US EPA REG V/FOR THE ACCO

SHIPMENT ID NUMBER: 61453

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					CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION	
5. CONTAINER IDENTIFICATION NUMBER / SC PERMIT	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/100 cm2 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
07-0359-01/NA 536 S. CLARK STREET CHICAGO, IL 60604	4	0.0396	11.3398	.0007	NP	NP	36-H	0.0396	100	SEALED SOURCES/NP	0.00	Cd-109	7.4000E+02 2.0000E+01
												H-3	7.4000E+03 2.0000E+02
												Ni-63	5.5500E+02 1.5000E+01
												Ni-63	5.5500E+02 1.5000E+01
												Ni-63	5.5500E+02 1.5000E+01
		1.4000	25.0000	.007	NP	NP		1.4000					
												Ni-63	2.9600E+02 8.0000E+00
												Ni-63	2.9600E+02 8.0000E+00
												Ni-63	2.9600E+02 8.0000E+00
												Ni-63	2.9600E+02 8.0000E+00
												Ni-63	5.5500E+02 1.5000E+01
												Ni-63	5.5500E+02 1.5000E+01
												Ni-63	5.5500E+02 1.5000E+01
												Ni-63	5.5500E+02 1.5000E+01
												Ni-63	1.8500E+02 5.0000E+00
													-------- --------
												Subtotal	1.3394E+04 3.6200E+02
													======== ========
												Total	1.3394E+04 3.6200E+02
07-0359-02/NA 536 S. CLARK STREET CHICAGO, IL 60604	4	0.0396	11.3398	.0007	NP	NP	36-H	0.0396	100	SEALED SOURCE/NP	0.00	Am-241	1.1100E+03 3.0000E+01
													-------- --------
												Subtotal	1.1100E+03 3.0000E+01
													======== ========
		1.4000	25.0000	.007	NP	NP		1.4000				Total	1.1100E+03 3.0000E+01
Shipment Totals		0.0792	22.6796										1.4504E+04 3.9200E+02
		2.8000	50.0000										

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

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass 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

Note 3: 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

FORM 541 (10-96)

07-0358L

FORM 540 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 630-660-9555

ORGANIZATION: US EPA REGION V

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [X] YES [ ] NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 12

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [X] NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER: NA

5. SHIPPER -- NAME AND FACILITY
US EPA REG V/FOR THE ACCOUNT OF ADCO SERVICES
536 S. CLARK
CHICAGO, IL 60604

SC PERMIT: N/A

SHIPMENT NUMBER: 07-0358 L

CONTACT: KAREN FUGATE

TELEPHONE NUMBER (Include Area Code): 630-660-9555

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

CONTACT: ROBERT BASSETT

TELEPHONE NUMBER (Include Area Code): 708-429-3013

SIGNATURE -- *Authorized carrier acknowledging waste receipt*

DATE: 12/26/07

SHIPMENT I.D. NUMBER: 61453

[ ] COLLECTOR
[ ] PROCESSOR
[X] GENERATOR TYPE (Specify) G

EPA I.D. NUMBER: ILD047267364

SHIPPING DATE: 12/26/07

7. FORM 540 AND 540A — PAGE 1 OF 2 PAGE(S)
FORM 541 AND 541A — 2 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 07-0358 L

9. CONSIGNEE - Name and Facility Address
ADCO SERVICES, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

CONTACT: LEN WARBIANY-FACILITY MANAGER

TELEPHONE NUMBER (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: [signature]

TITLE: Reg IH

DATE: 12/26/07

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	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		3.2560E+00	8.8000E-02	NA	15. LBS; 2.33 FT3	07-0358-01
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		2.2200E+01	6.0000E-01	NA	22. LBS; 2.33 FT3	07-0358-02
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		3.2560E+00	8.8000E-02	NA	12. LBS; 2.33 FT3	07-0358-03
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		3.2560E+00	8.8000E-02	NA	11. LBS; 2.33 FT3	07-0358-04
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		3.2560E+00	8.8000E-02	NA	8. LBS; 2.33 FT3	07-0358-05
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		1.4800E+01	4.0000E-01	NA	130. LBS; ~~7.5~~ 116 FT3 3.25	07-0358-06

FOR 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.

FORM 540 (10-96)

FORM 540A

ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER (CONTINUATION)

8. MANIFEST NUMBER (Use this number on all continuation pages) 07-0358 L

PAGE 2 OF 2 PAGES

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	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		1.4800E+01	4.0000E-01	NA	135. LBS; ~~7.5~~ 11.6 FT3	07-0358-07
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		7.7700E-01	2.1000E-02	NA	40. LBS; 2.1 FT3	07-0358-08
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		5.5500E-01	1.5000E-02	NA	45. LBS; 2.1 FT3	07-0358-09
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		1.2950E+00	3.5000E-02	NA	96. LBS; 4.1 FT3	07-0358-10
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		5.5500E-01	1.5000E-02	NA	37. LBS; 2.1 FT3	07-0358-11
DOT EXEMPT	NA	NA	Solid PAPER PLASTIC GLASS	C-14		3.7000E-01	1.0000E-02	NA	51. LBS; 2.1 FT3	07-0358-12

FORM 540A (10-96)

FORM 541 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional 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
12	m3	1.1089	kg	273.0626	NP	NP	NP	NP
	ft3	39.1500	lb	602.0000				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE	
MBq	6.8376E+01	NP	6.8376E+01	NP	NP	(kgs)	NA
mCi	1.8480E+00	NP	1.8480E+00	NP	NP	(lbs)	NA

2. MANIFEST NUMBER: 07-0358 L

3. PAGE 1 OF 2 PAGE(S)

4. SHIPPER NAME: US EPA REG V/FOR THE ACCO

SHIPMENT ID NUMBER: 61453

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		
5. CONTAINER IDENTIFICATION NUMBER / SC PERMIT	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/100 cm2 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	
07-0358-01/NA 536 S. CLARK STREET CHICAGO, IL 60604	19 2.0 CUBIC FOOT FIBER BOX	0.0660	6.8039	<.005	NP	NP	39-H	0.0660	100	PAPER PLASTIC GLASS/NP	0.00	C-14	3.2560E+00	8.8000E-02	AU
												Subtotal	3.2560E+00	8.8000E-02	
		2.3300	15.0000	<.05	NP	NP		2.3300				Total	3.2560E+00	8.8000E-02	
07-0358-02/NA 536 S. CLARK STREET CHICAGO, IL 60604	19 2.0 CUBIC FOOT FIBER BOX	0.0660	9.9790	<.005	NP	NP	39-H	0.0660	100	PAPER PLASTIC GLASS/NP	0.00	C-14	2.2200E+01	6.0000E-01	AU
												Subtotal	2.2200E+01	6.0000E-01	
		2.3300	22.0000	<.05	NP	NP		2.3300				Total	2.2200E+01	6.0000E-01	
07-0358-03/NA 536 S. CLARK STREET CHICAGO, IL 60604	19 2.0 CUBIC FOOT FIBER BOX	0.0660	5.4431	<.005	NP	NP	39-H	0.0660	100	PAPER PLASTIC GLASS/NP	0.00	C-14	3.2560E+00	8.8000E-02	AU
												Subtotal	3.2560E+00	8.8000E-02	
		2.3300	12.0000	<.05	NP	NP		2.3300				Total	3.2560E+00	8.8000E-02	
07-0358-04/NA 536 S. CLARK STREET CHICAGO, IL 60604	19 2.0 CUBIC FOOT FIBER BOX	0.0660	4.9895	<.005	NP	NP	39-H	0.0660	100	PAPER PLASTIC GLASS/NP	0.00	C-14	3.2560E+00	8.8000E-02	AU
												Subtotal	3.2560E+00	8.8000E-02	
		2.3300	11.0000	<.05	NP	NP		2.3300				Total	3.2560E+00	8.8000E-02	
07-0358-05/NA 536 S. CLARK STREET CHICAGO, IL 60604	19 2.0 CUBIC FOOT FIBER BOX	0.0660	3.6287	<.005	NP	NP	39-H	0.0660	100	PAPER PLASTIC GLASS/NP	0.00	C-14	3.2560E+00	8.8000E-02	AU
												Subtotal	3.2560E+00	8.8000E-02	
		2.3300	8.0000	<.05	NP	NP		2.3300				Total	3.2560E+00	8.8000E-02	
07-0358-06/NA 536 S. CLARK STREET CHICAGO, IL 60604	4	0.2124	58.9670	<.005	NP	NP	39-H	0.2124	100	PAPER PLASTIC GLASS/NP	0.00	C-14	1.4800E+01	4.0000E-01	AU
												Subtotal	1.4800E+01	4.0000E-01	
		7.5000	130.0000	<.05	NP	NP		7.5000				Total	1.4800E+01	4.0000E-01	

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

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass 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

Note 3: 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

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

ADCO SERVICES, INC.

2. MANIFEST NUMBER
07-0358 L

3. PAGE 2 OF 2 PAGE(S)

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER							
							PHYSICAL DESCRIPTION			14 CHEMICAL DESCRIPTION		15 RADIOLOGICAL DESCRIPTION			16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5 CONTAINER IDENTIFICATION NUMBER / SC PERMIT	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/100 cm2 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	
07-0358-07/NA 536 S. CLARK STREET CHICAGO, IL 60604	4	0.2124 7.5000	61.2350 135.0000	<0.005 <0.05	NP NP	NP NP	39-H	0.2124 7.5000	100	PAPER PLASTIC GLASS/NP	0.00	C-14 Subtotal Total	1.4800E+01 1.4800E+01 1.4800E+01	4.0000E-01 4.0000E-01 4.0000E-01	AU
07-0358-08/NA 536 S. CLARK STREET CHICAGO, IL 60604	3	0.0595 2.1000	18.1437 40.0000	<0.005 <0.05	NP NP	NP NP	39-H	0.0595 2.1000	100	PAPER PLASTIC GLASS/NP	0.00	C-14 Subtotal Total	7.7700E-01 7.7700E-01 7.7700E-01	2.1000E-02 2.1000E-02 2.1000E-02	AU
07-0358-09/NA 536 S. CLARK STREET CHICAGO, IL 60604	3	0.0595 2.1000	20.4117 45.0000	<0.005 <0.05	NP NP	NP NP	39-H	0.0595 2.1000	100	PAPER PLASTIC GLASS/NP	0.00	C-14 Subtotal Total	5.5500E-01 5.5500E-01 5.5500E-01	1.5000E-02 1.5000E-02 1.5000E-02	AU
07-0358-10/NA 536 S. CLARK STREET CHICAGO, IL 60604	3	0.1161 4.1000	43.5449 96.0000	<0.005 <0.05	NP NP	NP NP	39-H	0.1161 4.1000	100	PAPER PLASTIC GLASS/NP	0.00	C-14 Subtotal Total	1.2950E+00 1.2950E+00 1.2950E+00	3.5000E-02 3.5000E-02 3.5000E-02	AU
07-0358-11/NA 536 S. CLARK STREET CHICAGO, IL 60604	3	0.0595 2.1000	16.7829 37.0000	<0.005 <0.05	NP NP	NP NP	39-H	0.0595 2.1000	100	PAPER PLASTIC GLASS/NP	0.00	C-14 Subtotal Total	5.5500E-01 5.5500E-01 5.5500E-01	1.5000E-02 1.5000E-02 1.5000E-02	AU
07-0358-12/NA 536 S. CLARK STREET CHICAGO, IL 60604	3	0.0595 2.1000	23.1332 51.0000	<0.005 <0.05	NP NP	NP NP	39-H	0.0595 2.1000	100	PAPER PLASTIC GLASS/NP	0.00	C-14 Subtotal Total	3.7000E-01 3.7000E-01 3.7000E-01	1.0000E-02 1.0000E-02 1.0000E-02	AU
Shipment Totals		1.1089 39.1500	273.0626 602.0000										6.8376E+01	1.8480E+00	

FORM 541A (10-96)

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